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To Identify the Risk Factors of Preterm Birth among Mothers of Preterm Neonate, Admitted in SNCU of Tertiary Care Hospital, WB: A Descriptive Cross Sectional Study

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Abstract: ***A descriptive cross sectional study was conducted to identify the risk factors of preterm birth among mothers of preterm neonate, admitted in SNCU of Tertiary care hospital, WB. The mothers of preterm neonate were selected by consecutive sampling. Risk factors of preterm birth were identified by semi structured interview schedule and record analysis. The findings of the study showed that the PROM was the most common risk factor (63.3%) and anaemia was the 2nd most common risk of preterm birth (33.33%). Others risk factors were Antepartum hemorrhage (20%), Pregnency induced hypertension (10%), Gestational diabetes mellitus (6.67%) and bad obstetrical history (10%). There was a statistically significant association between gravida and age of the mother, nutritional status and socioeconomic condition of the mother at 0.05 level of significant. The study had implicated in the field of nursing practice, research, education and administration to take measure to reduce preterm birth by taking action on risk factors of preterm birth and increasing awareness about good obstetrical care and Government facilities available for antenatal care.***

Keywords: Preterm neonate, Risk factors, preterm birth

1. Introduction

Preterm birth [PTB] is defined as a live birth that occurred before 37 completed weeks[27], counting from date of last menstrual period. PTB is the largest direct cause of neonatal mortality. Incidence of Preterm Birth globally, an estimated 15 million babies are born preterm every year, accounting for more than 1 in 10 live births[27]. The incidence varies by region, with higher rates in low- and middle-income countries due to disparities in health care access, maternal nutrition, and reproductive health service. Prematurity is the major cause of death among children under five around the world, and a leading cause of disability and ill health later in life. Sub-Saharan Africa and south Asia country account for over 60 percent of preterm births worldwide. Of the fifteen million babies born too early each year, more than one million die due to complications related to preterm birth. Low birth weight (newborns weighing less than 2,500 grams at birth), due to prematurity and/or restricted growth in utero, is also a major contributor of newborn and child deaths, as well as disability and non-communicable diseases globally. To do this, it is critical that families, communities and health care workers value small babies so that they receive the life-saving care they need. To reduce the preventable deaths, it is important to identify the risk factors of preterm birth in region wise analysis which is helpful to do better action during preconception, antenatal and postnatal period.

The global annual prevalence of preterm birth ranges from 9-12%. India had the highest number of preterm births in 2020 that is 3.02 million. It is accounting for over 20 per cent of all preterm births

Worldwide[28].The prevalence of preterm birth is unevenly distributed within India, ranging from 9% to 14% to 16% for rural Gujrat, rural Tamil Nadu and rural west Bengal respectively.[29]

There are different associated factors which lead to preterm birth. Several risk factors have been identified including socioeconomic status, maternal age, history of preterm birth, infection, multiple pregnancy, pregnancy complications such as pre-eclampsia and life style factors such as smoking, poor nutrition, stress. Additionally, disparities in access to prenatal care and health care services further contribute to variations in preterm birth rate. Benefits of Studying Preterm Birth understanding the causes and consequences of preterm birth offers several critical benefits are improved prevention strategies by identifying modifiable risk factors, better prenatal care and early interventions for high-risk mothers, enhanced neonatal care and resource planning in hospitals, long-term monitoring and support for children born preterm, policy development aimed at reducing global health inequalities related to maternal and child health.

Problem Statement

A descriptive cross-sectional study to identify the risk factors of preterm birth among mothers of preterm neonate, admitted in SNCU of selected government hospital, WB.

Objectives

1) To assess the risk factors of preterm birth among mothers of preterm neonates, admitted to the SNCU of selected govt. hospital, WB.
2) To determine the association between the risk factors of preterm birth and the selected demographic factors among mothers of preterm neonates, admitted to the SNCU of selected govt. hospital, WB.

