

# Assessment of risk factors associated with pre-term labour in Tertiary care Hospitals, Lahore

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## ABSTRACT

**Background:** Pakistan has one of the highest rates of preterm births, nearly 16 for every 100 babies born. Around 4% of these premature babies, are at highest likelihood of death. The objective of this study was to assess association of multiple risk factors with preterm birth in Pakistani women.

**Patients and methods:** An analytical cross-sectional study was carried out in Obstetrics and Gynecology Department of Akhtar Saeed Trust Hospital and Farooq Hospital, West Wood Branch, Lahore from October 2018 to December 2019. Total 116 pregnant females who gave birth to preterm babies with gestational age between 20-37 weeks were included. Data about patients' socio-demographic profile, previous obstetric history and current gestational profile was collected using closed ended structured questionnaire. Variables were presented in the form of frequency tables. Chi-square and Fisher exact test were applied to establish association of various risk factors and preterm presentation of patients' in hospital. A p-value  $\leq 0.05$  was taken as significant.

**Results:** Out of 116 participants, 49 (42.2%) were aged between 20-25 years, 47 (40.5%) were illiterate. Of the total sample 60 (51.7%) participants were obese (BMI >30). Eighty-two (70.7%) patients were multigravida and 65 (56.1%) gave the history of previous cesarean section. Significant association was found between preterm birth and multi-parity (p=0.001), previous history of abortion (p=0.000), intrauterine death (p=0.001), infertility (p=0.04), cesarean-section (p=0.000), and inter-pregnancy interval of less than 24 months (p=0.007). Other significant factors associated with preterm labour were urinary tract infections (p=0.001), documented fever more than 101°F (p=0.000), anemia (p=0.000), singleton pregnancy (p=0.000) and cephalic fetal presentation (p=0.002), during current pregnancy.

**Conclusion:** Multi-gravidity, history of abortion, intrauterine death, previous infertility, cesarean-section, inter-pregnancy interval of less than 24 months, UTI, genital tract infection, anemia, singleton pregnancy and cephalic fetal presentation during current pregnancy were observed to be significantly associated with preterm births.

## Keywords:

Preterm birth; Risk factors; Multi-gravidity; Intrauterine death; Abortion; Cesarean-section; Anemia

## INTRODUCTION

Preterm birth refers to birth of a baby after 20<sup>th</sup> week but before 37<sup>th</sup> complete week of gestation.<sup>1</sup> Globally, preterm birth is the outcome of 5-18% of all the pregnancies.<sup>2</sup> According to World Health Organization (WHO), Pakistan has one of the highest rates of preterm births, with nearly 16 for every 100 babies born.<sup>3</sup> Premature birth is one of the leading causes of neonatal mortalities, accounting for almost 35% of all neonatal deaths worldwide.<sup>4</sup> A number of risk factors have been identified causing an increased risk of premature delivery such as maternal age less than 18 years or more than 35 years<sup>5</sup>, maternal body mass index

(BMI) during current pregnancy and inter-pregnancy interval (<6 months) are crucial in increasing the risk of preterm delivery.<sup>5-7</sup>

Low socio-economic and poor nutritional status also ground for preterm labor and birth.<sup>8</sup> According to American Pregnancy Association, women are at greatest risk of preterm labor and subsequent delivery in her future pregnancies if they had previous premature birth or second trimester abortion, history of infertility (primary/secondary) or pregnant with multiples.<sup>9</sup>

Women with history of vaginal bleed or subnormal amount of liquor (either polyhydramnios or oligohydramnios) or with fetal mal-presentation are at higher risk of suffering from premature labour and birth of baby, before 37 completed weeks of gestation.<sup>10</sup>

Maternal infections like urinary tract infection or bacterial vaginosis are strong risk factors in the chain of causation of preterm births.<sup>11</sup> Alcohol consumption and smoking either active or passive also influences the probability of preterm labor and delivery.<sup>12</sup> Also, the

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outcome of pregnancy in the form of premature labor and delivery is strongly associated with the level of antenatal care, which a woman receives during her pregnancy.<sup>13</sup>

The objective of this study was to find out association of multiple risk factors with preterm labor in Pakistani women with different physical parameters, co-morbidities, socio-demographic and gestational profiles.

## PATIENTS AND METHODS

An analytical cross-sectional study was carried out in Obstetrics and Gynecology Department of Akhtar Saeed Trust Hospital and Farooq Hospital, West Wood branch, Lahore from 15<sup>th</sup> October 2018 till 31<sup>st</sup> December 2019, after ethical approval from the institution. Using non-probability purposive sampling technique, total 116 patients, who presented to obstetric OPD or emergency labor room with spontaneous preterm labor, induction of preterm labor, emergency or elective preterm cesarean section with gestational age between 20-37 weeks, irrespective of their age and parity were included. Patients with gestational age less than 20 weeks or more than 37 weeks or not willing to participate were excluded. Data was collected using closed ended structured questionnaire. Variables included in questionnaire were maternal age, maternal education, family income, maternal BMI, parity, gestational age, co-morbidities like diabetes, hypertension, UTI and weeks of gestation at the time of presentation. Data was entered and analyzed using SPSS version 23. Chi-square and Fischer Exact Test were applied keeping 95% confidence interval and a p-value  $\leq 0.05$  was taken as significant.

