

Occurrence and Contributing Factors of Pre-Term Delivery among Postnatal Mothers

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Abstract: ***Background:** Pre-term delivery has a significant role in neonatal mortality and morbidity. It is a major determinant of short-term and long-term complications in infants and children. **Objectives:** The objective of the study was to determine the occurrence and risk factors contributing to pre-term delivery that could be targeted to reduce the risk. **Methods:** A descriptive survey research study was conducted on occurrence and contributing factors of pre-term delivery among postnatal mothers at maternity unit of selected Government Hospital, West Bengal. Non probability purposive sampling was employed to select 140 samples. Data were collected by using semi-structured interview schedule and record analysis proforma. **Results:** The occurrence of pre-term deliveries was 22.4%. Majority (59%) of the respondents belonged to the age group 19-30 years. Majority (53.6%) of the subjects had premature rupture of membrane followed by 30.8% had less than 2 years of spacing between present and past pregnancy, 21.4% respondents had history of previous pre-term child birth, 14.3% respondents had history of infertility and polyhydramnios, 10.7% respondents had multiple pregnancy. In case of life style factor 34.3% respondents were taking less than 8 hours of rest per day on average, 23.6% of subjects had smoking habit, 11.4% of subjects had felt anxiety in day-to-day life, 8.6 % of subjects had sexual activity during present pregnancy. In respect of medical-surgical factors 51.4% had anemia. 25% of the respondents had Pregnancy induced hypertension (PIH), 22.9% of the respondents had gestational diabetes mellitus, 17.1% of the respondents had hypothyroidism. There was statistically significant association between occurrence of pre-term delivery and age, religion, monthly family income and number of family members and there was also statistically significant association between age and contributing factors of pre-term delivery at 0.05 level of significance and p value is <0.05. **Conclusion:** Identifying these factors not only helps to reduce the burden of pre-term birth but also to improve neonatal health. Depending upon the findings of the present study appropriate strategies and various interventional protocols has to be developed by government and private bodies in order to reduce the burden of pre-term delivery.*

Keywords: Pre-term deliveries, contributing factors, demography, Neonatal mortality, Neonatal morbidity

1. Introduction

The period of gestation is really important for an infant's subsequent health and survival. According to WHO, data published November 2022 an estimated 15 million babies are born too early worldwide in a year. Of every 10 births, 1 baby is born early and every 40 seconds there is one death of the baby occurs due to this early delivery. This delivery which occurs before the estimated period is known as pre-term delivery. Pre-term delivery is defined by WHO as babies born alive before the completion of 37 weeks of gestational age since the first day of the last menstrual period. It can happen naturally because of early labor or if the membranes rupture too soon. Doctors might also decide to deliver early for the health of the mother and baby through caesarean or inducing labour. Premature infants are at higher risk for short- and long-term complications, such as disabilities and challenges in growth and mental development.¹ In 2020, India had the most pre-term births worldwide, totaling 3.02 million, which accounts for 20% of all pre-term births globally, according to the WHO publication Born Too Soon: decade of Action on the pre-term birth report. The high prevalence of pre-term births in countries like India can be partly attributed to their large population sizes, high number of total births, and weaker healthcare systems.² While most pre-term births occur naturally, some are due to medical issues such as infection or other pregnancy complications that require early induction of labor or cesarean birth. Most pre-term births happen in southern Asia and sub-Saharan Africa, but it's a problem worldwide.

A better understanding of the factors of pre-term birth will help in developing solutions to prevent pre-term birth is critical designing effective prevention strategies. It can also help to provide effective prenatal counselling in the prevention of pre-term delivery. It helps healthcare professionals develop better screening methods, identify high-risk pregnancies and implement timely interventions to reduce the incidence of pre-term birth and its complications. Additionally, research in this area contributes to the development of evidence-based guidelines and policies aimed at reducing pre-term birth rates and improving outcomes for both mothers and babies. Therefore, the researcher intends to describe the risk factors and burden of pre-term births in a Government Hospital, in West Bengal.

