Prevalence and Characteristics of Preterm Deliveries at Salmaniya Medical Complex

Bushra Qayyum MBBS, FCPS (Pak), MRCOG (U.K)* Arjumand Bano Qamaruddin MD** Saadia Haroon MBBS, MRCOG (U.K)***

ABSTRACT

Background: A significant contributor to infant morbidity and mortality is preterm delivery, which is defined as delivery prior to 37 weeks of completed gestation (259 days). The purpose of this research was to identify risk factors for preterm delivery and the frequency with which it occurs.

Methodology: The Salmaniya Medical Complex in the Kingdom of Bahrain was the site of a cross-sectional study that lasted from January 2019 through June 2019. The study's sample size was 1,289 people. The study included all pregnant women who gave birth after the 20th week of gestation during that time. We did not include patients who were discharged or transferred to another hospital prior to delivery. During the analysis, the data was found. A significance level was established with a p-value lower than 0.05, and a 95% confidence interval was computed.

Results: The current study's findings indicated that the rate of preterm birth was 205 and 1084, and there was no discernible relationship between preterm birth and mother age. Neonatal weight and gestational age showed significant difference in relation to preterm birth. Frequency of preterm birth was significantly higher among multigravida women. i.e. (p-value=0.018). Nulliparous women had significantly higher frequency of preterm birth as compared to primi-parous and multiparous women. i.e. (p-value=0031) Spontaneous delivery was significantly higher among women without preterm birth. i.e. Preterm birth (Yes:92.7% vs. No:98.5%, p-value<0.001). Rate of antenatal complications was significant higher among women who had preterm delivery. i.e. p-value<0.001. The antenatal complications among women were PROM, PIH, GDM and APH respectively. Maternal complications were seen in 18(8.8%) mother with preterm delivery (the most frequent maternal complication was hypothyroidism followed by diabetes, cardiac disease and asthma) and among 87(7.5%) mothers without preterm delivery (the most frequent maternal complication was hypothyroidism followed by diabetes, infective disease, cardiac disease, hypertension and renal disease respectively) (OR=1.192, p-value=0.519).

Conclusion: Preterm birth is a notable issue among women who give birth at Salmaniya Medical Complex in the country of Bahrain. Extended gestational diabetes mellitus (GDM), premature rupture of membranes (PROM), pregnancy-induced hypertension (PIH), and antepartum haemorrhage (APH) are distinct factors that contribute to preterm birth. Improving the management of these obstetric difficulties and doing research to understand the mechanisms through which they contribute to premature delivery provide a viable strategy for reducing the high rates of preterm birth.

Keywords: Prevalence, Preterm, Pregnancy.

INTRODUCTION

Preterm birth, which refers to the delivery of a baby before 37 weeks of completed gestation (259 days), is a significant contributor to health problems and death in newborns. Despite thorough investigation, preterm delivery continues to represent 5-10% of all births in affluent nations, and the rates are rising. Although the death rate linked to preterm delivery has decreased as a result of the use of prenatal steroids and advancements in newborn intensive care, preterm infants continue to be vulnerable to significant problems. The conditions encompass respiratory distress syndrome, necrotizing enterocolitis, retinopathy of prematurity, sepsis, intraventricular haemorrhage, periventricular leukomalacia, as well as long-term cognitive and sensory impairment.

* Specialty doctor
  Obstetrics and Gynaecology
  Royal Bolton Hospital.
  United Kingdom.
  E-mail: Bushra.qayyum@gmail.com
** Senior Resident
  Salmaniya Medical Complex
  Kingdom of bahrain
  E-mail: Dr.Bano88@gmail.com
*** Specialist
  Obstetrics and Gynaecology
  Royal Bahrain Hospital
  Kingdom of Bahrain
  E-mail: Saadiadiwan@hotmail.com

