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RESEARCH PAPER.

PREVALENCE OF PRE TERM LABOUR AND ASSOCIATION OF SPONTANEOUS ONSET PRETERM LABOUR WITH SELECTED FACTORS AMONG WOMEN DELIVERED AT DE SOYSA HOSPITAL FOR WOMEN COLOMBO

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ABSTRACT

The World Health Organization estimates the prevalence of preterm birth to be 5–18% across 184 countries of the world. Statistics from countries with reliable data show that preterm birth is on the rise. A cross-sectional descriptive study was conducted at all four post-natal wards of De Soysa Hospital for Women (DSHW) Colombo in April to December 2018. A total of 516 mothers who met the eligibility criteria were enrolled into the study. Maternal age, parity, period of gestation, maternal BMI, type of the preterm delivery (spontaneous or iatrogenic), evidence of preterm premature rupture of membrane, gender of the newborn and the birth weight of the baby was recorded in data extraction sheet from the bed head ticket (BHT). From total sample, 292(56.6%) mothers were between the ages of 18 - 29 and 20(3.9%) >40 years, primiparous (n=196, 38%), near term pregnancies (34 to 36+6 weeks) (n=333, 64.5%), and 115(22.3%) were preterm pregnancies (31 to 33+6 weeks). 242(47%) mothers with BMI 18.5-24.9. Maternal age, BMI, parity, and fetal gender were significantly associated with preterm birth ($p = < 0.05$). Association between the period of gestation and the maternal age, parity, and birth weight of the newborn were significant ($p = < 0.05$). Significant association of maternal age, BMI of the mother, parity of the mother, and gender of the fetus, with the preterm deliveries. From those parity and the BMI of the mother are the most significantly associated factors with the preterm deliveries. At-risk mothers should receive intensified antenatal care to mitigate preterm birth. Furthermore, modifiable factors such as BMI & age of conception can optimize or manipulate as a risk reduction strategy.

INTRODUCTION

Preterm delivery (PTD) is considered when a delivery happens before 37 weeks of gestation and incidence of preterm delivery is rising even with advance medical practice at present[1].Preterm neonates have high rates of early and late post neonatal morbidity/mortality & the risk of morbidity & mortality increases as the time of delivery

decreases with the gestational age[1]. Preterm delivery causes neonatal mortality and morbidity and it relates to early delivery before 34 weeks of gestation which occur in 2% of pregnancies. Extreme PTD (before 28 weeks) and early PTD (28-30 weeks) each occur in 0.25% in all pregnancies. Mortality and morbidity are very high (50%-100%) especially those who delivered before 26 weeks of gestation. This is based on limited unpublished data in Sri Lanka. Moderate PTD (31-33 weeks) occurring about 0.6% and mild PTD (34-36 weeks) occur about 3% of all pregnancies. History of previous preterm birth, presence of a short cervix, short intervals between pregnancies, history of certain types of surgery on the uterus and cervix, multiple pregnancy, and some pregnancy complications such as antepartum PV bleeding are considered as risk factors for preterm labour[2]. Social and lifestyle factors such as low body weight during pregnancy, smoking during pregnancy and substance abuse during pregnancy should get into account[2]. Advanced maternal age at birth is considered a major risk factor for birth outcomes. But the association remain unclear with preterm birth[3]. The scope of the association remains unclear, despite numerous studies assessing the risk of preterm birth in obese women compared with normal weight patients[4]. Most of the studies have been carried out in developed, western countries, even though developing countries show more frequent PTD with adverse pregnancy outcomes[5]. Most of studies have been conducted in developed countries and associated factors to preterm delivery is not assessed in our community. Some of selected factors like body mass index can be modified before and during pregnancy, so by doing that we can minimize the risk of preterm deliveries. Also, it will help us to anticipate & predict the preterm birth if there is an establish association with factors which is assessing this study.