2. Materials and Methods

Design

A descriptive survey research study was conducted on 140 postnatal mothers at maternity unit of R.G. Kar Medical College and Hospital for 4 weeks of December, 2023.

Inclusion and exclusion criteria

Postnatal mothers who were staying in maternity unit for up to 48 hours after spontaneous pre-term vaginal delivery and had willingness to participate in this study and could speak in Bengali were included in the study. Postnatal mothers who were mentally ill and critically ill are excluded from this study.

Ethical Consideration

Ethical permission was taken from the Institutional Ethics Committee of R.G.Kar. M.C.H., Kolkata.

Informed consent was taken from the participants.

Tools of Data Collection

A Semi-structured interview schedule was developed to gather information regarding demographic characteristics of participants which consists of 8 items. Record analysis proforma on occurrence of pre-term delivery consists of two items. Semi-structured interview schedule on the contributing factors of pre-term delivery which consists of 20 items of which 6 items are on the obstetrical factors, 14 items are on lifestyle factors which may contribute to occurrence of pre-term delivery. Record analysis proforma on contributing factors of pre-term delivery consists of 25 items on contributing factors of pre-term delivery among them 13 items on obstetrical factors and 11 items are on medical factors during present pregnancy and rest 1 item is on surgical factors occurred before present pregnancy which may contribute the pre-term delivery and identified from the record of mothers. Here the records of the mothers included are Bed Head Tickets and Maternal and Child Protection Cards.

Table 1: Demographic Characteristic of the respondents (n=140)

Demographic characteristics	Frequency (f)	Percentage (%)
Age (in years)		
<19	32	23
19-30	82	59
>30	26	18
Religion		
Hinduism	67	48
Islam	73	52
Residence		
Rural	49	35
Urban	62	44
Semi-urban	29	21
Educational status		
No formal education	7	5
Primary level	17	12
Secondary level	53	38
Higher secondary level	48	34
Graduation and above	15	11
Occupation		
Homemaker	118	84
Self-employed	22	16
Number of family member		
<5	72	51
≥5	68	49
Monthly family income (in rupees)		
<10000	62	44
10000-20000	66	47
>20000	12	9
Gestational age (in weeks)		
28 to <32 completed weeks	23	16
32 to <37 completed weeks	117	84

Recruitment of subjects

A purposive sampling technique was used to recruit sample. The sample size of 140 was calculated based on previously published study,³ with a type 1 error of 5% with power analysis formula.

According to pilot study conducted, the prevalence rate of pre-term delivery was 10.86%.

Z= Standard normal distribution at desired confidence (95%) =1.96, P= Prevalence =10.86 %, d= Margin of error = 5%

Necessary sample size: $(n) \frac{z^2 \times p(1-p)}{d^2}$

So, approximately 140 postnatal mothers were considered for the study.

Sample

In the present study sample comprised of the postnatal mothers of maternity unit of selected Government Hospital available during the period of data collection and who would meet the inclusion criteria.

Statistical Analysis

Descriptive statistics were used to describe data. Chi-square test was used to find out the association between different variables.

3. Results

Maximum (59%) of the respondents belonged to age group of 19-30 years whereas maximum of (52%) respondents were Islam, 44% respondents resided in urban area, 38% respondents were educated up to secondary level. Most of the respondents (84%) were homemaker. Maximum number of respondents (51%) had less than 5 family members, 47% had monthly family income between 10000-20000 rupees. Gestational age of most of the respondents (84%) were between 32 weeks to < 37 completed weeks and rest of the respondents were between 28 weeks to < 32 completed weeks.

Figure 1 Findings on the occurrence of pre-term delivery among postnatal mothers

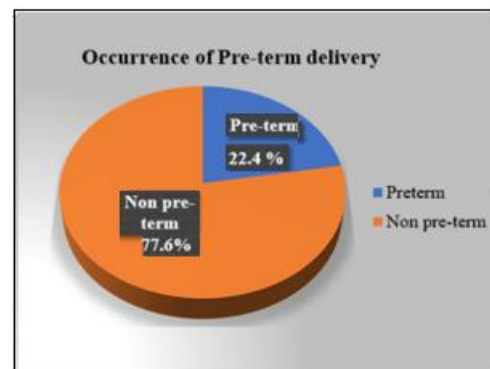


Figure 4: Pie Diagram representing the occurrence of pre-term delivery

Out of 934 births, number of pre-term deliveries was 209, making occurrence of pre-term deliveries of 22.4%.