Gestation at delivery and birthweight are two primary factors that significantly impact the death and morbidity rates of preterm infants. The occurrence of premature births has substantial financial repercussions for both healthcare systems and society as a whole. The occurrence of preterm birth is influenced by several factors. (1). The study presents worldwide and local assessments of the frequency of preterm birth. The statistics are concerning. In 2005, a total of 13 million infants were born prematurely around the globe, with Africa and Asia accounting for 85% of these births, which amounts to 11 million. Africa, North America, and Asia had the highest prevalence of preterm birth, with rates of 11.9%, 10.6%, and 9.1% respectively. When reliable trend data is accessible, it appears that the number of preterm births is similarly on the rise. In the United States, the incidence of preterm birth has risen by 35% over the last 25 years, mostly due to the increased utilisation of assisted reproductive technology.(2) Approximately 75% of births are the result of spontaneous premature labour, while the remaining cases are due to interventions for maternal and foetal illnesses that pose a risk to the mother or foetus, such as preeclampsia, foetal growth restriction, maternal diabetes, placenta previa, or placental abruption.(3) Preterm delivery is often associated with considerable morbidity, mortality and Attempts have been attempted to impede the process, operating under the idea that the greater the maturity of the foetus at the moment of birth, the more favourable the outcome for the newborn would be. The likelihood of survival significantly increases as the gestational age decreases, with each extra week spent in the womb. Research has shown that there is an increase in survival rates from 8% at 23 weeks of pregnancy, with a daily improvement of 3% at this stage of gestation(4). Preterm birth has a complex origin and has been characterised as a syndrome involving various pathological processes, such as uterine overdistention, ischemia, infection; additional risk factors for preterm birth include cervical disease, endocrine disorders, intrauterine infection, cervical abnormalities, and uterine malformations(5).

The Salmaniya Medical Complex is the leading tertiary care facility in the country of Bahrain, and it treats high-risk pregnancies, including those who are premature. Regardless, there are a dearth of regional research examining the causes and consequences of preterm delivery. The purpose of this research was to identify risk factors for preterm delivery and the frequency with which it occurs. This article presents the results of the research.

METHODS

A cross-sectional study was carried out at Salmaniya Medical Complex in the Kingdom of Bahrain from January 2019 to June 2019. The study had a sample size of 1289. The study covered all pregnant women who gave birth after 20 weeks of gestation. Individuals who were transported to another hospital or discharged before to delivery will be eliminated. A data collection tool was incorporated. Characteristics of the participants include their age, nationality, ethnicity, and occupation. Factors that contribute to the likelihood of negative social outcomes: Tobacco use, consumption of alcoholic beverages, and the use of illegal substances, Obstetric history includes information about the type of pregnancy, how far along it is, any issues that have arisen, the outcomes for the foetus, the weight of the foetus, and whether there are any congenital defects present. Obstetric history includes information about the number of previous pregnancies, the time between pregnancies, the method of past deliveries, and any previous instances of preterm delivery. Medical history: Past medical conditions, prescribed drugs, abnormalities of the uterus. The data collected from each participant was added to an Excel spreadsheet. The Excel sheet contained patients' characteristics, social risk factors, present obstetric

history, historical obstetric history, and medical history, as depicted in figure (1). The data was detected during the analysis. The chi-square and Fisher's exact tests were utilised to compare categorical variables, while the t-test was employed to evaluate continuous variables. A p-value below 0.05 was deemed statistically significant, and a 95% confidence range was computed.