2. Methodology

Research approach: Non experimental research approach.

Research Design: A Descriptive cross sectional research design.

Study population: Mother's of preterm neonate admitted in SNCU. The sample was selected by consecutive sampling.

Sample size and sampling procedure: Purposive sampling technique was adopted to select the present study settings and consecutive (Total enumerative) sampling technique was taken to select the subject. Total 30 mothers of preterm neonate were included in a study as a sample.

Data collection method: Total 30 mothers of preterm neonate were interviewed by using semi structured interview schedule and record analysis. For development of this tool reviewing of extensive research and non research based literature, peer group discussion, expert's guidance. To establish content validity of the tool, it was submitted to 5 experts. The experts were from different fields among these two experts from the nursing educator of obstetrics & gynaecology and other two experts from the community health nursing & one expert from child health nursing speciality.

Tool consisted of 3 parts.

1) Tool I: Structured interview schedule on demographic data. It contained 5 items.
2) Tool-II A: A semi structured interview schedule for risk factor of preterm birth it contained 6 items.
3) Tool II B: Record analysis it contained 11 items.

Data was collected by the investigator herself from 05/05/2025 -10/05/2025. Formal administrative permission was sought to conduct the study from Medical Superintendent of SSH, Nursing Superintendent of SSH, Sister incharge of SNCU, Principal of College of Nursing, SSH. After obtaining prior permission from concerning authorities SNCU I& II admission register documents collected. From baby register, as per inclusion criteria mother of the neonates admitted in SNCU I&II Newborn were listed down, sample was selected by (Total enumerative sampling). The investigator visited to collect Data SNCU I & II.

At first self introduction is given to the mother. Thorough explanation was given regarding the purpose of the interview schedule, written informed consent was taken. Structured interview schedule and semi- structured interview schedule was applied to the subject at their ward by maintaining privacy and strict confidentiality. At first structured interview schedule was applied for demographic data then semi structured interview schedule for risk factor of preterm birth then record analysis on MCPC document.

Total time taken from one interview was approximately 20 min.

Section 1:

Section 1: Demography characteristics of the sample. Description of sample characteristics in term of age, education, socio economic status, employment status, residence type.

Table 1: Frequency and percentage distribution of sample according to there age, educational status and socioeconomic status of mothers of preterm neonate, N=30

Demographic Characteristics	Frequency	Percentage (%)
Age of mother(year)		
13-18	9	30
19-24	15	50
25-30	6	20
31-36	0	0
>36	0	0
Educational status of mother		
No formal education	3	10
Primary	7	23.33
Secondary	13	43.33
Higher secondary	5	16.66
Graduation or above	2	6.66
Socioeconomic status of mother		
Upper class	4	13.33
Upper middle	9	30
Middle class	6	20
Lower Middle class	6	20
Lower class	5	16.66

Table 1: Depicts that among 30 mothers of preterm neonates admitted in SNCU. Maximum age of mother (50%) is in the age group of 19-24 years and minimum age of mother (20%) is in the age group of 25-30 years. There is no mother present above 30 years age.

The table depicts that majority of mother (43.33 %) have secondary education and very few mothers (6.66%) are graduate and above.

The table also depicts that majority belongs to (30%) is upper middle class and very few mother (13.33%) is in upper class.

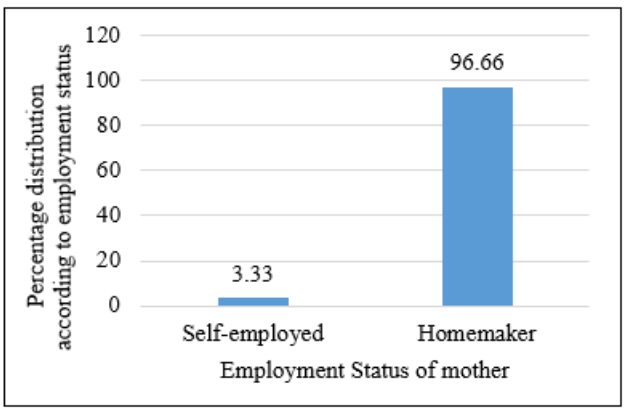

Figure 1: Bar diagram showing the Percentage distribution of sample according to their employment status

Bar diagram depicts that majority of the mother (96.66%) is homemaker and only 1 mother (3.33%) is self-employed.

