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Risk Factors for Early Preterm Birth at King Salman Armed Force Hospital in 2010

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Abstract

AIM: To investigate risk factors for early preterm birth.

METHODS AND MATERIAL: A retrospective comparative study was conducted at Tabuk, Kingdom of Saudi Arabia during the period from January to December 2010. Five hundred and ninety-five patient's files and delivery registry logbooks were reviewed, the following information was collected; demographic data, current and past obstetric histories. Then the early and late preterm births were compared for various risk factors. The Statistical Package for Social Sciences (SPSS version 22) was used. The Chi-square and t-test were used to test the statistical significance and a P-value<0.05 considered significant.

RESULTS: Prevalence of early preterm birth was found to be 2.5% in our study group. Women at risk for early preterm birth were: primigravidas (33.7% vs. 26.2% for control), P-value 0.039, OR 1.429 and 95% CI 0.982 - 2.079); multiple gestations (87.7% vs. 95.1% for control, P-value 0.002, OR 0.368 and 95% CI 0.196 - 0.688); and patients with a prior history of placental abruption (3.7% vs. 1.0% for control, P-value 0.027, OR3.928 and 95% CI 1.1360 - 13.586).

CONCLUSIONS: Current study indicated that early preterm births differed from preterm as a whole; primigravida, multiple gestations and a history of placental abruption are independent risk factors for them.

Introduction

Preterm birth defines as the delivery of an infant between 24 and 37 weeks gestation [1, 2]. It remains a big challenge in the perinatal health care and is associated with considerable mortality and short and long-term morbidities for the surviving infants. With the improvement in neonatal intensive care, late preterm infants (born after the 34 weeks) were at far lower risk for these complications when compared to early preterm infants (born between 24 and 34 weeks) [3-5].

Neonates born before 34 weeks experienced considerable morbidity and often necessitate admission to neonatal intensive care units [6]. These morbidities include cerebral palsy, mental retardation and risk for neonatal respiratory distress syndrome [7, 8]. Identification of risk factors before conception or early in pregnancy would lead to interventions that could help to prevent those complications. Many obstetricians decided to postpone delivery after the thirty-fourth week to ensure fetal lung maturity [12].

In Saudi Arabia, the literature is scarce concerning risk factors for early preterm birth. So this study was undertaken, in this survey, we sought to determine the risks associated with early preterm birth which can be prevented if they are fully assessed and appropriately managed.

Subjects and Methods

This retrospective comparative study conducted at King Salman Armed Force Hospital, Kingdom of Saudi Arabia (KSA). The patient's files and delivery registry logbooks in the year 2010 were approached. The ethical committees of both the University of Tabuk and King Salman Armed Force Hospital approved the research.

For this research, the following definitions were adopted: early preterm birth is the delivery at 24 to 33 6/7 weeks; late preterm birth is delivery at 34 to 36 6/7 weeks [4, 5].

During the study period, the number stands at 595 preterm deliveries (between 24 and 36 6/7 weeks of gestation), while 641 of neonates were recorded. The ethics of data collection were strictly followed, and the collected information was used only for research. Babies with chromosomal anomalies, congenital anomalies, and outborn infants were excluded. Comparisons were then undertaken between early and late preterm deliveries. Data have been collected from patient's files and delivery registry log book, which include the following information; maternal age, parity, gestational age, booking status, mode of deliveries, maternal disease, birth weight, multiple gestations and their sex.

The data also include previous pregnancy complications like; abortion, stillbirth, preterm premature rupture of membrane (PPROM), premature rupture of membrane (PROM), placenta abruption, placenta previa and caesarean section. The signs and symptoms of previous pregnancy from the patient record of the entire study group were carefully revised by the authors to reach the above diagnoses. "For example, placenta abruption was distinguished by Vaginal bleeding, abdominal pain, uterine tenderness, rapid contractions, Fetal heart rate abnormalities and confirmation after delivery by the presence of a retroplacental haematoma".

Statistical analysis was carried out by using the Statistical Package for Social Sciences (SPSS version 22). The Chi-square and t-test were used to test the statistical significance; the data were presented as number (percentages), mean (± SD) and a P-value < 0.05 considered statistically significant.

Results

The total numbers of deliveries were 7444. Among them, 595 patients delivered preterm, out of them 187 (31.4%) patients had early preterm delivery (Figure 1).

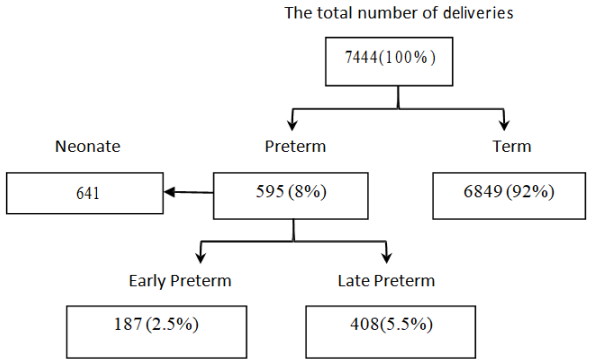

Figure 1: Methodology flowchart

Regarding the general characteristics of the study participants, mean (± SD) age of women in early (case) and late (control) preterm was 27.91 (± 6.110) and 28.15 (± 6.121), respectively. Other characters were shown in Table 1.

