

# Predisposing Factors and Outcome of Preterm Birth in a Tertiary Hospital

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## Abstract:

*Preterm birth is a challenging issue for both mother and baby, and pose major threat to newborn survival. The purpose of this study was to find out the magnitude of preterm birth, factors predisposing to preterm birth and its outcome during perinatal period.*

*This was a cross sectional study, conducted among mothers admitted with a gestational age > 28 weeks to < 37 weeks in Obstetrics and Gynae department of Institute of Child and Maternal Health (ICMH). During March-June, 2013, data was collected through face to face interview using structured questionnaire and review of hospital records. Data analysis done using SPSS version 20.*

*Among enrolled 103 women mean age was 23.3±4 years, 64% were multigravida, about 78% were late preterm (35-37 weeks). Commonest associated factor was premature rupture of membrane (53.7%). Other factors were Preeclampsia (16%), UTI (12%) and moderate anaemia (75%). Neutrophilia was found in 7.6%, urinary pus cell raised in 37% and vaginal infection was found in 7.6%. Corticosteroids was given for lung maturity to 55% and Tocolytics used in 11 % mothers. About 50% born by CS, 24% by Obstetric Forceps and 26% by spontaneous vaginal delivery. Puerperal Pyrexia was the most common postpartum complication. Delayed cry was in 66%, , 56% required admission to neonatal ward, of them 91% and 45% belong to gestation age 28-34 weeks and 35-37 weeks respectively. Perinatal death was in 2%, 24.3% had neonatal jaundice and 29 % developed septicemia*

*Preterm birth is associated with several risk factors like paternal smoking, high parity, infection and premature rupture of membrane. Change in obstetric practices in favor of early termination by caesarean section for maternal or fetal indication is also an important determining factor for preterm birth. Awareness among health professionals and public should be made for avoidance of risk factors and adoption of risk specific strategies may contribute to reduction of preterm births and its complications.*

**Key words:** Preterm birth, Predisposing factor, Neonatal mortality and morbidity

## Introduction:

Preterm labor and delivery are very challenging obstetric complications encountered by obstetricians, as are preterm neonates for the neonatologist. Preterm birth is the leading cause of neonatal morbidity and mortality and an important public health concern<sup>1, 2</sup>. Preterm birth is estimated to be a risk

factor in at least 50% of all neonatal deaths and second most common cause of under-5 deaths<sup>3</sup>.

Globally an estimated 15 million babies are born preterm that is one in 10 births<sup>4</sup>. Preterm labor is defined as the onset of labor prior to 37 completed weeks<sup>5</sup>. Preterm birth can be further sub-divided based on gestational age into extremely preterm

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(<28 weeks), very preterm (28 - <32 weeks), moderate preterm (32 - 33 completed weeks of gestation) and late preterm or near term (34-36 weeks)<sup>6, 7</sup>. Majority of preterm births (85%) occur in Asia and Sub Saharan Africa and over 80% of the global neonatal deaths annually are due to complications related to preterm birth<sup>8</sup>. Bangladesh ranked 7<sup>th</sup> among the top 10 countries for high preterm births with 19% births occurring before 37 weeks of gestation<sup>9</sup>. In a study from India incidence of preterm labor was reported as 23.3%<sup>10</sup>.

There is a rising trend of premature birth worldwide because of multiple factors. One of the primary reason for this is increased frequency of multiple births due to assisted reproductive techniques (ART)<sup>11</sup>. The other risk factors include more working mothers, increasing age of pregnancy and underlying health problems in the mother like increased psychological stress<sup>12</sup>. There is also changes in obstetric practices. Because of medically indicated labor induction and caesarean delivery, with an increase in provider-initiated preterm births in moderate and late preterm infants who would not have otherwise been born preterm<sup>13</sup>, most of the increase in iatrogenic preterm births has occurred at late preterm gestation (34-36 weeks) among high-risk pregnancies and these increase in preterm birth have been accompanied by declines in stillbirth and neonatal death rates<sup>11</sup>. With the advancement of neonatal care the benefits of preterm labour is likely to be more than the expectant management in late preterm pregnancy<sup>11</sup>

This current study was done with the objectives of exploring the socio-demographic, medical and obstetric characteristics of mothers associated with preterm birth and its immediate consequences.

