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An Observational Study of Risk Factors Associated With Preterm Delivery in Singleton Live Pregnancy

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Abstract

Introduction: Prematurity is the most significant problem confronting Obstetrician in today's world. Preterm is defined as babies born alive before 37 weeks of pregnancy are completed. Preterm infants face higher risk of several disabilities including neurodevelopmental impairments, gastrointestinal complications, cerebral palsy, sensory deficits, learning disabilities, and respiratory illness. Risk factors for preterm birth include socioeconomic factors (e.g., physical work, education, domestic violence), maternal health issues (e.g., low weight, advanced age, medical conditions), and fetal conditions (e.g., growth retardation, congenital anomalies).

Aim & Objectives: To find risk factors associated with preterm delivery in Singleton live pregnancy.

Material & Methods: This was an observational study conducting in Department of obstetrics and gynecology, SMS medical college, Jaipur. An informed consent was taken from all the pregnant women admitted in labour room and fulfill the inclusion and exclusion criteria. All Pregnant women coming in labour room after 28 weeks of pregnancy with labour pain were included. All cases were divided into two groups. Group A consist of all Pregnant women in labour room between 28- $\leq$ 37 weeks Group B consist of all Pregnant women in labour room with > 37 weeks

Results: The mean age in group A was 23.80±3.59 years and mean age in group B was 24.17± 3.72 years. Mean BMI of Group A was 23.05±1.68 and Mean BMI of Group B was23.87±1.73. 61 preterm and 53 term mothers were nullipara, while 39 preterm and 47 term mothers were multipara. Overall maximum no of women i.e. 114(57%) women in our study were nullipara. In

Group A 11 females had LSCS and 89 females had NVD while in Group B 9 Females had LSCS and 91 females had NVD. 10 preterm females in Group A and 3 in group B had history of previous preterm delivery whereas in group A 90 females and in group B 97 females had no history of previous preterm delivery.

Conclusion: This was concluded from our study that factors such as History of preterm birth, abortion, unbooked mother, with low socio-economic status, hypertension in pregnancy, IUGR, Fetal distress, PROM, Abnormal liquor, vaginal infection and BMI were identified in the study as a risk factor for preterm birth.

Keywords: Preterm, Delivery, Singleton, Pregnancy.

Introduction

Prematurity is the most significant problem confronting Obstetrician in today's world. Globally, prematurity is the leading cause of death in children under the age of 5 years. Preterm is defined as babies born alive before 37 weeks of pregnancy are completed.[1] Prematurity is as sensitive indicator of National health. Preterm birth occurs in about 11% of all pregnancies, varying from 5-12%. Preterm labor complicates 5–10% of pregnancies and a leading cause of perinatal morbidity and mortality in both developed and developing countries. WHO estimates that there are 15 million preterm births every year.[2]

An estimated 13.4 million babies were born too early in 2020. That is more than 1 in 10 babies. Approximately 900000 children die in 2019 of complications of preterm birth.[3] Many survivors face a lifetime of disability, including learning disabilities and visual and hearing problems.

It can affect physical health, cognitive and behavioral dimensions, making it one of the significant challenges for modern public health. Preterm infants face higher risk of several disabilities including neurodevelopmental impairments, gastrointestinal complications, cerebral palsy, sensory deficits, learning disabilities, and respiratory illness.[4]

Various risk factors associate with preterm birth are Socioeconomic factors like physical work, education, effects of domestic violence, interpregnancy interval, maternal mental status.[5] Maternal Health Factors like low maternal weight, maternal height, BMI, advanced age, Hb levels, Ho previous preterm birth, H/o previous induced or spontaneous abortions, maternal medical conditions (maternal diabetes,[6] high BP, TB, Asthma etc), smoking in pregnancy, low vit. C intake, alcohol use, illicit drug use ;Gynaecological Factors like role of urinary tract and genital tract infection, H/o threatened abortion, weak or short cervix[7]; Fetal Factors like intrauterine growth retardation, intrauterine fetal death, congenital anomalies; latrogenic Factors like H/o induced abortion ,presence of a retained intrauterine device, assisted reproduction resulting in multiple pregnancies; Genetic Factors. Therefore, identifying the risk factors associated with preterm delivery is important as this can help in early and appropriate risk-specific management. Therefore, this study intends to determine the risk factors associated with preterm delivery in a tertiary care hospital in Jaipur.