METHODOLOGY

Descriptive cross-sectional study was conducted in the records of all four post-natal wards of De Soysa Hospital for Women (DSHW) at Colombo. All singleton pregnancies delivered via vaginal route before 37 weeks of gestation (dates should be corrected by early ultrasound scan), birth weight should be more than 500g, and newborn fetus should be viable at time of delivery at DSHW Colombo from April 2018 to December 2018. Patient who had a caesarian section, multiple pregnancies, Pregnancy induced hypertension/pre-eclampsia, medical disorders of pregnancy, Patient with previous cervical surgeries, diabetes in pregnancy, Induction of labour before 37 weeks of pregnancy, Intra uterine growth retardation, previous cord surgeries. Sample size was 516. Maternal age, parity, period of gestation, maternal BMI, type of the preterm delivery (whether spontaneous or medical), evidence of preterm premature rupture of membrane, gender and the birth weight of the baby as recorded in data extraction sheet from the bed head ticket (BHT). Every other BHT was considered for data collection as the sampling technique. Collected data was analyzed using Statistical Package in Social Sciences (SPSS) version 23. Data was demonstrated as tables, graphs and charts where it is relevant. $P < 0.05$ is considered as statistically significant.

RESULTS

There were 5824 total deliveries during the study period and 599 deliveries prior to 37 weeks' gestation. Out of this 516 were spontaneous preterm deliveries and 83 were induced due to some reason. Prevalence of spontaneous onset preterm deliveries is 8.8% among study population and 1.4% were iatrogenic preterm deliveries. Many of them 292(56.6%) were between the ages of 18 and 29 years. There were 113(21.9%) patients between the ages of 30-34 years, 89(17.2%) between the ages of 35-39 years, and 20(3.9%) beyond the age of 40. Most of the premature babies 298(58%) were males and 218(42%) were female babies.

Table 01: Distribution of gestation related pathophysiological conditions

Variable	Frequency (%)
Parity	
1	196(38.0)
2	165(32.0)
3	105(20.3)
4	41(7.9)
5	9(1.7)
Period of gestation	
Extreme preterm (< 28 weeks)	14(2.7)
Severe preterm (28 to 30 weeks + 6 days)	54(10.5)
Preterm (31 to 33 weeks + 6 days)	115(22.3)
Near Term (34 to 36 weeks + 6 days)	333(64.5)
Type of delivery	
Spontaneous	516(86.1)
Iatrogenic	83(13.9)
PPROM	
Positive	225(43.6)
Negative	291(56.4)
Total	**516(100.0%)**

PPROM - Preterm Prelabour Rupture of Membrane.

Among the mothers of premature babies, most of the mothers were primiparous (n=196, 38%). Most of the pregnancies were near term pregnancies (n=333, 64.5%), whereas there were 115(22.3%) preterm pregnancies between the gestation period of 31 to 33 weeks + 6 days, also 54(10.5%) severe preterm pregnancies, and 14(2.7%) extreme preterm pregnancies. Eighty-three (13.9%) mothers needed interventions, and their labour was induced, while the rest had spontaneous labour (n=516, 86.1%). Preterm prelabour rupture of membrane was observed in 225(43.6%) of the mothers. Among the mothers of premature babies, the majority 242(47%) of them were within the healthy weight range (BMI 18.5-24.9). There were 144(28%) patients with a BMI of between 23-27.4, 76(15%) with a BMI over 27.5, and underweight (BMI<18.5) patients who participated in study 54 in number (10%).

