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Research Article

Retrospective study factors related to preterm birth in Government Raja Mirasudar hospital and obstetric and perinatal outcome

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ABSTRACT

Background: Preterm birth is a leading cause of perinatal mortality and long-term morbidity as well as the long-term health consequences and cognitive outcomes. Present study was conducted to determine prevalence and risk factors and obstetric & perinatal outcome associated with preterm birth in Rajamirasudar Hospital, Thanjavur.
Methods: A case control study was conducted between Mar 2015 - Sep 2015 in Rajamirasudar Hospital, Thanjavur. All the live new-borns during the study period were investigated. Of 6805 live births during the study period 356 births occurred in <37 weeks were taken as a case and 579 term neonates were taken as a control group. Data were obtained through review of prenatal and hospital delivery records. Univariate and multivariate logistic regression analysis were applied to obtain magnitude of association between independent variables and preterm birth.
Results: The prevalence rate of preterm birth was 5.6%. History of previous preterm birth (OR=12.7,CI: 3.9-40.4, p<0.001), hypertension (OR=7.3, CI: 2.1-25.4, p=0.002), oligohydramnios (OR=3.9, CI:1.6-9.5, p=0.002), diabetics (OR=3.7, CI: 1.1-11.8, p=0.024), premature rupture of membrane (OR=3.1, CI:1.9-4.9, p=0.000), hypothyroid (OR=2.0, CI: 1.0-3.8, p=0.037), prepregnancy low BMI (OR=2.0, CI: 1.1-3.8, p=0.015), urinary tract infection in 26-30 weeks , (OR=1. 8 CI:1.0-3.2, p=0.04) were determined as significant risk factors for preterm birth.
Conclusions: Early detection and treatment of diseases or disorders among pregnant women especially hypertension, Oligohydramnios, diabetics, hypothyroid, urinary tract infection, pre pregnancy low BMI as well as the improving health care quality delivered to pregnant women may reduce preterm prevalence rate and also reduce neonatal morbidity and mortality.

Keywords: Prevalence, Preterm birth, Risk factors, Perinatal outcome

INTRODUCTION

Preterm birth, childbirth occurring at less than 37 completed weeks of gestation, is the direct cause for 24% of neonatal deaths.[1] Rates of preterm birth have been reported to range from 5-7% of live births in some developed countries and are estimated to be substantially higher in developing countries. Comparing with children born at term, preterm infants face to higher risk of several disabilities including neuro-developmental impairments, gastrointestinal complications, cerebral palsy, sensory deficits, learning disabilities, and respiratory illness.[3] The morbidity associated with preterm birth often extends to later life resulting in physical, psychological, and economic costs.[4] The precise role of events linked to an increased risk of preterm birth is unknown.[5]

Maternal job status, educational level, gravidity, history of periodontal infection, and history of urinary infection have no significant relationships with preterm birth.[6] Mahmoodi et al found no significant relationships between preterm birth and maternal factors (i.e. age, education, and pre-pregnancy body mass index). Significant relation was observed between maternal age and premature rupture of membranes (PROM) and PROM was also related to preterm birth significantly.[7]

Similar study in Yasuj found the risk of preterm labor in women with history of diabetes mellitus, thyroid dysfunction to be 2.3 times higher than healthy mothers.[8]

Estimation of preterm birth rates is required to implement interventions in order to reduce the risk of premature labor and delivery.[9] Prevalence of preterm delivery in different cities of Iran is in a range of 5.6-39.4%.[10] The etiology of preterm birth is multi factorial and it is affected by social, psychological, biological and genetic factors. Its prevalence also depends on the geographical and demographic features. This study was carried out to determine the prevalence and risk factors and obstetrics and perinatal outcome associated with preterm birth in Rajamirasudar Hospital, Thanjavur.

METHODS

All pregnant women hospitalized for delivery in RMH, Thanjavur were included in a case control study conducted from March 2015 to September 2015. Gestational age was estimated using either the first day of the last normal menstrual period or first trimester obstetric ultrasound. Preterm birth, defined as birth occurred in gestational age of less than 37 complete weeks. Termination of pregnancy before 22 weeks of gestation (miscarriage), stillbirth after 22 weeks of gestation, multiple birth, abnormality in uterine, cervical cerclage were excluded from the study. Including criteria for cases were defined as singleton live births occurred in less than 37 complete weeks. Control group considered as the singleton live births occurred at 37 or more completed weeks of gestation.

Of 6805 live births during the study period 356 births occurred at < 37 completed weeks and they were considered as cases. Control group (N=579) was randomly selected from singleton live births occurred at 37 or more completed weeks of gestatation. Data were collected retrospectively through review of prenatal and hospital delivery records using a self-designed questionnaire.