Table 2: Obstetrical Factors of the Respondents (n=140)

Obstetrical Factors	Frequency (f)	Percentage (%)
Gravida		
Primigravida	75	53.6
Multigravida	65	46.4
Parity		
Primipara	85	60.7
Multipara	55	39.3

Number of living children		
Nil	4	2.8
1	89	63.6
>1	47	33.6
Total number of antenatal visits		
<4	36	25.7
≥4	104	74.3
Total weight gain (kg)		
<5	32	22.9
5-10	98	70

Maximum (53.6%) postnatal mothers were primigravida. Majority (60.7%) of the respondents were primipara. The data also indicates that majority (63.6%) of the respondents had 1 living child whereas 33.6% respondents had more than 1 living child, most of the respondents (74.3%) had attended 4 times or more antenatal clinic 70% had gained total weight 5-10 kg followed by 22.9% respondents had gained total weight less than 5 kg.

36.9% multigravida had 2-5 years of spacing between present and past pregnancy, 32.3 % had more than 5 yrs. and rest of all had less than 2 years spacing between present and past pregnancy.

Table 3: Spacing between two pregnancies of the multigravida respondents (n=65)

Obstetrical Factors	Frequency (f)	Percentage (%)
Spacing between present and past pregnancy		
<2 yrs	20	30.8
2- 5 yrs	24	36.9
>5 yrs	21	32.3

Table 4: Obstetrical Factors of the respondents (n=140)

Obstetrical Factors	Frequency (f)	Percentage (%)
History of IUFD	20	14.3
History of abortion	19	13.6
History of previous pre-term child birth	30	21.4
History of bleeding	9	6.4
History of infertility	20	14.3
Present multiple pregnancy	15	10.7
Premature rupture of membrane	75	53.6
Oligohydramnios	10	7.1
Polyhydramnios	20	14.3
Placental previa	11	7.9
Rh-incompatibility	14	10
Major birth defect in newborn	5	3.6
Malpresentation of fetus in present pregnancy	13	9.3
IUGR of fetus detected in present pregnancy	11	7.9

The results also shows that majority (53.6%) of the subjects had premature rupture of membrane followed by 21.4% respondents had history of previous pre-term child birth, 14.3% respondents had infertility, polyhydramnios and IUFD (Intrauterine Fetal death), 13.6% had history of abortion 10.7% respondents had multiple pregnancy.

Table 5: Life Style Factors of the respondents (n=140)

Life Style Factors	Frequency (f)	Percentage (%)
Working Pattern		
Sedentary	104	74.3
Moderate	31	22.1
Heavy	5	3.6
Average Time of Taking rest per day		
<8hrs	48	34.3
≥ 8hrs	92	65.7

Table 6: Life Style Factors of the respondents (n=140)

Life style Factors	Frequency (f)	Percentage (%)
Regular antenatal exercise not done	105	75
Feeling of anxiety in day to-day life	16	11.4
Oral intake of tab. Paracetamol without doctor's advice	1	0.7
History of fall	2	1.4
History of accidental trauma on abdomen	1	0.7
Tobacco intake	2	1.4
Smoking habit by other members of family	33	23.6
Sexual activity	12	8.6
No regular intake of IFA supplementation	2	1.4
No regular intake of calcium supplementation	2	1.4

Table 7: Medical Surgical factors of the respondents (n= 140)