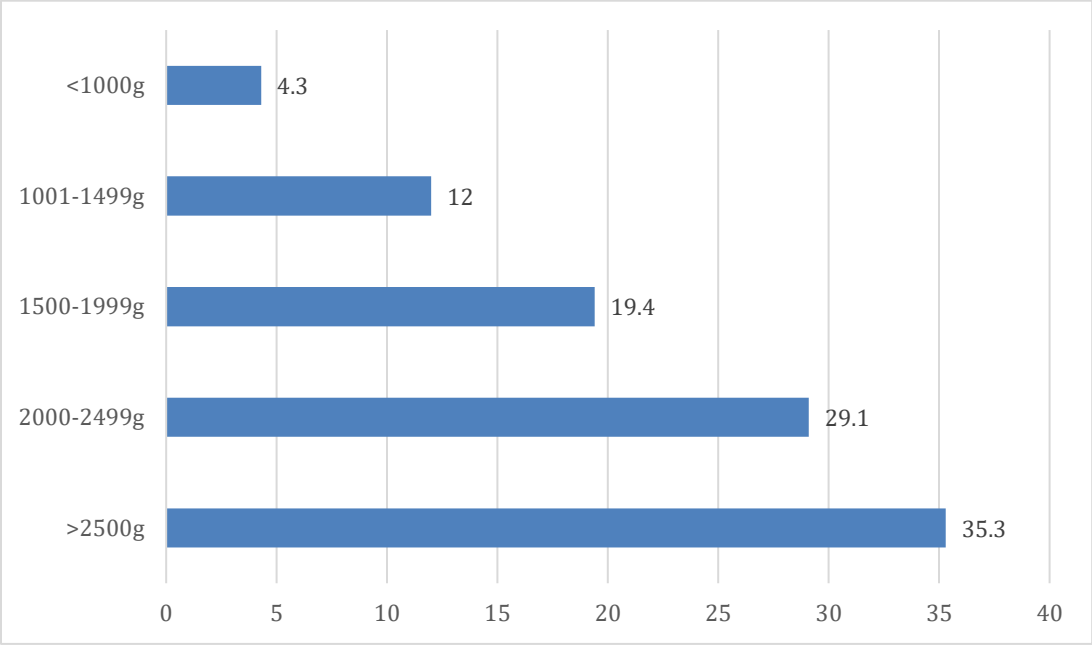

Figure 01: Distribution of birth weight

The majority of the newborns (n=182, 35.3%) weighed more than 2.5 kg, whereas 22(4.3%) weighed less than 1 kg (extremely low birth weight). The newborns with very low birth weight (1-1.5kg) were 62 in number (12%). The newborns weighed between 1500-1999g and 2000-2499g, where 100(19.4%) and 150(29.1%) respectively (Figure 1). There is a statistically significant association between the spontaneous onset of preterm delivery and the variables (maternal age, BMI, parity, gender, and the birth weight of the newborn), since the P values obtained for the variables are less than 0.001, which is less than the alpha value of 0.05.

Table 02: Association between period of gestation and selected factors

Demographic factors	Period of gestation Extreme <28 weeks and severe 28-30 weeks+6days (n=68)	Preterm 31-33 weeks + 6 days and near term 34-36 weeks +6 days (n=448)	P value
Maternal Age			
<29 years	55(80.9)	239(53.3)	<0.001
>29 years	13(19.1)	209(46.7)	
Gender			
Male	37(54.4)	261(58.3)	0.550
Female	31(45.6)	187(41.7)	
Parity			
Less than 3	22(32.4)	339(75.7)	<0.001
3 or more	46(67.6)	109(24.3)	
BMI			
<18.5	0(0.0)	54(12.1)	<0.001
18.5-22.9	6(8.8)	236(52.7)	
23-27.4	30(44.1)	114(25.4)	
>27.5	32(47.1)	44(9.8)	
Birth Weight			
<1500 g	68(100.0)	16(3.6)	<0.001
>1500 g	0(0.0)	432(96.4)	
PROM			
Positive	23(33.8)	202(45.1)	0.081
Negative	45(66.2)	246(54.9)	
Total	**68(15.2)**	**448(84.8)**	

On statistical analysis of the association between the period of gestation and selected variables, a statistically significant association was noted between the period of gestation and maternal age, parity, and birth weight of the newborn, where the P values obtained for the variables are less than 0.001, which is less than the alpha value of 0.05.

Table 03: Logistic regression

Variable	B	Sig	Exp (B)	95 % CI	
				Lower	Upper
Age	0.586	0.107	1.797	0.881	3.662
Parity	-1.393	<0.001	0.248	0.136	0.454
BMI	-1.342	<0.001	0.261	0.175	0.390
Constant	7.000				

Logit p(x)= 7.000+ 0.586(Age) -1.393(Parity) -1.342(BMI)

Even if the independent variables (parity and BMI) value is zero, the odds value can be computed as 7.000. Similarly, when parity and BMI rise by one unit, the logic p (x) value decreases by -1.393and -1.342 respectively. According to Hosmer and Lemeshow Test model is adequate. According to this model Parity and BMI are the most significant variables for the Period of gestation.

Discussion

Most of the mothers of premature babies were primiparous (n=196, 38%) in our study. As the literature says, in elderly mothers, preterm deliveries are commoner than normal without any association with the number of previous deliveries of the woman[25]. But in a study done in Israel, more preterm babies were born to multiparous women rather than women with a smaller number of pregnancies[26]. Reason may be that our study setting had more primiparous mothers than multiparous women when we were conducting the research. And also, Sri Lankan trend is towards the minimizing the size of the family depending on various social, financial and familial issues. Maybe that is the reason we have fewer multiparous mothers in our study.