RESULTS

According to the current study's results, 1084 full-term births and 205 preterm births occurred out of 1289. Present study results showed that maternal age had no significant difference in terms of preterm birth (Table 1). Mean maternal age of women with and without preterm birth was 30.54±6.26 and 30.81±7.07 years (With every 1-unit increase in age risk of preterm birth increases 0.994 times, OR=0.994, p-value=0.663). Mean gestational age for women with and without preterm birth was 33.57±3.31 and 38.96±1.28 week. Mean birth weight of neonates with and without preterm birth was 2.23±0.76 and 3.1±0.47 kg respectively (With every 1-unit increase in weight risk of preterm birth decreases by 0.062 times, OR=0.062, p-value<0.001). Parity status of mothers with preterm birth showed that 64(31.22%) mothers were primi-gravida and 141(68.78%) were multigravida while among mother without preterm birth 275(25.37%) mothers were pimi-gravida and 809(74.63%) were multigravida (Primi-gravida: OR=0.749, p-value=0.082). For mother with preterm birth 83(40.49%) were nulliparous, 52(25.37%) were primi-parous and 70(34.15%) were multiparous while mother without preterm birth 340(31.37%) wee nulliparous, 293(27.03%) were primi-parous and 451(41.61%) were multiparous (Nulliparous: OR=1.524, p-value=0.017 & Primi-parous: OR=1.125, p-value=0.551). Among mother with preterm birth 190(92.7%) had spontaneous, 10(4.9%) had induced and 5(2.4%) had IVF while among mother without preterm birth 1068(98.5%) mothers had spontaneous, 11(1%) had induced and 5(0.5%) had IVF (Spontaneous: OR=0.178, p-value=0.07 & Induced: OR=0.909, p-value=0.901). Antenatal complications were seen in 51(24.9%) mother with preterm birth and 152(14%) mother without preterm birth had antenatal complications (OR=2.031, p-value<0.001). Induction was given to 4(2%) mother with preterm birth and among 19(1.8%) mothers without preterm birth (OR=0.896, p-value=0.844). Women who had preterm delivery among them 95(46.3%) delivered through NVD, 22(10.7%) had elective and 78(38%) had emergency C-section and 10(4.9%) had vacuum delivery (NVD: OR=0.705, p-value=0.337, Elective C-Section: OR=0.602m, p-value=0.221, Emergency C-Section: OR=1.950, p-value=0.073). Mothers who had preterm birth among them 101(49.3%) were male and 104(50.7%) were female while mother who had term birth among them 558(51.5%) were male and 526(48.5%) were female neonates (OR=1.092, p-value=0.562). Conga was present in 3(1.5%) mother with preterm birth and present in 3(03%) mother without preterm birth (OR=0.187, p-value=0.041). G6PD was present in 12(5.9%) mother with preterm delivery and present in 93(8.6%) mother without preterm delivery (OR=1.509, p-value=0.194). Maternal complications were seen in 18(8.8%) mother with preterm delivery (the most frequent maternal complication was hypothyroidism followed by diabetes, cardiac disease and asthma) and among 87(7.5%) mothers without preterm delivery (the most frequent maternal complication was hypothyroidism followed by diabetes, infective disease, cardiac disease, hypertension and renal disease respectively) (OR=1.192, p-value=0.519). Sickle cell disease and trait was seen in 3(1.5%) and 16(7.8%) mothers with preterm delivery and among 12(1.1%) and 82(7.6%) mother without preterm delivery (Normal: OR=0.963, p-value=0.894, Trait: OR=1.281, p-value=0.724).

Table-1. Comparison of patients and neonatal characteristics in terms of Preterm birth

	Preterm Birth		OR	CI-95%		p-value
	Yes	No				
	205	1084		Lower	Upper	
Maternal Age (Years)	30.54±6.26	30.81±7.07	0.994	0.968	1.021	0.663
Gestational Age (Weeks)	33.57±3.31	38.96±1.28	-	-	-	-
Neonatal Weight (Kg)	2.23±0.76	3.1±0.47	0.062	0.042	0.091	<0.001
Gravida						
Primi-gravida	64(31.22%)	275(25.37%)	0.749	0.541	1.037	0.082
Multigravida	141(68.78%)	809(74.63%)	Ref			
Parity						
Nulliparous	83(40.49%)	340(31.37%)	1.524	1.077	2.157	0.017*
Primi-parous	52(25.37%)	293(27.03%)	1.125	0.764	1.656	0.551
Multiparous	70(34.15%)	451(41.61%)	Ref			
Type						
Spontaneous	190(92.7%)	1068(98.5%)	0.178	0.051	0.620	0.007
Induced	10(4.9%)	11(1%)	0.909	0.202	4.101	0.901
IVF	5(2.4%)	5(0.5%)	Ref			
Antenatal Complications						
Yes	51(24.9%)	152(14%)	2.031	1.417	2.911	<0.001
None	154(75.1%)	932(86%)	Ref			
PROM	8(3.9%)	7(0.6%)				
PIH	18(8.8%)	41(3.8%)				
GDM	19(9.3%)	92(8.5%)				
APH	1(0.5%)	3(0.3%)				
GDM+APH	5(2.4%)	7(0.6%)				
Pre-Cesarean	0(0%)	2(0.2%)				
Induction						
Yes	4(2%)	19(1.8%)	0.896	0.302	2.663	0.844
No	201(98%)	1065(98.2%)	Ref			
Mode of Delivery						
NVD	95(46.3%)	660(60.9%)	0.705	0.346	1.439	0.337
Elective C-Section	22(10.7%)	179(16.5%)	0.602	0.267	1.356	0.221
Emergency C-Section	78(38%)	196(18.1%)	1.950	0.941	4.042	0.073
Vacuum Delivery	10(4.9%)	49(4.5%)	Ref			
Gender						
Male	101(49.3%)	558(51.5%)	1.092	0.810	1.472	0.562
Female	104(50.7%)	526(48.5%)	Ref			
NOF						
0	11(5.4%)	5(0.5%)	1.141	0.331	3.93	0.835
1	167(81.5%)	1065(98.2%)	0.081	0.042	0.158	<0.001
>2	27(13.2%)	14(1.3%)	Ref			
Conga						
Yes	3(1.5%)	3(0.3%)	0.187	0.037	0.932	0.041
No	202(98.5%)	1081(99.7%)	Ref			
G6PD						
Yes	12(5.9%)	93(8.6%)	1.509	0.811	2.808	0.194
No	193(94.1%)	991(91.4%)	Ref			