## RESULTS

The socio-demographic profile showed that 49 (42.2%) patients were aged between 20-25 years and 38 (32.8 %) belonged to age group 30-35 years. Out of total, 47 (40.5 %) patients were illiterate and 104 (89.7%) were housewives. Monthly family income of 56 (48.3%) women was less than Pak Rs. 20,000. The results regarding the physical parameters of patient showed that out of 116 patients, 60 (51.7%) were obese with BMI more than 30 (Table 1).

Analysis of gestational profile of patients showed significant association between presentation of patient before 37 complete weeks of gestation and multi-gravidity ( $p=0.001$ ), inter-pregnancy interval of less than 24 months ( $p=0.007$ ), history of previous abortion ( $p=0.000$ ), history of previous intra-uterine death ( $p=0.001$ ), history of previous infertility ( $p=0.04$ ) and previous cesarean section ( $p=0.000$ ) (Table 2).

The data analysis of patient's current pregnancy profile showed that, the current pregnancy of 78 (67.2%) patients was planned whereas 38 (32.7%) patient had unplanned pregnancy.

Urinary tract infection ( $p=0.001$ ) and genital tract infections ( $p=0.000$ ) were more prevalent among women who had late/moderate preterm presentation. Documented fever of more than 101° F ( $p=0.000$ ), anemia ( $p=0.000$ ), singleton pregnancy ( $p=0.000$ ), cephalic presentation of fetus ( $p=0.002$ ) and adequate amniotic fluid ( $p=0.000$ ), during current pregnancy were significantly associated with preterm labour. Majority of the patients (78.4%) received antenatal care at a healthcare center during the course of their current pregnancy (Table 3).

Table 1. Socio-demographic profile

Characteristics	Extremely preterm (20 – 28 weeks)	Very preterm (28 – 32 weeks)	Moderate/late preterm (32 – 37 weeks)	Frequency (n = 116)	Percentage	p-value
<b>Age groups</b>						
15-20 years	0	0	8	8	6	0.741
20- 35 years	6	7	94	107	92.24	
More than 35 years	0	0	1	1	0.9	
<b>Educational status</b>						
Illiterate	1	1	45	47	40.5	0.167
Matric	3	4	31	38	32.7	
Graduate	2	2	27	31	26.7	
<b>Occupation</b>						
Housewife	6	7	91	104	89.7	0.000
Working women	0	0	12	12	10.3	
<b>Income per month of family</b>						
Less than Rs.20,000	4	3	49	56	48.3	0.840
Rs.20,000-50,000	2	4	43	49	42.2	
More than Rs.50,000	0	0	11	11	9.5	
<b>Body-mass index (BMI)</b>						
Normal (18.5-24.9)	1	0	18	19	16.4	0.356
Over-weight (25-29.9)	1	1	35	37	31.9	
Obese (more than 30)	4	6	50	60	51.7	

Table 2. Previous gestational profile

Characteristics	Extremely preterm (20 – 28 weeks)	Very preterm (28-32 weeks)	Moderate/late preterm (32 – 37 weeks)	Frequency (n = 116)	Percentage	p-value
Gravidity						
Multigravida	5	6	71	82	70.7	0.001
Primigravida	1	1	31	34	29.3	
Abortions	3	3	23	29	25	0.000
Intra-uterine deaths	0	1	3	4	3.4	0.001
Inter-pregnancy interval (n = 82, remaining primigravida)						
<24months	3	4	52	59	50	0.007
>24months	2	2	19	23	19.8	
History of infertility	2	0	7	9	7.8	0.04
History of Cesarean section	5	5	55	65	56.1	0.000

Table 3. Current pregnancy profile

Characteristics	Extremely preterm (20 – 28 weeks)	Very preterm (28 – 32 weeks)	Moderate/late preterm (32 – 37 weeks)	Frequency (n = 116)	Percentage	p-value
Current pregnancy						
Planned	4	4	70	78	67.2	0.840
Unplanned	2	3	33	38	32.7	
Pregnancy Induced Hypertension	0	2	18	20	17.2	0.390
Gestational diabetes mellitus	0	0	6	6	5.2	0.671
Antepartum hemorrhage	0	1	3	4	3.4	0.25
Urinary tract infection	6	6	41	53	45.7	0.001
Genital tract infection	5	7	99	111	95.6	0.00
Fever >101° F	5	7	94	106	91.4	0.00
Anemia	1	2	50	53	45.7	0.000
Status of current pregnancy						
Single	6	6	92	104	89.7	0.000
Twins	0	1	11	12	10.3	
Fetal presentation						
Cephalic	6	5	95	106	91.4	0.002
Breech	0	2	8	10	8.6	
Amniotic fluid						
Adequate	5	7	91	103	88.8	0.000
Oligohydramnios	1	0	11	12	10.3	
Polyhydramnios	0	0	1	1	0.9	