Best route for delivering preterm is questionable in the literature. So that it is very difficult to decide whether to go for normal deliveries or to go for a cesarean section or go for another method of assisted deliveries (not recommended before 34 weeks) as the baby is already at risk. After reviewing 22 scientific studies Smriti denied any changes of the outcome for the baby depending on the method of the delivery. However nowadays the number of pregnancies with interventions are increasing in the preterm deliveries[27]. But in our sample, only eighty-three (13.9%) mothers needed interventions, and their labour was induced for some reason, while the majority had spontaneous onset of labour (86.1%). It is a good trend in this sample low rates of interventions and low cesarean sections which reduces the unwanted complications of the surgical procedures.

Preterm prelabour rupture of membrane (PPROM) was observed in 225(43.6%) of the mothers. But in a study done by Jean Marie, had experienced only 25% PPROMs, while half of them were idiopathic and the rest of the quarter was iatrogenic[28]. Maybe in our setting we are doing a smaller number of medically indicated preterm deliveries as we are lacking facilities for a proper care of a preterm baby. However, it is possible for Southeast Asians to get an added risk of PPROM, which we should study further as we are lacking information on this area.

Among the mothers of premature babies, the majority (47%) of them were within the healthy weight range (BMI 18.5-24.9). Of them more than quarter of the patients were having a BMI between 23-27.4kg/m^2. Nearly 15% had a BMI over 27.5kg/m^2, and 10% were underweight (BMI<18.5). These values might show the normal distribution of the weights of the pregnant females or sometimes it can have a relationship with the preterm deliveries.

However, in a meta-analysis done using data from 39 studies, they have decided to have variable outcomes in various types of premature deliveries in mothers with higher BMI values. As an example, obese mothers had an increased risk of going into medically indicated preterm deliveries as obesity is a risk factor for diabetes in pregnancy & hypertension/pre-eclampsia which need early induction depending on its complexity, while the risk of PPROM was lower in that population[29]. Due to the fact that in our study we did not compare BMI with those two types separately, we can't comment on this risk factor properly. But total risk of preterm deliveries has been increased in the obese women as the found results depending on the p values of our study. As usually obese people can have added problems in many conditions, so that better to accept this as a risk factor and trying to maintain the BMI in normal values is beneficial for the pregnant mothers in many ways and for all the childbearing aged ladies.

Most of the newborns (35.3%) weighed more than 2.5 kg. Reason should be, most of the pregnancies being near term pregnancies in our study sample. Less than 5% showed extremely low birth weight (weighed less than 1 kg), maybe due to only 2.7% extreme preterm pregnancies were reported in that sample. As we are still a developing country with less facilities, we can't go for medically indicated preterm deliveries in very low aged fetuses as we are not sure about the outcome of them with our limited facilities.

According to the results of our study, there is a statistically significant association between the preterm delivery and maternal age. In another retrospective study, there was an increased risk in preterm babies in the teenage and advanced age groups[30], the majority (27%) of the mothers were less than nineteen years of age and the next highest rates (23.9%) were in mothers more than forty years of age[30]. Those age groups seem to be having increased risk of many complications including risk of getting preterm babies. However, both

those groups are having an added risk in their pregnancies already with other complications and risk of maternal and fetal morbidity.

As described above in our study, we have shown that there is a statistically significant association between the risk of having preterm deliveries and maternal age, BMI of the mother, maternal parity, gender of the newborn and the birth weight of the baby according to the p values. A study done in the United States also described the association of low birth weight of the baby in both black and white people of their community[31], Similar to what we found in our study in Sri Lanka. According to the findings of our research, parity and BMI of the mother are the most significant variables for the period of gestation.

Conclusion

In conclusion, there is a significant association of maternal age, BMI & parity of the mother and gender of the fetus with the risk of having preterm deliveries. From those parity and the BMI of the mother are the most associated factors with the preterm deliveries for our local patients. Studying on the same topic using a larger sample size is recommended for further information. Studying the association of those selected factors with the PPROM separately would be beneficial to comment on the association with that alone. When studying the association of BMI of the mother, special concerns should be offered as there are controversial points in the literature. Due to the paucity of local literature on this topic, future studies should be done further on this area.

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