Material & Methods

This observational cohort study was conducted at the Department of Obstetrics and Gynaecology, SMS Medical College, Jaipur. It began in December 2022 and was designed to last for one year or until the desired sample size was achieved, with an additional 2 months allocated for data compilation and statistical analysis. The study encompassed all pregnant women admitted to the labor room and delivered in the department, focusing specifically on those with a gestational age of 28 to less than 37 weeks. Ethical clearance was obtained from the

institutional review board and ethical committee to ensure compliance with ethical standards.

Inclusion Criteria

1. Pregnant women with gestational age > 28 weeks with spontaneous labour.
2. Women willing to give consent.
3. Women not included in other study.

Exclusion Criteria

1. Congenital anomalies in fetus
2. IUFD (Intra Uterine Fetal Death)

Study Sample: After applying inclusion and exclusion criteria study population was divided into two groups: - Group A - Singleton live pregnancy with gestational age 28-≤37 weeks. Group B -Singleton live pregnancy with gestational age> 37 weeks.

Sample Size: The sample size was calculated for 80% study power and an alpha error of 0.05, requiring 100 births in each group (preterm birth 28 to <37 weeks and term birth >37 weeks) based on guidelines from a seed article by Sureshbabu et al. on preterm delivery risk factors in a tertiary care hospital in South India.

Results and Observation

In our study the maximum number of females i.e. 142(71%) belong to age group 20-25 years, only 6 females were in age group >31 years and this comprised the minimum number in the study population .10(5%) were in the age group <20 years and 42(21%) belong to age group 26 to 30 year. The mean age in group A was 23.80±3.59 years and mean age in group B was 24.17± 3.72 years.

Table 1: Correlation of Preterm Delivery with Body Mass Index

Body Mass Index (kg/m2)	Group A(n)(Preterm)	Group B (n) (Term)	Total (n, %)
<18.5 (Underweight)	3	2	5,2.5%
18-5-24.9(Normal)	86	76	162, 81%
25-29.9(Overweight)	9	21	30, 15%
>30 (Obese)	2	1	3, 1.5%
Total	100	100	200,100%

In Group B 78 Females had BMI normal or less, 21 females were overweight and 1female was obese. Mean BMI of Group A was 23.05±1.68 and Mean BMI of Group B was23.87±1.73. We observed that 61 preterm and 53 term mothers were nullipara, while 39 preterm and 47 term mothers were multipara. Overall maximum no of women i.e. 114(57%) women in our study were nullipara. We found that in Group A 17 females had history of abortion in compared to group B 8 females had history of abortion while in group A 83 females and in group B 92 females had no history of abortion.

Graph 1: Correlation of Preterm Delivery with History of Cesarean Section

In Group A 11 females had LSCS and 89 females had NVD while in Group B 9 Females had LSCS and 91 females had NVD. Group A and 3 in group B had history

of previous preterm delivery whereas in group A 90 females and in group B 97 females had no history of previous preterm delivery.

Table 2: Correlation of Preterm Delivery with Fetomaternal complications

Feto-maternal Complications	Group A (Preterm)	Group B (Term)	P value
	N	N	
Maternal Complication			
Hypothyroidism	0	1	0.5
Hypertension	18	4	0
Gestational diabetes mellitus	3	1	0.128
Fetal Complications			
IUGR	25	6	0.001
Fetal distress	19	5	0.001
Other Complications			
Placenta previa	3	1	0.212
Premature rupture of the membranes	34	13	0
Placental abruption	4	3	0.512
Abnormal liquor(oligo/poly)	17	8	0.005

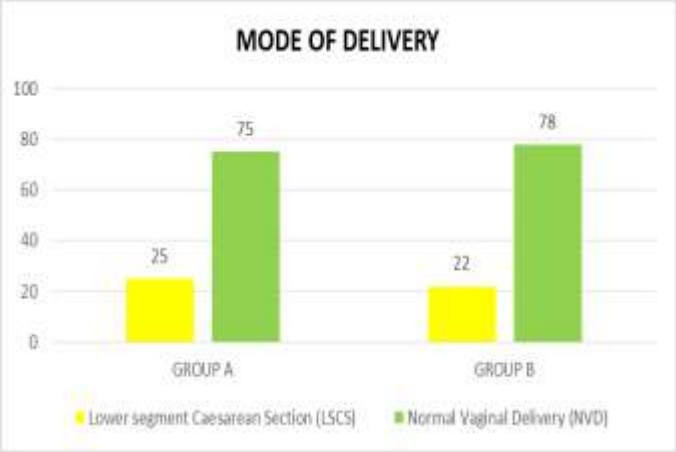
In Group A under maternal complication 18 females had hypertension, 3 females had gestational diabetes. While in fetal complication 25 females had IUGR and 19 females had fetal distress. In other complication 3 females had placenta previa, 34 females had PROM, 4 females had placenta abruption and 17 females had abnormal liquor. In Group B under maternal complication 1 female had hypothyroidism, 4 females had hypertension,1female had gestational diabetes mellitus. While in fetal complication 6 females had IUGR and 5 females had fetal distress. In other complication 1 female had placenta previa, 13 females had PROM, 3 females had placental abruption and 8 females had abnormal liquor.

