

Research Article

Preterm Births, Frequency and Risk Factor Profile at Tertiary Care Hospital

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ABSTRACT

Objective: Over the last 20 years, preterm birth (PTB) rates have risen steadily and alarmingly. In 2022, approximately 2.3 million newborns died globally within the first 28 days of life, highlighting the critical vulnerability of this early period. Pakistan has the highest neonatal mortality rate 37.6 deaths per 1,000 live births in 2023. Research identifies several contributing factors, including prematurity-related complications, birth defects, low vaccination coverage, unsafe deliveries, poor breastfeeding practices, SIDS, poverty, and an under-resourced healthcare system.

Study Design: To see the frequency in our setup and risk factors for prematurity.

Methodology: This descriptive cross-sectional study was conducted at Imran Idrees Teaching Hospital from 21st March to 31st August 2025. A total of 221 patients fulfilling were enrolled. A pre-designed, structured proforma was used for data collection.

Results: There were 85 (38.4%) preterms, among them 48 (56.5%) males and 37 (43.5%) females. Overall, hypertensive disorders and oligohydramnios were the predominant risk factors among females, with a low contribution of diabetes. Hypertension and oligohydramnios were common in both sexes; however, isolated hypertension in 7 cases (15.9%) and oligohydramnios in 7 (15.9%) were more frequent among females, whereas combined diabetes and hypertension in 2 cases (3.6%) were relatively more common in males.

Conclusion: Preterm birth affected 38.4% of deliveries, with a slight male predominance while hypertensive disorders and oligohydramnios were the leading risk factors overall, females showed a higher frequency of these complications.

Keywords: Hypertension, Diabetes, Preterm Births, Oligohydramnios.

INTRODUCTION

Preterm birth (PTB), defined by the World Health Organization as delivery before 37 completed weeks of gestation¹, remains a major global health concern² and is the leading cause of death in children under five.³ Globally, approximately 15 million babies are born preterm each year⁴, with about 10.6% of all live births falling into this category. Of these, 85% occur between 32-36 weeks, 10% between 28-31 weeks, and 5% -classified as extremely preterm before 28 weeks.⁵

Preterm birth can result from spontaneous preterm labor (50%), preterm premature rupture of membranes (30%), or (20%) have no identifiable cause.⁶ Risk factors include gestational diabetes mellitus (GDM)⁷, pregnancy-induced hypertension (PIH), and

fetal anomalies.⁸ Male infants are particularly vulnerable to complications related to prematurity.⁹

Preterm infants face a range of immediate health issues due to organ immaturity, including respiratory distress, feeding difficulties, poor thermo-regulation, and a heightened susceptibility to infections.¹⁰ Those born extremely preterm are at higher risk for serious complications such as bronchopulmonary dysplasia (BPD), intraventricular hemorrhage (IVH), necrotizing enterocolitis (NEC), white matter injury (WMI), sepsis, and retinopathy of prematurity (ROP).¹¹ These conditions often lead to long-term morbidities including cerebral palsy, cognitive delays, impaired motor function, and visual and auditory deficits.¹²

Developmentally, preterm children are more likely to experience learning disabilities, attention deficits, and language delays such as reduced word production, shorter utterances, and poorer grammar and reading skills, when compared to their full-term peers. These difficulties often persist into school age and may begin as early as infancy with lower syllable production and limited speech imitation. Very low birth weight (VLBW) infants, defined as those under 1500 grams, are particularly at risk for these developmental impairments.¹³

Despite advances in neonatal care improving survival rates, preterm birth still poses a substantial burden on healthcare systems. Prolonged stay in Neonatal Intensive Care Units (NICU) is common, often resulting in disrupted parent-infant bonding¹⁴ and high economic costs.¹⁵ Early medical interventions, including the use of corticosteroids for lung development and magnesium sulfate for neuroprotection, have shown benefit. Involvement of pediatric and neonatal specialists from the prenatal period through postnatal care is essential for improving outcomes.¹⁶

The psycho-social impact on families is significant. The need for intensive care, frequent medical follow-ups, and potential long-term disabilities can lead to emotional stress, financial hardship, and disruptions in family dynamics. The study is designed to see frequency in our setup and risk factors for prematurity so that effective and cost-effective measures can be implemented to reduce preterm births and neonatal morbidity and mortality.

MATERIALS AND METHODS

A cross-sectional descriptive study was carried out on patients of Imran Idrees Teaching Hospital from 21st March to 31st August 2025. A total of 221 patients fulfilling were enrolled. Stillbirths, unsure gestational age and who didn't give informed consent were excluded from study. The babies born less than 37 completed weeks of gestation were considered preterm. Approval was taken from ethical committee. Informed consent was taken from all participants. A pre-designed, structured proforma was used for data collection. It included maternal demographic and obstetric details, antenatal and intrapartum risk factors, mode and indication of delivery, and detailed neonatal information such as gestational age, birth weight categories, immediate neonatal course, morbidity during hospital stay, and final outcomes. This facilitated standardized

assessment and comparison of preterm neonates. Data was analyzed by using SPSS-25.