The questionnaire contained socio-demographic factors and maternal and prenatal care characteristics of current and previous pregnancies. Socio-demographic factors included: age, education level, social class, maternal occupation, parents' consanguinity, and area of residence (rural or urban). Maternal and prenatal care characteristics in current pregnancy covered body mass index, maternal height, gestational diabetes, hypothyroid , hypertension in pregnancy, low systolic blood pressure (≤100), urinary tract infection, preterm rupture of membrane, location of placenta, amniotic fluid volume, infertility history and treatment, mode of delivery, congenital abnormalities.

Previous pregnancy and reproductive history characteristics included; gravidity, parity, history of abortion, number of previous abortion, history of still birth, history of preterm labor. The term gestational hypertension was used for woman with hypertension (i.e. blood pressure ≥140/90 mmHg) after 20 weeks of gestation.[11] Chronic hypertension also included in or study.

Urinary tract infection is diagnosed where asymptomatic bacteruria was present on positive urine culture test, premature rupture of membrane or leakage of amniotic fluid referred to a rupture that occurred before the onset of regular contraction or before 37 weeks of pregnancy.[12,13] For oligohydraminos AFI < 5 cm is taken as a cut off value. Perinatal outcome of the baby also evaluated. This project was approved by ethical committee of Thanjavur medical college, Thanjavur.

Statistical analysis

Chi-square was employed to compare distribution of variables between the groups; univariate analysis was applied to evaluate associations between independent variables and preterm birth. In order to highlight important risk factors for preterm birth, multivariate regression analysis was conducted and all the variables displaying significant relationships with preterm birth in the univariate analysis were entered into the model (Forward Wald Model). For the logistic regression, results are reported as odds ratios and 95% confidence intervals (CI) along with P value.

RESULTS

Out of 6805 live newborns delivered, 356 (5.6%) were preterm. Among the variables considered as socioeconomic characteristics, only social class of parents was significantly correlated with preterm delivery (OR= 1.4, CI: 1.0-1.8, p=0.016). The results for statistical analysis of maternal and prenatal care characteristics of the subjects in current pregnancy in relation with preterm birth are summarized in Table 1.

Table 1: Body mass index.

Body mass index	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
<19/8	39 (12.5)	51 (9.3)	90 (10.4)	1.27 (0.80-2.01)	0.305
19/8-26	158 (50.5)	263 (47.8)	421 (48.8)	1 (ref)	ref
26/1-29/9	67 (21.4)	143 (26.0)	210 (24.3)	0.78 (0.54-1.10)	0.465
30≤	49 (15.7)	93 (16.9)	142 (16.5)	0.87 (058-1.30)	0.518

Table 2: Maternal height.

Maternal height	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
155>	101 (30.9)	140 (24.7)	241 (27.0)	1.36 (1.00-1.84)	0.046
155≤	226 (69.1)	426 (75.3)	652 (63.0)	1 (ref)	

Table 3: Obstetric variables.

Gestational diabetes	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
Yes	15 (4.4)	11 (1.9)	26 (2.8)	2.41 (1.09-5.32)	0.029
No	323 (95.6)	572 (98.1)	895 (97.2)	1 (ref)	
Hypertension	17 (5.0)	8 (1.4)	25 (2.7)	4.0 (1.71-9.40)	0.001
Preeclampsia	28 (8.2)	12 (2.0)	40 (4.3)	4.40 (2.20-8.81)	0.000
No hypertension	298 (86.9)	566 (96.6)	864 (93.0)	1 (ref)	Ref
Hypothyroid					
Yes	57 (16.6)	62 (10.5)	119 (12.9)	1.69 (1.14-2.49)	0.008
No	286 (83.4)	526 (89.5)	812 (87.2)	1 (ref)	
Urinary tract infection during pregnancy					
Yes	61 (18.4)	71 (12.5)	132 (14.7)	1.57 (1.08-2.29)	0.016
No	271 (81.6)	498 (87.5)	769 (85.3)	1 (ref)	
Preterm rupture of membrane					
Yes	95 (28.7)	96 (16.6)	191 (21.0)	2.02 (1.46-2.79)	0.000
No	236 (71.3)	483 (83.4)	719 (79.0)	1 (ref)	
Dental problems					
Yes	136 (43.3)	267 (49.4)	403 (47.1)	0.78 (0.593-1.03)	0.088
No	178 (56.7)	274 (50.6)	452 (52.9)	1 (ref)	
Location of placenta					
Anterior	132 (46.5)	227 (43.7)	359 (44.7)	1.04 (0.710-1.55)	0.811
Posterior	88 (31.0)	164 (31.5)	252 (31.3)	0.96 (0.63-1.46)	0.878

Table 4: Mode of delivery.

Mode of delivery	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
Normal delivery	135 (39.0)	194 (32.9)	329 (35.2)	1.30 (0.98-1.71)	0.060
Caesarian delivery	211 (61.0)	395 (67.1)	606 (64.8)	1 (ref)	

Table 5: Fetal outcome.

