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Prevalence of complications associated with premature births in Khyber Pakhtunkhwa

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Abstract---Objectives: This cross-sectional study was executed in three districts of Khyber Pakhtunkhwa (Abbottabad, Peshawar and Charsada), from April 2021 to January 2023, to determine the complications associated with premature births. Methods: The study comprised 339 preterm infants, including 175 male and 164 female infants. All the demographic features of the mother for assessment of the potential risk factors for preterm births along with the initial fetal weights were recorded in the delivery room, and the complications of preterm births were also recorded. Results: Maternal demographic features revealed that a significant proportion of women ($p < 0.05$) pertained to age group of 30-40 years (42.18%), subsequently 20-30 years (31.56%), below 20 years (17.99%) and above 40 years (8.25%). A significant number of women who gave birth to premature babies ($p < 0.05$) were in their Multiparous phase (82.01%) and sixty-one women were in their Primiparous stage (17.99%). Most of the women were emaciated ($p < 0.05$) and had poor health status (59.58%), while,

12.38% had moderate health. It was evident from the findings that there was a non-significant correlation among the gestational groups ($p \geq 0.05$), in which a maximum number of patients were lying in very mature infants (56.63%), followed by moderately premature (28.90%) and extremely preterm (14.45%). Conclusion: It was concluded that prenatal care and obstetric complications were significantly associated with preterm births and mothers with chronic diseases had a greater ($p < 0.01$) prevalence of BDs.

Keywords---Birth complications, Birth defect, Multiparous, Prenatal care, Preterm deliveries.

Introduction

A preterm birth (PTB) is the birth occurring before 37 weeks or 259 days of gestation. Very preterm infants are born before 32 weeks of gestation, and extremely preterm infants are those born before 28 weeks of gestation, while late preterm refers to a birth after 34-36 weeks of the pregnancy. Preterm birth may consequence from spontaneous labor with integral membranes, premature rupture of membranes, cesarean delivery owing to maternal or fetal etiology, or stimulation of labor. Preterm labor is illustrated through uterine contractions happening extra frequently than once every 10 minutes and loss of vaginal fluids, before 37 weeks. Premature newborns are at a larger risk for developmental delays, cerebral palsy, and hearing and visual problems ¹.

Numerous motherly risk factors are connected amid preterm birth, *i.e.* deficient visits for antenatal-care, maternal age, gestational hypertension, nutritional status, obstetric difficulties, maternal infection, low birth weight, hormonal imbalance and history of abortion. Additionally, urinary tract infections and vaginitis are significant risk factors for premature birth. Increased fetal fibronectin concentrations and short-length cervix are strapping markers of spontaneous PTB. It is a prominent ground for infant morbidity and considerably elevated prenatal mortality. Even while premature babies can live, they have major long-term health issues, including possible impact on fetus's overall health, delayed neurodevelopment, cognitive traits, behavioral traits, and significant gastrointestinal and respiratory disorders ²⁻⁴.

Approximately 9 million infants die throughout the perinatal and neonatal stages. Developing nations account for nearly 98% of this mortality and Pakistan is ranked at fourth number of preterm births. In Pakistan, infant mortality rate is 42/1000 live births ⁵. Therefore, this study was conducted to estimate prevalence of complications associated with premature births in Khyber Pakhtunkhwa, Pakistan.

Materials and Methods

Study Location

From April 2021 to January 2023, research was undertaken at neonatology departments of tertiary care hospitals in three districts of Khyber Pakhtunkhwa *viz* Abbottabad, Peshawar and Charsada. The sample comprised all preterm infants of all sexes who were admitted during the study period.

Inclusion and Exclusion Criteria

All premature infants (n=339) of both different sexes, who were born before 37 weeks gestation were considered as inclusion criteria and the exclusion criterion was dysmorphic facial features of the infants.

Study Design

All the demographic features of the mother for assessment of the potential risk factors for preterm births along with the initial fetal weights were recorded in the delivery room, soon after parturition. Based on gestational age, infants were classified into three categories; extremely preterm (born before 28 weeks of gestation), very premature infants (born between 29 and 33 weeks) and moderately premature infants (born between 34 and 37 weeks of gestation).

Statistical Analysis

All the complications found in fetuses after birth were recorded to determine their prevalence and collected data was compiled in MS Excel sheets, computed and statistically analyzed using the Chi-square test and ANOVA test including Tukey, among the treatment groups at the significance of p at less than 0.05.