PROM: Premature rupture membrane; APH: antepartum hemorrhage; PIH: pregnancy induced hypertension
GDM: Gestational Diabetes Mellitus; NVD: Natural vaginal deliver

	Preterm Birth		OR	CI (95%)		p-value
	Yes	No		Lower	Upper	
	205	**1084**				
Maternal Complications						
Yes	18(8.8%)	87(7.5%)	**1.192**	**0.699**	**2.033**	**0.519**
No	187(91.2%)	1003(92.5%)	Ref			
Asthma	1(0.5%)	2(0.2%)				
Cardiac Disease	2(1%)	5(0.5%)				
Diabetes	3(1.5%)	**21(1.9%)**				
Hypertension	0(0%)	3(0.3%)				
Hypothyroidism	12(5.9%)	**43(4%)**				
Infective Disease	0(0%)	**6(0.6%)**				
Renal Disease	0(0%)	1(0.1%)				
Sickle Cell						
Normal	186(90.7%)	990(91.3%)	**0.963**	**0.551**	**1.682**	**0.894**
Diseases	3(1.5%)	12(1.1%)	**1.281**	**0.324**	**5.062**	**0.724**
Trait	16(7.8%)	82(7.6%)	**Ref**			

DISCUSSION

Many underdeveloped nations do not have accurate data on the frequency of preterm birth [2, 4]. The primary goal of this study was to ascertain the prevalence of preterm birth and its associated factors at a hospital in Bahrain. The results of our study indicate that preterm birth is a notable health issue in this specific population, with a prevalence incidence of 205 per 1084 live births in hospital settings. Additionally, we found that conditions such as pregnancy-induced hypertension (PIH), antepartum haemorrhage (APH), and extended premature rupture of membranes (PROM) are individually linked to preterm birth. The study's findings regarding the prevalence of preterm birth align with the estimates provided by the World Health Organisation (WHO), which indicate that the greatest rates are observed in sub-Saharan Africa and South Asia. These findings are also consistent with previous studies conducted in Zimbabwe and Malawi. (6, 7).

The study findings indicated that there was no statistically significant variation in preterm birth rates based on maternal age. Previous research has demonstrated a positive correlation between maternal age and the likelihood of preterm delivery. Women who are 35 years or older have an odds ratio (OR) of 1.4, with a 95% confidence interval (CI) of 1.3–1.5, for experiencing spontaneous preterm delivery.(8) The prevalence of this is slightly elevated among women who are 40 years and older, and even more so among those who are 45 years and older(9).

The results of the current study indicate that nulliparous women had a considerably greater incidence of preterm birth compared to both primiparous and multiparous women. The p-value is equal to 0.0031. The incidence of spontaneous delivery was notably greater among women who did not have preterm birth. Specifically, the occurrence of preterm birth was found to be 92.7% in the "Yes" group and 98.5% in the "No" group, with a p-value of less than 0.001. Furthermore, some studies have demonstrated that a higher number of pregnancies is likely to elevate the likelihood of premature delivery as a result of uterine alterations, such as the stretching of the myometrium from prior pregnancies. Some moms with a large number of pregnancies may also have experienced complications during childbirth that could be attributed to unknown causes that may continue to affect future pregnancies. There was no correlation between the time between pregnancies and the occurrence of preterm birth. This contrasted with the results obtained by Gordon and colleagues and Agustin Conde and others, but aligned with the findings of J Etuk and others in Nigeria.(10)