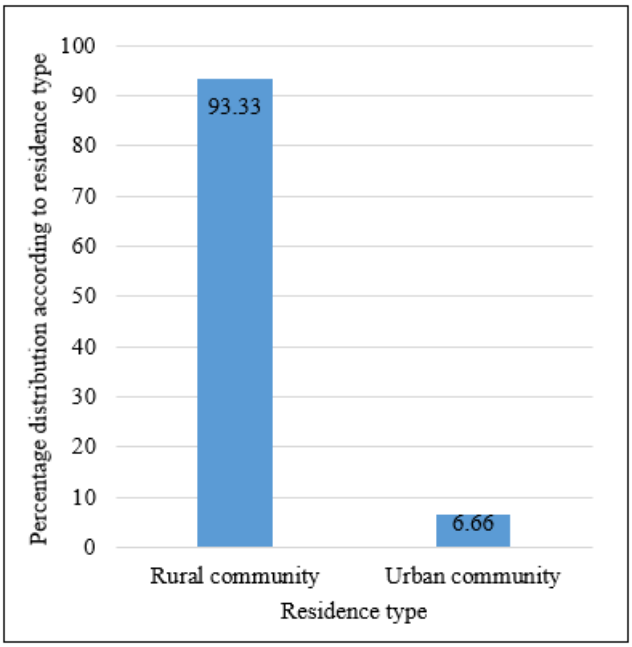

Figure 2: Bar diagram showing Percentage distribution of sample according to residence type

Bar diagram depicts that most of the mothers are coming from rural community (93.33%).

Section –II: Frequency and percentage distribution of Risk factor

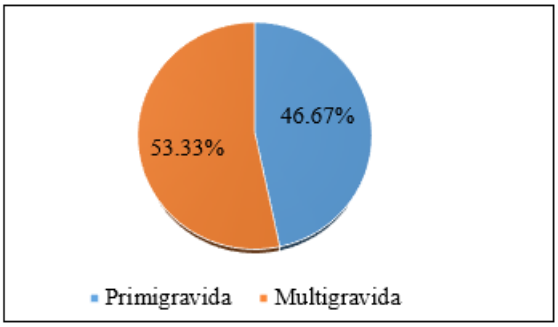

Figure 3: Pie diagram showing Percentage distribution of primi gravida and multi gravida mother

Data presented in figure 3, depicts that 53.33% mother of preterm neonate admitted in SNCU are Multi gravida whereas 46.67% are Primi gravida mother.