Table 1: A comparison between early and late-term deliveries

	Early preterm Mean (± SD)	Late preterm (Control) Mean (± SD)	P-Value*
Maternal age/year (n = 595)	27.91 (± 6.110)	28.15 (± 6.121)	0.660
Gestation age/weeks (n = 595)	30.11 (± 2.696)	35.44 (± 0.739)	0.000
Birth weight/g (n = 641)	1443.42 (± 638.863)	2539.92 (± 547.925)	0.000

*t-test.

Table 2 illustrated that parity (P-value 0.039, OR 1.429 and 95% CI 0.982-2.079) was the only obstetrics risk factor for early preterm birth during pregnancy but booking status, mode of delivery and maternal disease were not.

Table 2: Risk factors for early preterm birth in the current pregnancy (n = 595)

Obstetric factors		Early Preterm group N (%)	Control group (Late preterm) N (%)	P-value*	OR†	95%CI‡	
						lower	upper
Maternal age	< 19 y	7 (3.7%)	13 (3.2%)				
	19-39	147 (93%)	372 (91.2%)	0.423			
	>39	6 (3.2%)	23 (5.6%)				
Booking status	Booked	150 (80.2%)	333 (81.6%)	0.382	0.913	0.589	1.415
	Unbooked	37 (19.8%)	75 (18.4%)				
Parity	PG	63 (33.7%)	107 (26.2%)	0.039	1.429	0.982	2.079
	Multi	124 (66.3%)	301 (73.8%)				
Mode of delivery	Vaginal	113 (41.2%)	270 (66.2%)	0.195	0.780	0.546	1.116
	CS	74 (39.6%)	138 (33.8%)				
Maternal disease	DM	3 (1.6%)	16 (3.9%)				
	HTN	11 (5.9%)	11 (2.7%)				
	Cardiac	1 (0.5%)	2 (0.5%)				
	Anemia	0	1 (0.2%)	0.24			
	HTN and DM	0	3 (0.7%)				
	Cardiac and DM	0	1 (0.2%)				

*Chi-square; †OR = odds ratio; ‡CI =confidence interval.

Comparing late preterm birth, history of placenta abruption (P-value 0.027, OR 3.928 and 95% CI 1.136-13.586) was significantly high in cases of early preterm birth. Histories of abortion, PPROM, PROM, placenta previa, caesarean section, and stillbirth were the other associated factors in late preterm births, but they were not found to be significant when compared with early preterm birth (as shown in Table 3).

Table 3: Risk factors for early preterm birth in Previous obstetrics history (n = 595)

Previous maternal history		Early Preterm group N (%)	Control group (Late preterm) N (%)	P-value*	OR	95%CI	
						Lower	Upper
History of Abortion	Yes	67 (35.8%)	130 (31.9%)	0.194	0.838	0.582	1.206
	No	120 (64.2%)	278 (68.1%)				
History of PPROM†	Yes	13 (7.0%)	16 (3.9%)	0.085	1.83	0.862	3.888
	No	174 (93.0%)	392 (96.1%)				
History of PROM‡	Yes	3 (1.6%)	12 (2.9%)	0.254	0.538	0.150	1.930
	No	184 (98.4%)	396 (97.1%)				
History of Placenta Abruption	Yes	7 (3.7%)	4 (1.0%)	0.027	3.928	1.136	13.586
	No	180 (96.3%)	404 (99.0%)				
History of Placenta Previa	Yes	4 (2.1%)	7 (1.7%)	0.473	1.252	0.362	4.331
	No	183 (97.9%)	401 (98.3%)				
History of caesarean section	Yes	25 (13.4%)	54 (13.2%)	0.529	0.988	0.594	1.645
	No	162 (86.6%)	354 (86.8%)				
History of still birth	Yes	23 (12.3%)	37 (9.1%)	0.143	0.711	0.409	1.235
	No	164 (87.7%)	371 (90.9%)				
History of preterm birth	Yes	5 (2.7%)	11 (2.7%)	0.613	0.992	0.340	2.895
	No	182 (97.3%)	397 (97.3%)				

*Chi-square; †PPROM: preterm premature rupture of membrane; ‡PROM: premature rupture of membrane.

Table 4 depicted that the multiple pregnancies is a risk factor for early preterm birth which is statistically significant (P-value 0.002, OR 0.368 and 95%CI 0.196-0.688), where the sex of the baby was not (P-value 0.622 OR 0.92 and 95%CI 0.662-1.28).