## DISCUSSION

Multiple risk factors have been associated with the commencement of early onset labor, worldwide.<sup>14</sup> The main purpose of this study was to find out association of various risk factors with preterm labour.

Result of this study revealed that there was no significant association between maternal age and preterm birth ( $p=0.863$ ), where majority, 42.2% of the patients were of age group 20-25 years. However, a cohort study done in Canada, has showed that advanced maternal age ( $\geq 40$  years) was strongly associated with preterm birth. The study included 32 hospitals, and its data analysis revealed that preterm birth was more prevalent in women more than 40 years of age compared to women less than 40 years ( $p$ -value = 0.01).<sup>15</sup>

Current study showed no association of maternal education and the monthly family income with premature labour and birth. Similar results were shown by another cohort study that covered 132,714 deliveries.

The study showed that percentage of preterm births was significantly higher among woman in the lowest family income group (6.1%) compared to woman who were economically privileged (5.6%).<sup>16</sup>

In this study, maximum patients (51.7 %) who delivered preterm babies, were having a BMI  $>30$  and hence were obese. Comparable results were shown in another study done in Sweden. The study highlighted that risk of extremely preterm, very preterm and late/moderate preterm deliveries and births increased with maternal BMI. The rate of preterm births, among the study participants, was 0.2% to 0.4% higher among women with BMI more than 35 as compared to women with normal BMI (18.5 -24.9).<sup>17</sup>

Current study demonstrated strong association between multi-parity and preterm presentation. Another research done in Saudi Arabia which covered 8040 deliveries, showed contrast result i.e. multi-parity is not a risk factor for preterm labor and birth in subsequent pregnancy ( $p=0.118$ ).<sup>18</sup>

Significant association of preterm labour was observed with history of any previous abortion previous intra-uterine death, history of previous infertility and previous cesarean section, in this study. These findings are in line with other study which showed that preterm deliveries and birth were more prevalent in women with bad obstetric histories.<sup>19</sup>

This study indicated strong association of premature labor and inter-pregnancy interval less than 24 months. This finding was also reflected by another study, revealing that shorter inter-pregnancy is one of the risk factors for preterm delivery and birth.<sup>20</sup> Prior studies have shown that comorbidities like pregnancy induced hypertension (PIH) and gestational diabetes mellitus (GDM) are linked to the causation of preterm births.<sup>21</sup> However, in this study no statistical association of preterm birth was found with PIH and GDM.

Current research revealed that urinary tract infection, genital tract infections and documented fever >101°F were positively correlated with preterm labor and birth. Similar pattern was observed in another study, showing significant association of bacterial vaginosis and febrile illnesses ( $p < 0.05$ ) with premature labour.<sup>22</sup>

Positive association was also observed between anemia during current pregnancy and premature births. Comparable results were shown by a meta-analysis, regarding effect of anemia on pregnancy outcome i.e., risk of preterm birth is significantly higher in anemic group.<sup>23</sup>

Singleton pregnancy was more common in the study population of this research (89.7%). However, a research done in Kenya, showed positive correlation of twin pregnancy with premature birth. Risk of preterm birth was found to be 4 folds in case of twin pregnancy compared to pregnancy with single fetus, among the studied population.<sup>24</sup>

Fetal breech presentation and prematurity had been associated in another study.<sup>25</sup> But this study showed contrasting result i.e. the association of cephalic presentation with preterm presentation of patient in obstetric department ( $p = 0.002$ ). In the current study, pregnancy outcome and amniotic fluid index (AFI) was compared. Findings indicated that preterm delivery and birth was more common among women with normal AFI as compared to women with subnormal amniotic fluid. However, another research contradicts this finding, showing incidence of preterm delivery among women with borderline AFI was considerably higher compared to women with normal AFI.<sup>26</sup>

This study was a cross-sectional survey but a better understanding of subject can be achieved by conducting case-control study. Moreover, for deeper understanding, sample size can be increased.

## CONCLUSION

Multi-gravidity, history of abortion, intrauterine death, previous infertility, cesarean section, inter-pregnancy interval of less than 24 months, UTI, genital tract infection, documented fever more than 101°F, anemia, singleton pregnancy and cephalic fetal presentation during current pregnancy are independent risk factors for preterm birth in this study.

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