

ORIGINAL ARTICLE

COMMON RISK FACTORS OF SPONTANEOUS PRETERM LABOUR WITH INTACT FOETAL MEMBRANES

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Background: Spontaneous preterm labour (sPTL) refers to the presence of uterine contractions at least once every 10 minutes associated with cervical effacement of 80% and dilatation of >2 Cm before 37 weeks of gestation with intact foetal membranes. The objective of the study was to determine an association between common risk factors and sPTL with intact foetal membranes. **Methods:** This case control study was conducted in the Department of Obstetrics and Gynaecology, Ayub Teaching Hospital, Abbottabad. Sample of 262 was divided equally into two groups. Low BMI was considered as <18.5 Kg/m², while BMI between 18.5 and 24.9 Kg/m² was considered as normal. Data was analysed using SPSS-20. For categorical variables like BMI, frequencies and percentages were calculated, and for continuous variables like age, Mean±SD were calculated. Odds ratios were calculated as measure of association with calculation of 95% CI. **Results:** Cases with low BMI were 30 (11.5%), while 4 (1.5%) controls had low BMI. Cases with the past history of preterm delivery were 48 (36.6%), while 4 (3.1%) were from controls. There was a significant difference in BMI and past history of preterm delivery amongst cases and controls ($p<0.05$). **Conclusion:** Risk factors like low BMI and past history of preterm delivery are significantly associated with sPTL with intact foetal membranes.

Keywords: Spontaneous preterm labour, body mass index, BMI, risk factors

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INTRODUCTION

Spontaneous preterm labour (sPTL) is the commencement of labour between ≥ 24 weeks to <37 weeks of conception.¹ The delivery of a live born neonate before 37 weeks of gestation is called preterm birth which is the leading cause of neonatal morbidity,² long-term disability, and infant mortality.² Approximately 15 million births occur annually as preterm and 1.1 million children die from its complications especially in Africa and North America due to immaturity of multiple organ system, intellectual disabilities, and neurodevelopmental disorders.^{3–5} Spontaneous preterm birth has huge significances for neonates, infants, and their families.⁶

The World Health Organization (WHO) defines BMI-based fatness categories as: Underweight (BMI <18.5 Kg/m²), normal weight (18.5–24.9 Kg/m²), overweight (25.0–29.9 Kg/m²), and obese (≥ 30.0 Kg/m²).⁷ However, it does not imitate same adjustment of weight to height between both sexes or even across age groups.⁸ The prevalence of underweight is high even prevalence of obesity is increasing worldwide.⁹

Recurrent preterm birth is defined as two or more deliveries before 37 completed weeks of parturition. Patients with a history of preterm birth have greater risk of recurrence and sPTL.¹⁰ The risk of recurrence of spontaneous preterm birth (sPTB) is higher in women who had first or second live births before 34 weeks of gestation.¹¹ The rate of recurrence is 19–26% in the second pregnancy which is more than

two-fold increase in risk of subsequent preterm delivery.^{12,13} The worldwide prevalence of infants born as preterm each year is 11.1%.⁴

MATERIAL AND METHODS

This case control study was designed and conducted in the Department of Obstetrics and Gynaecology, Ayub Teaching Hospital, Abbottabad. WHO software was used to calculate sample size by using the proportion of estimating odds ratio with relative precision in case control study with the following assumptions: Confidence level= 95%, Power of test= 90%, Proportion of exposure of (BV) in preterm= 25%, Proportion of exposure (BV) in full term= 11.3%. The sample size of 262 was equally divided into two groups of 131 cases and 131 controls. Non-probability consecutive sampling was used to collect samples. Pregnant women presenting after 24 weeks of gestation with sPTL with intact membranes were considered as cases. While, pregnant women presenting after 37 complete weeks of gestation with normal pregnancy were considered as controls. Period of gestation was calculated from first day of last menstrual cycle.¹⁴ Spontaneous preterm labour was diagnosed by presence of uterine contractions at least one every 10 minutes associated with cervical effacement of 80% and dilatation of more than 2 Cm before 37 weeks and 6 days of gestational period and with intact foetal membranes on clinical examination. Maternal BMI was calculated by using formula, weight (Kg)/height (m²).