Table 4: Risk factors for early preterm birth in newborn

Neonate characters		Early Preterm group N (%)	Control group (Late preterm) N (%)	P-value*	OR	95%CI	
						Lower	Upper
Multiple gestation (n = 595)	Yes	164 (87.7%)	388 (95.1%)	0.002	0.368	0.196	0.688
	No	23 (12.3%)	20 (4.9%)				
Sex of the baby (n = 641)	Male	121 (56.3%)	231 (54.2%)	0.622	0.92	0.662	1.28
	Female	94 (43.7%)	195 (45.8%)				

*Chi-square.

Discussion

In this study, we assessed the risk factors for early preterm birth as this group might be differing from overall preterm birth. Very few efforts have been tried to estimate the causative factors of early preterm births. If addressed, this can help to decrease the occurrence of preterm birth.

Factors such as maternal age, booking status, parity, multiple gestation, mode of delivery, sex of the babies and maternal disease in the current pregnancy and other factors in the previous obstetrics history like abortion, PPROM, PROM, placental abruption, placenta previa, caesarean section and stillbirth are known risk factors for preterm birth [12-14]. In our study, the factors mentioned above were studied with its relation to early preterm birth among deliveries at King Salman Armed Force Hospital (KSAFH) during the year 2010.

The prevalence of early preterm birth in our study group was found to be 2.5% which is more than the prevalence reported by Lo CC et al. (1.4%) because they excluded iatrogenic preterm deliveries which were included in our study [15]. The prevalence of total preterm birth in our study found to be (8%). Compared to other cities of Kingdom of Saudi Arabia, Similar findings were reported in Jazan (8.24%) [16], while others in Riyadh and Abha cities reported lower rates (5%) [17, 18]. Compared to another part of the world, it is found to be more or less equal to that in Asian (9.8%) and European countries (6.7%), but less than in African (12.6%) and Vietnam (11.8%) [19].

In our study, experience previous history of placenta abruption was identified as the most significant risk factor for preterm birth with odds ratio of 3.928 and 95% CI 1.136-13.586 found in 3.7% cases of early preterm birth Comparing to 1% in late preterm birth (control), which indicated by P-value 0.027 as a highly significant. The mechanism for this has not been well understood, however, the associated placental insufficiency and abruption and it recurrent nature may explain this relation. Our study also revealed significant associations between early preterm birth and primigravidas (33.7% vs 26.2% for control, P-value 0.039, OR 1.429 and 95% CI 0.982 - 2.079).

Multiple gestations are found to be high in both groups 87.7% for the early preterm vs 95.1% for the control group, although, it is found to be statistically significant (P-value 0.002) when the Odd ratio (0.368) done they found to be not significant. Therefore, it is an important risk factor in both early and late preterm birth.

Most prior studies found that risk factors for early preterm birth include a prior preterm delivery, history of fetal demise, history of placental abruption, history of abortions and maternal age (< 20 years and > 34 years). Although, these were contradictory to our results, except the prior history of placental abruption was in line with the findings of our study [20-23].

In support of our findings, a study from Mandruzzato et al. and Dey et al. reported that parity was a risk factor for the early preterm birth. They did not find any significant association with late preterm birth [24, 25].

Our study showed that there was no association between early preterm birth and other risk factors in the current pregnancy as maternal age (P -value 0.423), booking status (P -value 0.382, OR 0.913 and 95% CI 0.589 - 1.415), mode of delivery (P - value 0.195, OR 0.78 and 95% CI 0.546 - 1.116), maternal disease (P -value 0.24, OR 1.065 and 95% CI 0.82 - 1.385), number of fetus (P -value 0.002, OR 0.368 and 95% CI 0.196 - 0.688) and sex of the baby (P -value 0.622, OR 0.92 and 95% CI 0.662-1.28).

Dey et al. indicated that some maternal

medical conditions, including hypertensive disorders of pregnancy and diabetes, are associated with an increased risk for preterm birth at the same time increase the incidence of late preterm birth [25]. The s e results support our findings that no significant association between maternal medical diseases and early preterm birth.

The present study showed that mothers with previous maternal histories of abortion (P -value 0.194, OR 0.838 and 95% CI 0.582 - 1.206), PPROM (P -value 0.085, OR 1.83 and 95% CI 0.862 - 3.888), PROM (P -value 0.254, OR 0.538 and 95% CI 0.15 - 1.93), placenta previa (P -value 0.473, OR 1.252 and 95% CI 0.362 - 4.331), cesarean section (P -value 0.529, OR 0.988 and 95% CI 0.594 - 1.645), still birth (P -value 0.143, OR 0.711 and 95% CI 0.409 - 1.235) and preterm birth (P -value 0.613, OR 0.992 and 95% CI 0.340 - 2.895) found to be not statistically significant with early preterm birth when compared to late preterm birth.

The strengths of this study are a comparative design and first to describe early preterm birth in Tabuk, KSA. The limitation is that it is retrospective and done in one centre cannot be considered representative of all early preterm births.

In conclusion, parity, multiple gestations and a history of placental abruption were identified as important risk factors for early preterm birth. Identifying pregnant women with these risks may decrease the rate of preterm birth and its consequences

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