#### Method:

This was a cross sectional study conducted at Obstetrics and Gynae inpatient department of Institute of Child and Mother Health between March to June 2015. Mothers with 28 to 36 weeks gestation were enrolled consecutively. Gestational age was determined from last menstrual period, clinical records and early ultra sonogram report (within 12 weeks gestation) if available. Severely moribund patients like severe Preeclampsia, shock, APH, convulsion were excluded. Data was collected through face to face interview and reviewing hospital records using structured questionnaire. Follow up

was done up to discharge from hospital. Data analysis was done using SPSS program version 20 and expressed in percentage.

#### Results:

During the study period total 103 patients were enrolled. The mean age of them was 23.3±4 years. Majority were multigravida (64%), 64% came from rural areas and 54% completed primary education (Table 1). About 78% were late preterm (35-37 weeks), a quarter of them had history of abortion, and 86% exposed to smoking by husband (Table II).

More than half of them presented with premature rupture of membrane (53.7%), 16% preeclampsia and 12% with urinary tract infection (Table III). Hemoglobin was estimated in 98 patients and 75% of them had severe anemia. Neutrophilia was detected in 44% urinary pus cells were raised in 37%, high vaginal swab C/S found positive culture in 7.6% (Table IV).

Antenatal Corticosteroid was given for lung maturity (up to 36 weeks gestation) in 55% and tocolytics used in 11% mothers (Table-5). About 50% of baby born by CS, 24% by Forceps, 26% by spontaneous vaginal delivery. Puerperal Pyrexia (85%) was the most common postpartum complication. About 32% required Blood Transfusion Table Table-VI. Table VII shows neonatal outcome. Average birth weight was 2.12 ±0.3 Kg with a range of 1.2 to 2.7 Kg. Delayed cry was in 66%, 56% required admission to neonatal ward, of them 91% and 45% belong to gestation age 28-34 weeks and 35-37 weeks respectively. Perinatal death was in 2%, 24.3% developed neonatal jaundice and 1.9% had septicemia. Table-VIII shows relationship of gestational age with some parameters. Significant relationship found between birth weight and gestational age, also birth weight and admission in NICU.

**Table-I**  
*Socio demographic and clinical characteristics*  
(n=103)

Characters	N=103 (%)	
Residence	Rural	66 (64.1)
	Urban	37 (35.9)
Education	Illiterate	22 (21.4)
	Primary	56 (54.4)
	Secondary	25 (24.3)
Gestational age	28-34 weeks	23 (22.3)
	35-37 weeks	80 (77.7)

**Table-II***Distribution according to risk factors n=103 (%)*

Parity	Primi	37 (35.9)
	Multi	66 (64.1)
Obstetric history	History of Abortion/MR	26 (25.2)
	Pre-term labor	3 (2.9)
	Stillbirth	4 (3.9)
Smoking history	Husband smoker	89 (86.4)

**Table-III***Distribution according to Predisposing factors n=103 (%)*

PROM (Premature rupture of membrane)	51 (49.5)
Pre- eclampsia	15 (14.5)
APH	3 (2.9)
Less fetal movement	5 (4.8)
Multiple pregnancy	4 (3.8)
Urinary infection	11 (10.6)
Vaginal infection	2 (1.9)

**Table-IV***Distribution according to Laboratory Investigations*

Characters	No.	N (%)
Anaemia (n=98)	Moderate (10-10.9 gm/dl)	24 (24.5)
	Severe (7-9.9 gm/dl)	74 (75.5)
TC	Normal	53 (51.5)
	Raised	50 (48.5)
DC – Neutrophil count (n=99)	Normal	55 (55.6)
	Raised	44 (44.4)
Urine R/E(Pus cell)	Normal	65 (63.1)
	Raised	38 (36.9)
Albumin (n=98)	Positive	36 (36.7)
	Null	62 (63.3)
HVS C/S growth (n=66)	Positive	5 (7.6)
	Normal	61 (92.4)

**Table-V***Distribution according to Corticosteroid and Tocolytics use*

Drugs	Number	Percentage
Corticosteroid	57	54.8
Single dose	28	26.9
Double dose	29	24.1
Tocolytics	11	10.6
Salbutamol	6	54.5
Nifedipine	4	56.3
Magnesium Sulphate	1	9.1