Medical surgical Factors	Frequency (f)	Percentage (%)
PIH	35	25
Eclampsia	8	5.6
Chronic hypertension	4	2.9
Gestational diabetes mellitus	32	22.9
Overt diabetes	7	5
Mild anemia	51	36.4
Moderate anemia	16	11.4
Severe anemia	5	3.6
Hypothyroidism	24	17.1
Hyperthyroidism	5	3.6
UTI	4	2.9
Hepatitis	2	1.4
HIV	2	1.4
VDRL	1	0.7
Genital Herpes	1	0.7
Asthma	11	7.9
History of appendicectomy	7	5
History of LUCS	5	3.6
History of Laparotomy	1	0.7
History of Shock wave lithotripsy	1	0.7

Most of the respondents (75%) had not done regular antenatal exercise. Data also reveals that family members of 23.6% of subjects had smoking habit, 11.4% of subjects had felt anxiety in day-to-day life, 8.6 % of subjects had sexual activity. 1.4% had history of fall, history of tobacco abuse, irregular intake of IFA (Iron and Folic acid) and calcium supplementation. It also shows 0.7% had taken tab. paracetamol without doctor's advice and also 0.7% had history of fall in the present pregnancy.

Most (74.3%) of the respondents had sedentary working pattern and majority (65.7%) of the respondents were taking 8 hours or more rest per day on average during present pregnancy.

36.4% of the respondents had mild anemia, 11.4% had moderate and 3.6% of the respondents had severe anemia, 25% of the had PIH, followed by 22.9% of the had gestational

diabetes mellitus, 17.1% of the respondents had hypothyroidism, 5.6% of the respondents had eclampsia during the present pregnancy. The data also indicates that 7.9% of the subjects had asthma, 3.6% had hypothyroidism. 2.9% had chronic hypertension and UTI (Urinary tract infection) in present pregnancy. Only 3.6% had history of lower uterine cesarean section.

Table 8: Area-wise Mean, median, mean % score and rank order of factors (n=140)

Contributing Factors	Maximum possible score	Mean	Mean (%)	Median	Rank	Z score
Obstetrical factors	42	24.58	58.52	24	1 st	1.39
Medical surgical factors	24	13.61	56.71	13.5	2 nd	-0.93
Life style factors	29	15.89	54.79	16	3 rd	-0.45

Maximum mean percentage score (58.52%) was in obstetrical factor followed by the medical-surgical Factors (56.71%) and lifestyle factors (54.79%).

The Z-score for 'Obstetrical factors' is positive. This means that this factor is above average. That is, it has a greater impact than other factors.

The Z-score of the others is negative. This means that they are below the overall average. Their impact is relatively small.

Table 9: Association between the occurrence of pre-term delivery with selected demographic variables (n=140)

Variables	Pre-term delivery		Chi square (χ^2)	df	P value	Remarks
	28 to <32 weeks	32 to <37weeks				
Age (in Years)						
<19	9	23	6.68	2	0.04	Significant
19-30	8	74				
>30	6	20				
Religion						
Hinduism	6	61	5.23	1	0.02	Significant
Islam	17	56				
Monthly family Income (in rupees)						
<10000	10	52	11.48	2	0.01	Significant
10000-20000	7	59				
>20000	6	6				
Number of family members						
<5	7	65	4.86	1	0.03	Significant
≥ 5	16	52				

There was statistically significant association between the occurrence of pre-term delivery and age, monthly family income, number of family members of the respondents at 0.05 level of significance and p value is <0.05.

There was statistically significant association between the contributing factors of pre-term delivery with age of the respondents at 0.05 level of significance and p value is <0.05.

Table 10: Association between the contributing factors of pre-term delivery and age among the respondents

Variables	Obstetrical Factors		Chi square (χ^2)	df	P Value	Remarks
	Below Median (<54)	At & Above Median (>54)				
Age (in years)						
<19	22	10	14.16	2	0.001	Significant
19- 30	40	42				
>30	5	21				

4. Discussion

The present study shoes that majority (59%) of the respondents belonged to the age group 19-30 years. The findings are supported by a study conducted by Suseela TL, Subbiah MV, Tabasum MA et al. (2021) among mothers who had pre-term delivery to assess the risk factors and management associated with pre-term deliveries and their outcome in tertiary care teaching hospital, Kodapa. ⁴