RESULTS

There were 85 (38.4%) were preterm (<37 weeks gestation). Among the preterm neonates, 48 (56.5%) were males and 37 (43.5%) were females, yielding a male-to-female ratio of approximately 1.3:1. With respect to growth status, 49/85 (58%) preterm neonates were appropriate for gestational age, 34/85 (40%) were small for gestational age, and only 2/85 (2%) were classified as large for gestational age (Tables 1-2).

In terms of absolute birth weight, 69/85 (81.2%) preterm neonates had a birth weight ≥ 1500 g, 13/85 (15.3%) were very low birth weight, and 3/85 (3.5%) were extremely low birth weight. Of the 85 preterm neonates, 41/85 (48.3%) required admission to the neonatal intensive care unit, while 5/85 (5.9%) neonatal deaths were recorded (Table 3, Fig. 1).

Maternal hypertension emerged as a significant factor associated with preterm delivery, with hypertensive mothers having a 1.48-fold (48%) increased likelihood of delivering prematurely compared to non-hypertensive mothers. Maternal diabetes was also associated with preterm birth; however, diabetic mothers had a 0.70-fold (30%) reduced likelihood of premature delivery compared to non-diabetic mothers (Table 4).

Overall, 199/221 (90.04%) of total hospital deliveries were conducted by cesarean section, whereas 22/221 (9.96%) were normal vaginal deliveries. Among preterm female neonates, maternal hypertension was present in 7 cases (15.9%), while 1 mother (2.3%) had both hypertension and diabetes (Table 5).

Oligohydramnios was observed in 7 cases (15.9%), and 1 case (2.3%) had coexisting oligohydramnios and hypertension. Overall, hypertensive disorders and oligohydramnios were the predominant risk factors among females, with a low contribution of diabetes. In preterm male neonates, hypertension alone was observed in 2 cases (3.6%), while oligohydramnios was noted in 3 cases (5.4%) [Table 6].

Additionally, 2 mothers (3.6%) had combined gestational diabetes mellitus and hypertension, indicating a higher prevalence of metabolic-hypertensive comorbidity in the male group.

Hypertension and oligohydramnios were common in both sexes; however, isolated hypertension (7 cases with 15.9%) and oligohydramnios (7 with 15.9%) were more

frequent among females, whereas combined diabetes and hypertension (2 cases (3.6%) were relatively more common in males.

Table 1: mode of delivery of total and preterm births (n=221)

Delivery Method	No.	%
C-Section	199	90.05
Normal Delivery	22	9.95

Table 2: Association of birth weight with prematurity (n = 85)

Birth weight (kg)	26-32 weeks (n=85)	33-36 weeks (n=85)	Total
0.1 -1.49	9 (10.6%)	6 (7.1%)	15 (17.6%)
1.5-1.99	8 (9.4%)	7 (8.2%)	15 (17.6%)
2.00-2.49	5 (5.9%)	17 (20.0%)	22 (25.9%)
≥2.50	2 (2.4%)	29 (34.1%)	31 (36.5%)
Total	24 (28.2%)	59 (69.4%)	85 (100%)

Table 3: The mean birth weight was 2.41 in our study (+/-0.78kg)

Location in Growth Chart	Gestational Age (weeks)		Percent (n=85)
	26-32 (n=16)	33-36 (n=69)	
SGA	11 (68.7%)	17 (24.6%)	28 (33%)
AGA	5 (31.3%)	49 (71.0%)	54 (63.5%)
LGA	-	3 (4.4%)	3 (3.5%)

Table 4: Maternal hypertension and premature labor (n=221)

Variable	Hypertension	No Hypertension
Preterm	12 (5.4%)	73 (33%)
Term	10 (4.5%)	126 (57.1%)

Table 5: Maternal diabetes and premature labor (n=221)

Variable	Gestational Diabetes mellitus	No Gestational Diabetes Mellitus
Preterm	3 (1.1%)	82 (37%)
Term	8 (3.9%)	128 (57.9%)

Table 6: Maternal hypertension, diabetes and premature labor

Variable	Gestational Diabetes Mellitus + Hypertension	No Gestational Diabetes Mellitus + No Hypertension
Preterm	3 (1.3%)	73 (33%)
Term	4 (1.8%)	141 (63.9%)