**Table-VI***Distribution according to maternal outcome*

Characters	N=103 (%)	
Mode of Delivery	CS	50
	Instrumental delivery (Forceps)	22
	Vaginal Delivery	31
Maternal complication (n=20)	Post partum haemorrhage	2 (10)
	Post partum pyrexia	17 (85)
	Wound infection	1 (5)
Blood transfusion (n=98)	Yes	31 (31.6)

**Table-VII**  
*Distribution according to Fetal outcome*

Character	Number (%)
Birth weight (kg) (n=103)	
LBW (1.5-2.49 kg)	83 (80.6)
VLBW (1-1.49 kg)	2 (1.9)
Normal weight ( $\geq 2.5$ kg)	18 (17.5)
Delayed cry	68 (66)
Admission in neonatal ward	57 (55.8)
Death within 7 days	2 (1.9)
Septicemia	3 (2.9)
Jaundice	25 (24.3)
Non establishment of BF	7 (6.8)
Apgar score at 1 minute (n=101) 4-7More than 7	87 (86.1) 14 (13.9)
Apgar score at 5 minute (n=100)4-7More than 7 minute	44(44)56(56)

**Table-VIII**  
*Correlation between gestational age and selected parameters*

Characters		Gestational age (N=103)		P value
		28 -34 weeks	35 -37 weeks	
Smoker	Husband	18 (78.3)	71 (88.8)	0.297
	None	5 (21.7)	9 (11.2)	
Obstetric factor (n=95)	Active labor	1 (4.3)	3 (4.2)	0.913
	APH	1 (4.3)	2 (2.8)	
	Less fetal movement	1 (4.3)	4 (5.6)	
	Multiple pregnancy	0 (0)	4 (5.6)	
	Pre- eclampsia	5 (21.7)	10 (13.9)	
	PROM	12 (52.2)	39 (54.2)	
	Urinary infection	3 (13)	8 (11.1)	
	Vaginal infection	0 (0)	2 (2.8)	
Mode of delivery	CS	10 (43.5)	40 (50)	0.241
	Instrumental delivery	3 (13)	19 (23.8)	
	NVD	10 (43.5)	21 (26.2)	
Birth weight (kg) (n=102)	LBW (1.5-2.49 kg)	22 (95.7)	61 (77.2)	0.021
	VLBW (1-1.49 kg)	1 (4.3)	1 (1.3)	
	Normal weight ( $\geq 2$ kg)	0 (0)	17 (21.5)	
Delayed cry	Yes	10 (52.6)	19 (38.8)	0.263
	No	9 (47.4)	29 (59.2)	
	Absent	0 (0)	1(2)	
Admission in neonatal ward	Yes	21 (91.3)	36 (45)	0.000
	No	2 (8.7)	44 (55)	
Hospital stay duration (days)	1-3 days	9 (39.1)	37 (46.8)	0.600
	4-7 days	14 (60.9)	41 (51.9)	
	More than 7 days	0(0)	1 (1.3)	

### Discussion:

Preterm birth is an issue of concern and various research being done to find out the contributory

factors. In a population based study from Chile preterm birth was more prevalent among mothers younger than 18 years and older than 38 years,

primipara and grand multipara<sup>14</sup>. In the current study majority was between second and third decade of life and multigravida. This is a reflection of social norm of early marriage and child bearing. In a study from Iran mean age was 28, 3±6.1 and were same with mothers of term pregnancy<sup>15</sup>

Most women in this study were residents of rural areas which is consistent with study from Tanzania. Theresia et. al<sup>16</sup> who has shown that women who live in rural areas during pregnancy are 5% more likely to have preterm delivery. This may be due to more likelihood of engaging in hard physical activity in rural areas and limited accessibility to health facilities for prevention of Preterm birth<sup>16</sup>.

Among the risk factors multiparity, premature rupture membrane, APH, preeclampsia were prevalent in the current study. In a study from Tanzania it was found that PIH was seven fold more likely to have preterm birth<sup>16</sup>. It is described that hypertensive disease decrease uteroplacental blood flow leading to intrauterine growth retardation that cause preterm delivery. In a study from India 14.4% reported to have history of preterm delivery and a similar proportion had history of abortion<sup>10</sup>. The EPIPAGE study showed women with history of induced abortion is at higher risk of Preterm labour<sup>17</sup>. Majority of Premature labour were late preterm which is consistent with a community based research in Bangladesh<sup>18</sup>.