Perinatal outcome: RDS	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
Yes	137 (41.5)	197 (34.7)	334 (37.2)	1.33 (1.00-1.76)	0.043
No	193 (58.5)	380 (65.3)	563 (62.8)	1 (ref)	
Birth asphysia	Preterm n (%)	Term n (%)	Total n (%)	OR (95%CI)	p-value
Yes	55 (16.3)	49 (6.7)	94 (10.2)	2.71 (1.75-4.19)	0.000
No	283 (83.7)	545 (93.3)	828 (89.8)	1 (ref)	

The odds of delivering a preterm birth was significantly high among the women with short stature, gestational diabetes, pre-eclampsia, hypertension, hypothyroid, urinary tract infection during pregnancy, preterm rupture of membrane, Oligohydramnios. Comparing to control group, although the differences were not statistically significant, we observed higher prevalence rates of preterm birth in women with; BMI 19/8<Kg/m2, polyhydramnios, pregnancy through In vitro fertilization (IVF), pregnancy through ovular stimulator drugs consumption and congenital abnormalities.

Women with previous experience of abortion, a birth interval of less than 3 years, history of preterm birth, and

women with history of low birth weight delivery significantly were more likely to deliver preterm infant. We observed incidence rates of preterm birth to be higher in women with three or more parity, experiencing three or more previous abortions, history of still birth, and history of delivering term low birth weight, however, the differences were not statistically significance. Based on the results obtained from multivariate analysis; history of preterm birth, hypertension during pregnancy, oligohydramnios, premature rupture of membrane, hypothyroid, urinary tract infection during pregnancy, diabetics were identified as significant risk factors for preterm birth delivery.

DISCUSSION

The prevalence of preterm birth found in current study (5.6%) is appreciably lower than the rates reported for African (12.6%) and European countries (6.7%) but is higher than rate of 4.4% reported for Italy.[14] The low rate of preterm birth found in present study might reflect success of different programs introduced by Tamilnadu Health ministry to improve health service quality delivered to pregnant women including pre-pregnancy and pregnancy health care in the last decade.

Experience of previous preterm birth was identified as the most significant risk factor for preterm birth with odds ratio of 12.7. This study found that women with previous preterm delivery were at increased risk for their next pregnancy.[15] The recurrence risk in women with a previous preterm delivery ranges from 15% to more than 50% depending on the number and gestational age of previous deliveries. The mechanism for this has not been well understood, it can occur in women with prior spontaneous labor as well as those with inducing preterm birth.

Medical disorders like (e.g. gestational diabetes, hypertension, and obesity) that tend to last from one pregnancy to the next, might explain many repetitive spontaneous and induced preterm births. Hypertension and pre-eclampsia that increased the risk of preterm birth by 7.3 and 3.6 folds, respectively.

Hypertension causes vasospasm in uterine vessels and reduce uterplacental flow which in turn causes intrauterine growth restriction.[16] High rate of disorders like placenta abruption and pre-eclampsia and intrauterine growth restriction among women with hypertension may results in surgical operations and preterm birth. Renzo et al reported the likelihood of preterm birth to be 2.6 times greater among women with chronic hypertension.[5]

Some reports have estimated the likelihood of preterm birth to be 3-10 times higher in women with Oligohydramnios.[17]

In our study PROM is the most common cause of Oligohydramnios.[11] Similar to present study preterm rupture of membrane has been reported to be related significantly to preterm birth.[7] Some studies have not found hypothyroid to be a risk factor for preterm delivery.[18] However, similar to our findings, others reported that the risk of prematurity to increase 1.3 times in women who suffered from hypothyroid.

The infection of the urinary system is the most prevalent bacterial infections occurred during pregnancy. Similar to our results, Schieve et al has considered urinary system infection as a risk factor for premature birth.[19] Infection may raise release of inflammatory chemokine's and cytokines such as interleukins and tumor necrosis factors. Microbial endotoxins and proinflammatory cytokines stimulate the production of prostaglandins (other inflammatory mediators) and matrix-degrading enzymes that finally result in stimulation of uterine contractions, preterm rupture of the membrane, and preterm birth.[20] RDS and Birth asphyxia significantly associated with preterm birth, which is agreement with findings where the risk of RDS and asphyxia was higher in women with preterm.[21,22]

The data for some variables were collected based on the medical records of the subjects and that; there might be a potential risk for quality of recorded data. Other limitation was that, where the mothers did not remember the date of the first day of last menstrual period accurately, we calculated gestational age by obstetric ultrasound taken in first trimester. To insure the accuracy of data the obstetric ultrasound should be performed by the same person and the same machine for all participants; while it was not possible in our study.

CONCLUSION

History of preterm birth, hypertension, preterm rupture of the membrane, oligohydramnios, diabetics, urinary infection, hypothyroid were identified as the most important risk factors for preterm birth. Identifying pregnant women at the risk of preterm delivery and proving quality healthcare may decrease the rate of preterm birth and its consequences.

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