Table 3: Correlation of Preterm Delivery with UTI, Vaginal Infection and Treatment of Infertility

Parameter	Group A (Preterm)	Group B (Term)	total	%
UTI	17			12.50%
Vaginal infection	45	32	77	38.50%
Treatment of Infertility	28	24	52	26%

17 Females in Group A and 8 in Group B had UTI while UTI not present in 83 Group A and 92 Group B females. In Group A 45 Females had vaginal infection and 55 females not had vaginal infection while in Group B 32 Females had vaginal infection and 68 females not had vaginal infection. We found that 28 Preterm females and 24 term females took infertility treatment while 72 Preterm females and 76 term females not took infertility treatment.

Graph 2: Mode of Delivery



In Group A 25 females had LSCS and 75 females had NVD while in Group B 22 Females had LSCS and 78 females had NVD.

Discussion

Preterm birth, also known as premature birth, is the birth of a baby at fewer than 37 weeks gestational age, as opposed to full-term delivery at approximately 40 weeks. Preterm birth is the most common cause of infant death and is the leading cause of long-term disability related to the nervous system in children.

In our study, maximum number of females 0in both groups were belonging to age 20 - 25 years. In group A mean age was 23.80±3.59 years while mean age in group B was 24.17±3.72 years which is statistically insignificant (P=0.56) which state that age is not a risk factor for preterm delivery. Similar age group correlation was seen in study conducted by Richa Acharya et al[8], Enoch odame anto et al.[9] which was statistically insignificant.

In group A mean BMI was 23.05 ±1.68 as compared to group B had mean BMI 23.87 ± 1.73 which is statistically significant (P < 0.001). Similar result was seen in study conducted by Yun-ping-zang et al.[10] Enoch odame anto et al.[9] which was statistically significant.

In Group A 11 females had LSCS and 89 females had NVD while in Group B 9 females had LSCS and 91 females had NVD. Similar result were seen in study conducted by Haifa ali bin et al.[11]Enoch odame anto et al.[9] with statistically insignificant.

In group A complication in preterm females are:- hypertension(18), gestational diabetes mellitus(3) while fetal complications were IUGR (25), fetal distress(19) and other complications as placenta previa (3),PROM(34), placental abruption (4) and abnormal liquor(17) whereas in group B hypertension(4), hypothyroidism(1), gestational diabetes mellitus (1) while fetal complications were IUGR(6), fetal distress(5) and other complications as placenta previa (1),PROM(13),placental abruption (3) and abnormal liquor(8). Similar result were seen in study conducted by Sureshbabu Rp et al[12], Enoch odame anto et al.[9], Haifa ali bin dahman et al.[11], Jamal et al.[13], Mustafa et al.[14] which was statistically significant .

In Group A 17 females had UTI as compared to 8 females in Group B. Similar result were seen in study conducted by kusum et al[15], Sureshbabu Rp et al.[12] which was statistically significant. In our study more number of vaginal infection in Group A as compared to Group B. In group A 45 women had vaginal infection as compared to 32 women in Group B. Similar result were seen in study conducted by Gibbes et al.[16] Garg et al.[17], Tajinder kaur et al.[18], Huidrom singh et al.[19] which was statistically significant. In group A 28 women took treatment of infertility while in group B 24 women took treatment for infertility. Similar result were seen in study conducted Sureshbabu Rp et al.[12] which was statistically insignificant.

In Group A 25 females had LSCS and 75 females had NVD while in Group B 22 females had LSCS and 78

females. Similar result were seen in study conducted by Haifa ali bin et al.[11] with statistically insignificant.

Conclusion

Preterm birth is an important reason of poor neonatal prognosis and death. This was concluded from our study that factors such as History of preterm birth, abortion, unbooked mother, with low socio economic status, hypertension in pregnancy, IUGR, Fetal distress, PROM, Abnormal liquor, vaginal infection and BMI were identified in the study as a risk factor for preterm birth. Hence, adequate antenatal care to at risk patient with attempts to prolong pregnancy and improve the neonatal outcome.

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