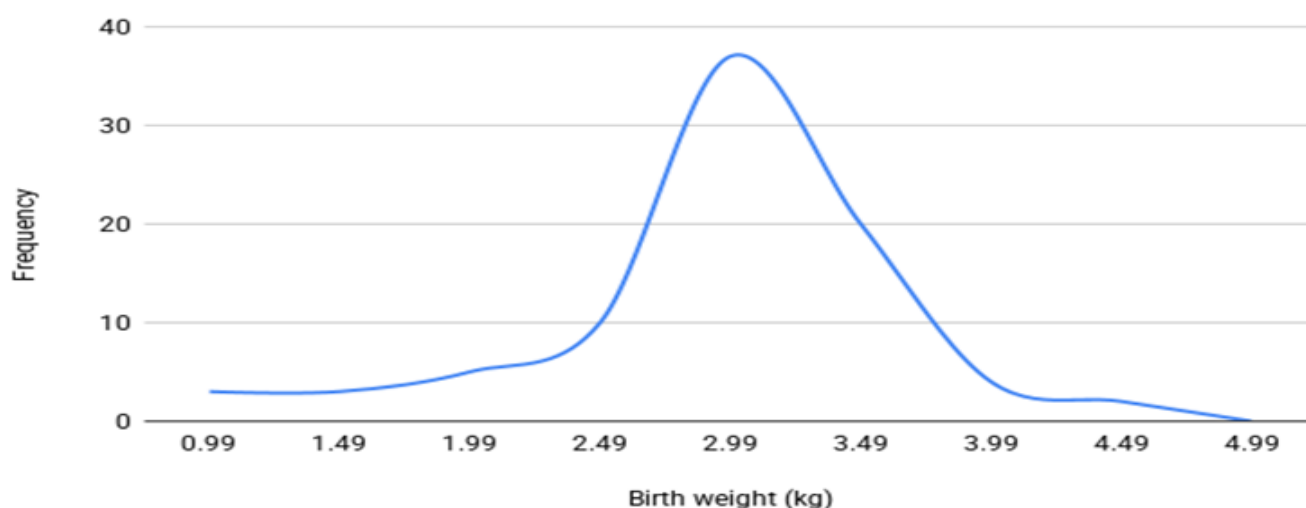


Fig. 1: Association of Birth Weight (according to Growth Chart) with prematurity (Relative risk: 1.48)

DISCUSSION

Over the past decade, there has been no measurable change in global preterm birth rates. This stagnation persists despite availability of better health care facilities, improvement in antenatal care and increased attention to routine health information systems. There are significant geographical variations in infant mortality rates.¹⁵ Preterm birth and low birth weight are major contributors to infant mortality.¹⁶

In this study, 35% of neonates were low birth weight (LBW; <2.5 kg) with a mean birth weight of 2.41 ± 0.78 kg, similar to South Asia's LBW prevalence (28%) and higher than the global average of 15-20%. According to international study female neonates had slightly higher LBW rates than males (16.7% vs 14.7%), and LBW was more common in preterm infants (23.6% vs 14.5%), consistent with findings from India (LBW 30-32%) and other developing countries.¹⁷ In the present study, more males 48 (56.5%) were affected. The overall infant mortality is higher in our study was (5.5%), comparable with Pakistan's national under-five mortality of 65.2/1,000, nearly double the global average (37/1000).¹⁸

Chronic conditions such as hypertension and diabetes are becoming increasingly prevalent, with a notable rise in cases where both conditions coexist. The adverse impact of each of these diseases on pregnancy outcomes is well established in Pakistan, noncommunicable diseases (NCDs) account for 74% of deaths and significantly affect pregnancy. Both diabetes mellitus and hypertension were significantly associated with preterm birth. Women with type 2 diabetes had 2.5 times higher odds of preterm delivery whereas those with hypertension had 1.5 times higher odds.¹⁹

The rate of preterm birth was 35% in women with both chronic hypertension and gestational diabetes, compared to 25% in those with chronic hypertension alone and 19.4% in those with gestational diabetes alone.²⁰ Our study showed 3.6% more chance of preterm births in pregnancies complicated by combined diabetes and Hypertensive disorders showed a strong association with preterm birth. International study showed 25% increased incidence of preterm births in hypertensive mothers. In a study conducted in Pakistan, 45.6% of preeclamptic women delivered preterm.²¹ Our study showed pre pregnancy hypertension, especially with preeclampsia, carries the highest risk of preterm birth (aRR 4.5) and SGA infants

Pre-pregnancy hypertension has been associated with the highest risk of preterm birth, particularly when complicated by preeclampsia (adjusted relative risk [aRR] 4.5), and is also linked to preterm birth with small-for-gestational-age (SGA) infants. In contrast, pre-pregnancy diabetes is primarily associated with an increased risk of preterm birth involving large-for-gestational-age (LGA) infants.

International study showed 17.7% more risk of preterm births with Diabetes in mothers.²² A study conducted in Pakistan shows women with gestational diabetes mellitus (GDM) had higher risks of preterm labor (26.8% vs 15.2%) and postpartum hemorrhage (10.9% vs 2.9%), while PGDM increased NICU admissions (47.8% vs 37.0%).²³

CONCLUSION

Preterm birth is highly prevalent accounting for 38.4% of all deliveries in our set up. The most prevalent maternal risk factors linked to preterm birth were hypertensive disorders of pregnancy and oligohydramnios, whereas diabetes had a lesser impact. These results underscore the necessity for early detection and effective management of maternal hypertension and amniotic fluid issues during antenatal care to mitigate the incidence of prematurity and its related neonatal complications. Enhancing maternal health services and implementing targeted, risk-based interventions could lead to better pregnancy outcomes.

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