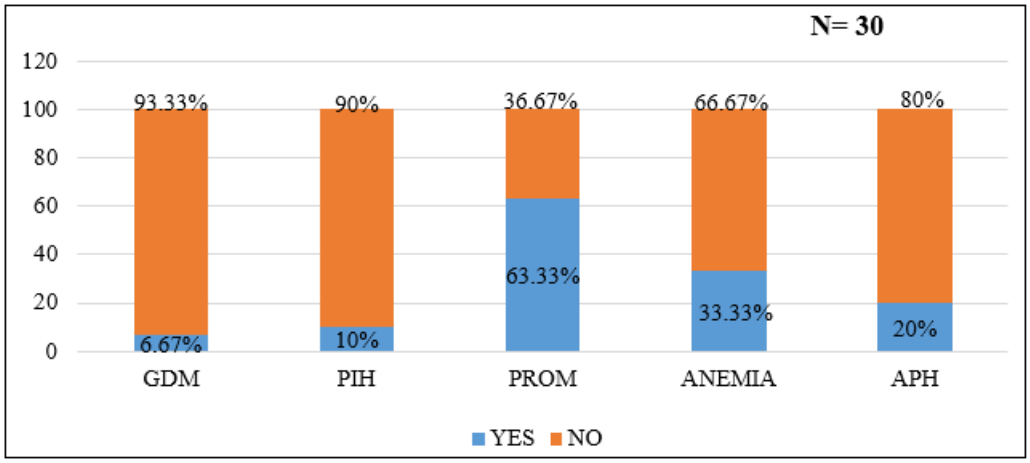

Figure 4: Bar diagram showing Percentage distribution of risk factors of preterm birth

Data presented in figure 4 depicts that Premature Rupture of the Membrane is the most common risk factor for Preterm birth (63.33%) and the second most common cause is anaemia which is 33.33%.

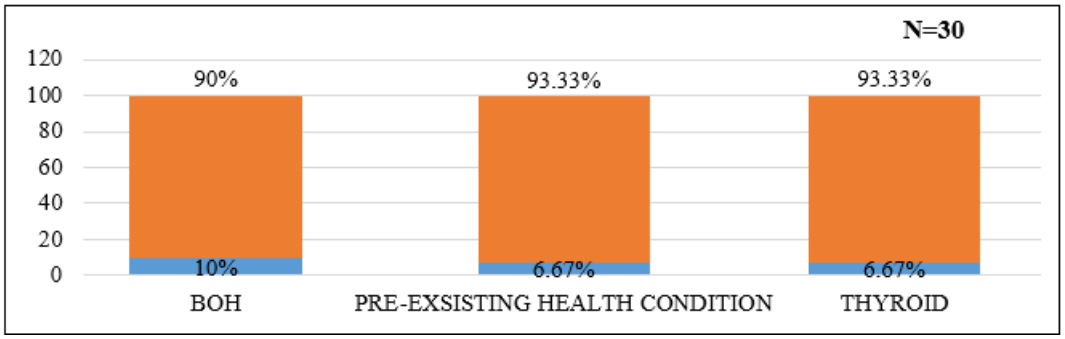

Figure 5: Bar diagram showing percentage distribution of Bad obstetrical history, pre-existing health condition and thyroid among mothers of preterm neonate in their antenatal period.

Above figure depicts that among 30 mother of preterm neonate admitted in SNCU only 3 mothers (10%) have bad obstetrical history, 6.67% have pre existing health condition like hypothyroidism and hypertension and 6.67% take thyroid medication.

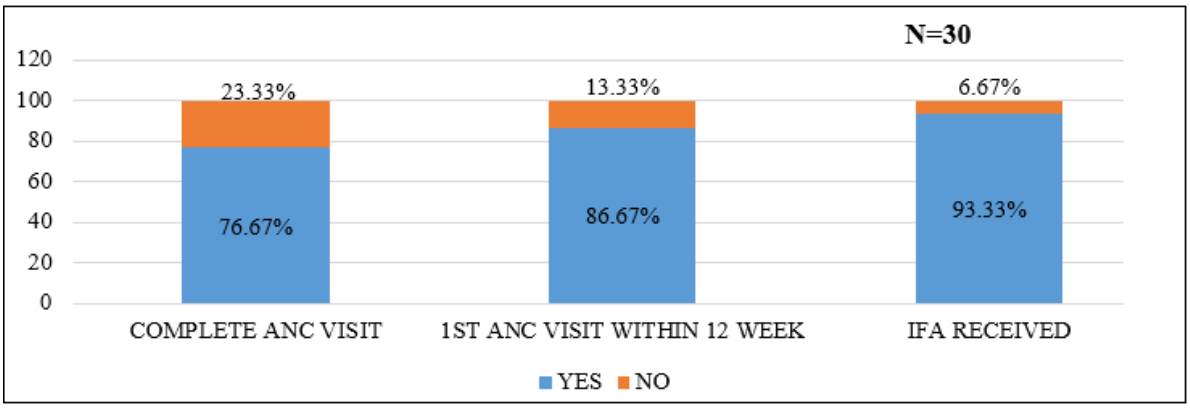

Figure 6: Bar diagram showing percentage distribution of complete ANC visit according to the gestational age, 1st ANC visit within 12 week and IFA received among antenatal mothers