Results

A cross-sectional study was conducted in three districts of Khyber Pakhtunkhwa, at the neonatology departments of tertiary care hospitals to determine the prevalence of complications associated with preterm births. The study included 339 preterm infants, including 175 male and 164 female infants. Their maternal demographic features revealed that a significant proportion of the women ($p < 0.05$) belonged to 30-40 years age (42.18%), subsequently 20-30 years (31.56%), below 20 years (17.99%) and above 40 years (8.25%). A significant number of women who gave birth to premature babies ($p < 0.05$) were in their Multiparous phase (82.01%) and sixty-one women were in their Primiparous stage (17.99%). The health status of the females was evaluated and it was found that most of them were emaciated ($p < 0.05$) and had poor health status (59.58%), 12.38% had moderate health and 28.02% of the females were healthy (Table 1). Maternal and fetal risk factors were analyzed for preterm delivery and it was found that a significant proportion of women ($p < 0.05$) lacked prospects to visit antenatal care centers (29.79%), subsequently gestational hypertension (21.23%), 2.5 Kg or less birth weight (15.92%), obstetric impenetrabilities and complexities (14.45%) and 3.83% of ladies revealed abortion history (Table 2).

The fetuses were categorized into three groups, based on their maternal gestational length *i.e.* extremely preterm (<28 weeks), very premature fetuses (29-33 weeks) and moderately mature infants (34-37 weeks), and it was evident from the findings that there was a non-significant correlation among former gestational groups ($p \geq 0.05$), in which a maximum number of patients were lying in very mature infant stage (56.63%), followed by moderately premature (28.90%) and extremely preterm (14.45%) (Table 3). Among the complications associated with preterm births, the most common were heart defects, pre-eclampsia, digestive disturbances, nervous disturbances, and respiratory and renal disturbances found in the children and some of these abnormalities were fatal and resulted in the death of 78 infants out of 339 (23.00% death rate) (Figure 1).

Table 1: Analysis of maternal demographic parameters

S. No	Demographic Parameters	Number of subjects (n)	Frequency (%)	p-value
1	Maternal Age (Years)			0.00001*
	<20	61	17.99	
	20-30	107	31.56	
	30-40	143	42.18	
	40-50	28	8.25	
2	Parity			0.00001*
	Primiparous	61	17.99	
	Multiparous	278	82.01	
3	Health Status			0.00001*
	Emaciated	202	59.58	
	Moderate	42	12.38	
	Healthy	95	28.02	

*indicated that the values were significant at $p < 0.05$

Table 2: Analysis of maternal and fetal risk factors for preterm deliverance

S. No	Risk Factors	Number (n)	Frequency (%)	p-value
1	Lack of antenatal care visits	101	29.79	0.00001*
2	Obstetric difficulties	49	14.45	
3	Gestational hypertension	72	21.23	
4	Birth weight <2.5 Kg	54	15.92	
5	History of abortion	13	3.83	

*indicated that the values were significant at $p < 0.05$

Table 3: Fetal categorization based on their maternal gestation stage

S. No	Patients Classification	Gestational Stage	Male infants	Female infants	Total n(%)	p-value
1	Extremely preterm	Before 28 weeks	19	30	49 (14.45)	0.2664
2	Very premature infants	Between 29-33 weeks	103	89	192 (56.63)	0.4612
3	moderately premature infants	Between 34-37 weeks	53	45	98 (28.90)	0.5917