Low BMI was considered at <18.5 Kg/m², while BMI between 18.5 and 24.9 Kg/m² was considered as normal. Data was entered in the SPSS-20 and analyzed. For categorical variables like BMI and past history of preterm deliveries, frequencies and percentages were calculated. For continuous variables like age, Mean±SD were calculated. Odds ratios were calculated as measure of association with calculation of 95% confidence interval, and *p*<0.05 was taken as significant.

RESULTS

Mean age of cases was 26.97±7.07 years while mean age of controls was 27.85±5.55 years (Table-1).

Table-1: Age in cases and controls

Age (Years)	Cases n=131	Controls n=131	Total n=262
Mean	26.97	27.85	27.41
SD	7.07	5.55	6.36

Cases with low BMI were 30 (11.5%) while 4 (1.5%) controls had low BMI. There was a significant difference between cases and controls (*p*<0.05). Odds ratios and 95% confidence intervals (CI) for low BMI of cases and controls were 9.431, 3.217, and 27.646. Cases with the past history of preterm delivery were 48 (36.6%), while 4 (3.1%) were from controls. There was a significant difference in the past history of preterm delivery amongst cases and controls (*p*<0.05). Odds ratio and 95% CI for past history of preterm delivery in cases and controls is shown in Table-2.

Table-2: Odds ratios (OR) and 95% confidence intervals (CI) for low maternal BMI and past history of preterm delivery in cases and controls [n (%)]

Variables	Cases	Controls	Total	<i>p</i>	Odds ratio	95% CI	
						Lower	Upper
Low BMI	30 (11.5)	4 (1.5)	34 (13)				
No	101 (38.5)	127 (48.5)	228 (87)	0.000*	9.431	3.217	27.646
Total	131 (50)	131 (50)	262 (100)				
Past history of preterm delivery	48 (36.6)	4 (3.1)	52 (19.8)				
No	83 (63.4)	127 (96.9)	210 (80.2)	0.000*	18.361	6.382	52.831
Total	131 (100)	131 (100)	262 (100)				

*Highly Significant

DISCUSSION

Our study shows that sPTL is significantly present in cases with low BMI as compared to controls (*p*<0.05). Similar results were quoted in a study conducted by Bennett *et al*¹⁵ that shows incidence of sPTL with intact foetal membranes is more in low BMI as compare to normal delivery at term. In Pakistan, 13.1% deliveries occur before 37 weeks where low BMI has been associated with low birth weight and preterm deliveries.

Even high BMI is significantly associated with endocrine and cardiac disorders and diabetes in women.^{16,17} Another study conducted in Pakistan demonstrated that obese women are at 1.5 times more risk of delivering preterm babies.¹⁸ However, some foreign studies yield controversial results on association between sPTB and BMI. A study concluded that underweight, overweight, and obese women are more likely to deliver preterm as compared to normal women.¹⁹ Other studies concluded that nulliparity, severe underweight BMI, and obesity are associated with higher risk of sPTL at <37 weeks.^{20,21} The higher risk of sPTL in women with high BMI can be reduced by using 17-OHPC.²² Hernessch *et al* concluded that BMI is significantly associated with sPTL throughout pregnancy in all gestational age groups. Obese II+ (≥35 Kg/m²) women are significantly less likely to develop sPTL while underweight women are significantly more likely to develop sPTL.²³ Multiple studies conducted on duration of pregnancy reported that higher BMI is associated with low rates of sPTL while others reported unchanged rates of sPTL. However, most of studies reported significant association between sPTL and low BMI.²⁴⁻²⁶

This study also revealed that past history of preterm delivery is significantly associated with spontaneous preterm delivery (*p*<0.05) and the same results were documented by IP *et al*²⁷ and Yuan *et al*²⁸. The risk of sPTL was 23% which is close to the absolute risk (30%) of spontaneous preterm birth (sPTB) before 37 weeks of gestation.²⁹ Underweight BMI, past history of preterm labour, less than six months of inter-pregnancy interval, younger age, and contraceptives are some of the main associated risk factors of recurrent preterm birth.³⁰⁻³² Some other studies^{33,34} concluded that women with the past history of preterm birth have higher risk of sPTB with higher odds.

CONCLUSION

Past history of preterm labour is associated with the greatest risk of sPTL followed by low maternal BMI.

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