History of preterm birth is an important risk factor for recurrence of preterm delivery. Study has shown an odd ratio of approximately 3 for recurrence of preterm labour<sup>19, 20</sup> Scharf et.al. reported that risk of subsequent twin preterm birth is significantly increased after a previous preterm singleton delivery than previous term singleton delivery<sup>21</sup>. In the current study history of preterm labour was found in about 3% cases. This might be an under reported figure resulting from delay in availing antenatal care so that appropriate dating of pregnancy is often missed.

There is evidence that Sexual Intercourse during the previous week, multiparity, short interval from last delivery, preeclampsia, fetal anomaly, rupture of membranes, hypertension, and amniotic fluid leak, respectively were risk factors for preterm labor. On the other hand, iron consumption, cephalic presentation, systemic disease, history of caesarean section, prenatal care, and optimum maternal weight could be considered as protective factors<sup>15</sup>. Some

studies have demonstrated that adequate utilization of pre-natal care is accompanied with improved birth weights and lower risk of preterm birth<sup>22</sup>.

Lockwood CJ estimated 50% of spontaneous preterm births are associated with ascending genital tract infection and those occurring before 30 weeks gestation are even more likely to be infection-related<sup>23</sup>. The incidence of histologic chorioamnionitis was found more with lower gestational age<sup>24</sup>. The significance of intrauterine infection lies not only in its contribution to the overall problem of preterm birth, but also in its unique neonatal sequelae. In the short term, very low birthweight infants born to mothers with clinical chorioamnionitis have twofold to threefold higher rates of respiratory distress syndrome, sepsis, and seizures compared with infants of similar birthweight born to uninfected mothers<sup>24</sup>. Intrauterine infection have 2 to 3 fold higher risk of respiratory distress syndrome in preterm infants<sup>24</sup>.

Urinary tract infections, malaria, bacterial vaginosis, HIV and syphilis are all associated with increased risk of preterm birth. In a study, presence of bacterial vaginosis at 28 weeks gestation was associated with an increased risk of spontaneous preterm birth<sup>25</sup> In the current study there was very limited scope of investigation facility, that may be a reason for infrequent diagnosis of infection in both mother and baby.

Smoking has been linked to preterm labor, and in this study majority of husbands were smokers. Smoking and excessive alcohol consumption as well as periodontal disease have been associated with increased risk of preterm birth<sup>26</sup>. In a meta analysis Cui et. al found that passive maternal smoking is associated with an increased risk of preterm birth<sup>27</sup>. Study from Indonesia showed that Smoking was associated with a decrease in the gestational age and an increased risk of preterm birth<sup>28</sup>. Maternal age, parity, previous preterm birth, multiple gestation, pregnancy induced hypertension, antepartum hemorrhage, prolonged prelabor rupture of membranes and urinary tract infections were significantly associated with preterm birth which is consistent with other studies.<sup>8</sup>.

Preterm rupture of membranes and infection were the common association of preterm labour consistent with other studies. Caesarean section was more in preterm labour >34 weeks than <34 weeks but



difference was not significant statistically (Table 8). However, this could be due to more liberal use of caesarean section in favour of better neonatal survival in late PML for obstetric indication like PROM.

A study from Bangladesh revealed a downward trend in preterm births in a rural setting, from 29% in 1990–1994 to 11% in 2010–2014<sup>29</sup>. One-quarter of this reduction in the proportion of preterm births was attributed to the decrease in parity and the rapid expansion of girls' education across this time period<sup>29</sup>. The UN declared Sustainable Development Goals (SDG) target aims to reduce neonatal mortality to at least as low as 12 deaths per 1,000 live births by 2030 which is achievable by reducing preterm births. Addressing the sociodemographic and obstetric risk factors through appropriate interventions can contribute towards reduction of preterm births.

#### Conclusion:

Preterm birth is quite common and complex problem and puts heavy pressure on hospital services as well as on the family. Multiparity, paternal smoking, infection, previous preterm birth, abortion and premature rupture of membrane were found to be common risk factors. Creating awareness among health professionals and public for reduction of avoidable risk factors and taking appropriate measures to address preterm birth is recommended.

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