All the values were non-significant at $p < 0.05$

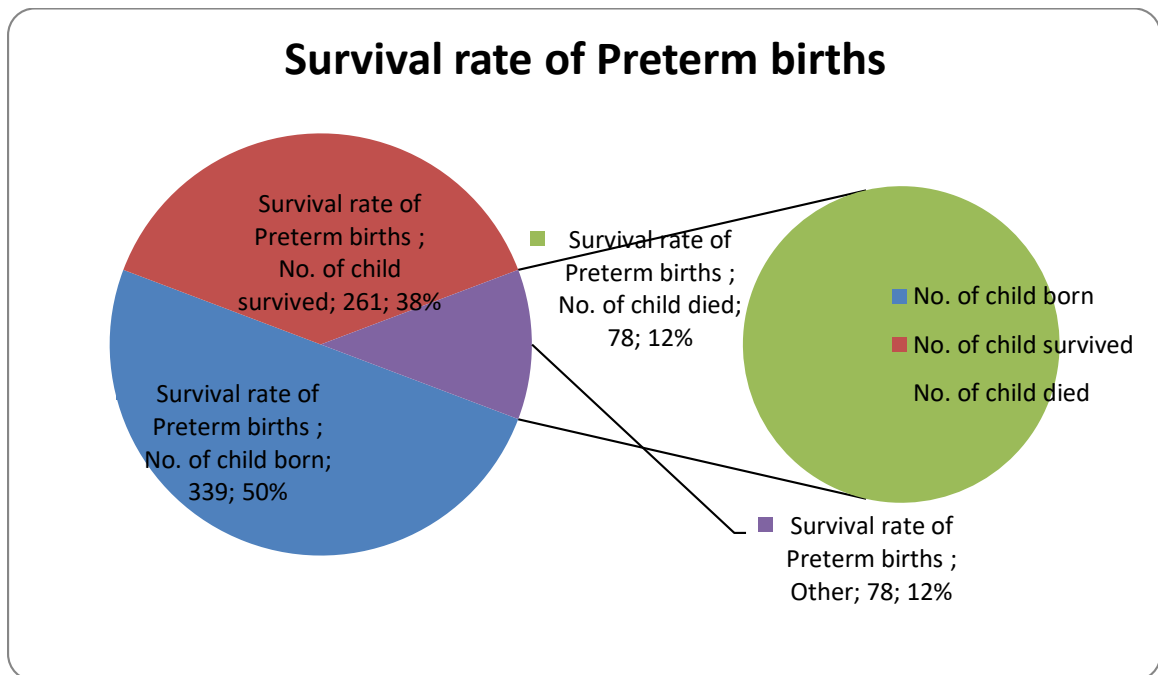


Figure 1: Graph showing the survival rate of preterm births

Discussion

Regardless of the cause of prematurity, the infant, the survival rate of premature babies admitted to a tertiary care hospital, their families and health care systems bear a tremendous burden. Dependent on the severity of prematurity and the development of multiple health problems, preterm infants' most significant concern is their lengthy hospitalization. The major cause of neonatal mortality is prematurity⁵. Each year, 0.29 (Millions) neonates expired within 4 weeks of birth owing to birth defects (BDs). BDs contributed to enduring impairment having substantial influences on community, their folks, societies and health departments. A study found that BDs were prevalent in Taiwan (2.72%), 2.5% in Europe and 3% in United States. According to WHO, overall prevalence lies between 4 and 6 percent⁶⁻⁸.

A detailed investigation was carried out on the maternal risk factors associated with preterm labor. It was found that African sub-Saharan and South Asian countries accounted for 60% world's preterm births. Seventy of 499 neonates were identified as clinical cases and 429 served as controls. Ultrasound monitoring, satisfactory prenatal care, mothers' urinalysis, hemoglobin measurement, iron+folic acid supplements, tetanus toxoid vaccination and measuring BP in pregnancy and use of a partograph in labor, such elements significantly abridged risk for premature births. Preterm birth rates were significantly affected by antenatal care utilisation, partograph use, obstetrical complexities and prior history of untimely delivery or preeclampsia ⁴. Similar to our findings, there were more male than female preterm infants. Among 61 premature female infants (72.13%) survived and 27.86% of them died, whereas among 69 premature male infants, (71.01%) survived and 28.98% died. This male dominance was also reported in male to female ratio of 1.21:1, which is consistent with our results ⁹⁻¹¹.

Conclusion

Pre-eclampsia, stillbirth, placental abruption, and neonatal death, were associated with a substantially increased risk of subsequent preterm delivery. Our findings revealed substantially elevated premature births. Preterm-births can be checked by recognizing maternal risk factors that may be prevented to control such complications. The research emphasized significance of prenatal care and obstetric complexities in preterm birth. Survival rate of pre-mature babies was high (76.99%) than the mortality rate of 28.98%. Mothers with chronic diseases had inclined ($p < 0.01$) prevalence of BDs. To reduce the incidence of prematurity, fetal, maternal and social risk factors leading to premature birth should be screened out.

Conflict of Interest

None.

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