The present study also revealed that family size of the maximum of the respondents (51%) was less than 5 family members. This is supported by another study conducted by Nwankwo HC, Habtu M, Rutayisire E et. al. (2022) on prevalence and factors associated with pre-term birth in a rural district Hospital, Rwanda. ⁵

The data in the present study showed that majority (53.6%) of the respondents had pre-mature rupture of membrane in the present pregnancy and 21.4% of the subjects had history of previous pre-term child birth. A study was conducted by Mahapatra V, Saraoogi S, Misra S (2022) on demographic profile, etiology and perinatal outcome associated with pre-

term birth in a tertiary Hospital of Balasore. The study showed that 29.96% of mothers had premature rupture of the membrane.⁶

The present study revealed that 30.8% of the multigravida respondents had less than 2 years interval between present and past pregnancy. A study was conducted by Choudhury R, Jakhar R. (2019) on risk factors associated with pre-term labor at a tertiary care centre in Jodhpur.⁷

The findings of the present study showed that 7.9% of the respondents had placenta previa and 10.7% of the respondents had multiple pregnancy in present pregnancy. The findings of the present study also revealed that maximum (51.4%) of the respondents had anaemia. These are supported by a study conducted by Suseela TL, Subbiah MV, Tabasum MA et al (2021) among mothers who had pre-term delivery to assess the risk factors and management associated with Pre-term deliveries and their outcome in a tertiary care teaching hospital, Kodapa.⁴

The findings of the present study showed that 22.9% of the respondents had gestational diabetes mellitus and 17.1% of the subjects had hypothyroidism. These are supported by another study conducted by Sureshbabu RP, Aramthottil P, Sumathy S et al. (2021) on risk factors associated with Pre-term delivery in singleton pregnancy in a tertiary care hospital, Kochi, Kerala in south India.⁸

According to the present study 11.4% of the respondents had felt anxiety in their day to-day life during present pregnancy. This is supported by another study conducted by Choudhury R, Jakhar R (2019) on risk factors associated with Pre-term labour at a tertiary care centre in Jodhpur, Western Rajasthan.⁷

The findings of the present study showed that 34.3% of the respondents were taking less than 8 hours of rest per day on average and 8.6% of the subjects had done sexual activity during present pregnancy. These are supported by another study conducted by Treevedi P, Saxena D, Puwar T, et al (2018) on risk factors for Pre- term births in rural Gujarat.⁹

The findings of the present study depicted that there was statistically significant association between the occurrence of pre-term delivery and age of respondents. This is supported by a study conducted by Gurung A, Wrarmert J, Sunny AK et. al. (2020) on incidence, risk factors and consequences of pre-term birth in Nepal.¹⁰

The findings of the present study depicted that there was statistically significant association between the contributing factors of pre-term delivery and age of respondents. A study was conducted by Esposito G, Mauri PA, Cipriani S. et al. (2022) on the role of maternal age on the risk of preterm birth among singletons and multiples: a retrospective cohort study in Lombardy, Northern Italy. The study suggested that, both advance and young maternal age were associated with an increased risk of preterm birth.¹¹

5. Limitation

A small number of participants (140) limiting generalization

of findings. Only selected factors are considered to identify their contribution towards pre-term delivery. The subjectivity of the self-report of the respondents further limited the study findings. The time duration of the study is less for generalization.

Acknowledgement

The investigator is sincerely thankful to all who cooperated and gave their time to the study. The investigator is also thankful to the respected Principal, Prof. Pranati Pal, for her invaluable support. Additionally, the investigator wishes to thank Mrs. Toma Dey, Mrs. Sebarata Das, Mrs. Uma Samanta, and all the teachers of the institution who guided and supported the work throughout the study. Finally, the investigator is thankful to all the people whose immense cooperation made this study possible.

Declaration of patient consent

The authors certify that all the consent had obtained from the participants appropriately. The participants understood that their names and initials will not be published and confidentiality will be maintained.

Financial support and sponsorship

The author has given financial support by herself. No external funding has done in this study.

Conflict of interest

No such conflict-of-interest present in this study.

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