The study revealed that the rate of emergency C-sections was greater among mothers who had preterm deliveries compared to those who did not. This observation was analogous to the discovery made by Olugbenga et al. (11). Operative delivery is not directly linked to preterm birth. Instead, it is a consequence of necessary delivery due to maternal or foetal causes caused by obstetric difficulties such as pregnancy-induced hypertension (PIH) and antepartum haemorrhage (APH), as demonstrated in this study. Kindinger et al.(12) it was noted that women who had a shorter cervical length and a greater likelihood of experiencing spontaneous preterm delivery had a predominance of L. iners (60%).

In a study conducted in 2015, it was discovered that there are only three significant risk factors. These variables include visiting the doctor less than four times during pregnancy (odds ratio: 4.072), experiencing early rupture of membranes (odds ratio: 4.031), and having placenta previa (odds ratio: 15.304). (13).

Results of the current study demonstrated that after controlling for confounders, prolonged The variables PROM, PIH, GDM, and APH were found to have a strong and statistically significant association with preterm birth, with a p-value of less than 0.001. The results of this research are comparable to the findings documented in other investigations. PROM has been linked to the presence of chorioamnionitis, which can manifest as a subclinical infection, as well as chlamydial vaginitis. Bacterial vaginosis-causing microorganisms can readily ascend during prolonged premature rupture of membranes (PROM) and lead to intrauterine infections. Subclinical chorioamnionitis and other unknown infections are believed to potentially cause the release of inflammatory mediators, such as interleukin 1. This release can then lead to the production of prostaglandins from the uterine decidua, finally resulting in preterm labour. The current investigation found a substantial association between PIH, a severe obstetric complication, and PTB. Despite limited understanding of the pathophysiology of this illness, uteroplacental ischemia is a viable explanation for the adverse pregnancy outcomes observed in cases of PIH, such as premature delivery and low birthweight. Moreover, PIH frequently leads to necessary premature deliveries, which could perhaps account for its correlation with PTB, although this relationship may not be causal. Similar to PIH, APH is also a significant factor in causing preterm deliveries, whether through vaginal birth or surgery, without necessarily being temporally associated with PTB (14). A cross-sectional study found that pregnancy induced hypertension (PIH) is associated with an elevated risk of preterm birth (OR: 1.12), as well as

eclampsia (OR: 3.57), anaemia (OR: 4.12), antepartum haemorrhage (OR: 3.05), placenta praevia (OR: 3.30), malaria during pregnancy (OR: 2.93), and urinary tract infection (OR: 1.53).(15)

A recent retrospective study on singleton pregnancy identified several risk factors using logistic regression analysis. These risk factors included lack of antenatal care (odds ratio [OR]: 2.63), previous preterm birth (OR: 5.06), pregnancy-related complications such as antepartum haemorrhage, hypertensive disorder, and premature rupture of membranes (OR: 5.12), being unmarried (OR: 2.41), and nulliparity (OR: 2.08). (16). The prior study also validated that the likelihood of preterm birth (PTB) was 5.17 times greater for premature rupture of membranes (PROM), which aligns with the findings of the earlier study. (6) Similarly the current study also confirmed that the risk of PTB was 8 times higher for PROM. This study categorises mothers who have experienced prolonged gestational diabetes mellitus (GDM), premature rupture of membranes (PROM), pregnancy-induced hypertension (PIH), and antepartum haemorrhage (APH) as a high-risk category for preterm birth (PTB). These characteristics are mostly adjustable and should serve as a solid foundation for prenatal interventions and improved management aimed at decreasing the impact of preterm birth.

CONCLUSION

Preterm birth is a notable issue among women who give birth at Salmaniya Medical Complex in the country of Bahrain. Extended gestational diabetes mellitus (GDM), premature rupture of membranes (PROM), pregnancy-induced hypertension (PIH), and antepartum haemorrhage (APH) are distinct factors that contribute to preterm birth. Improving the management of these obstetric difficulties and doing research to understand the mechanisms through which they contribute to premature delivery provide a viable strategy for reducing the high rates of preterm birth.

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