Above Bar diagram depicts that among 30 mother of preterm neonate admitted in SNCU 76.67% have completed their ANC visit accordingly to gestational age where has 23.33% mother have not completed it.

It also depicts that majority of the mothers (86.67%) had their 1st ANC visit within 12 weeks. Almost all mothers (93.33%) have received IFA supplementation.

Section III:

Table 2: Association of risk factors of preterm birth with selected demographic factors among mothers of preterm neonates admitted in SNCU, **N=30**

S No.	Variables	Age (years)			Total	df	Chi Square
		13-18	19-24	25-30			
1	Bad obstetrical history					2	3.327
	Present	0	3	0	3		
	Absent	9	12	6	27		
2	Pre existing medical condition					2	0.69
	Present	1	1	0	2		
	Absent	8	14	6	28		

Table 2 consist of data related to the age of mothers of preterm neonate and risk factors of preterm birth. There is no statistically significant association between age of the mothers with bad obstetrical history (3.327 at df 2). and preexisting medical condition of mothers (0.69 at df 2).

Table 3: Association of risk factors of preterm birth with Socio economical condition of mothers of preterm neonates admitted in SNCU, N=30

S No.	Variables	Socio economical condition					Total	df	Chi Square
		Upper class	Upper middle	Middle	Lower middle	Lower			
1	Nutritional status							4	12.23*
	Under weight	0	1	4	4	4	13		
	Normal	4	8	2	2	1	17		
2	Anaemia							4	1.841
	Present	1	2	2	3	2	10		
	Absent	3	8	3	3	3	20		

Table 3 consist of data related to the socioeconomic condition of mothers of preterm neonate and their nutritional status. There is statistically significant association between socioeconomic status and nutritional status (12.23 at df 4) of mothers. Whereas there is no significant relationship present between socioeconomic status and presence of anaemia (1.841 at df 4).

Table 4: Association of risk factors of preterm birth with educational status of mothers of preterm neonates admitted in SNCU, **N=30**

S No.	Variables	Education					Total	df	Chi Square
		Illiterate	Primary	Secondary	Higher secondary	Graduate			
1	1st ANC VISIT							4	7.072
	Done	1	43	12	4	2	23		
	Not done	2		1	1	0	7		
2	IFA								6.973
	Received	2	6	13	5	2	28		
	Not received	1	1	0	0	0	2		

Table 4 consist of data related to the educational status of mothers of preterm neonate and their 1st ANC visit within 12 weeks and received of IFA. There is no statistically significant association between these two variables (7.072 at df 4) and (6.973 at df 4) respectively.

3. Summary

The present study was conducted to assess the risk factors of preterm birth among mothers of preterm neonates admitted in the Special Newborn Care Unit (SNCU) of a selected government hospital in West Bengal. A descriptive cross-sectional design was adopted with a sample size of 30 mothers selected by non-probability purposive sampling.

The study showed that PROM, anemia, and APH were the most prevalent risk factors for preterm delivery. Although most of the mothers completed their antenatal care visits and received IFA supplementation, preterm births still occurred due to underlying medical, nutritional, and obstetric conditions. Statistically significant associations were found between gravida and age of the mother, and between nutritional status and socioeconomic status of the mother.

4. Major findings of the study

1) Findings Related to Demographic Data of Mothers:

- Age: Majority of mothers (50%) were in the age group of 19–24 years; 30% were 13–18 years and 20% were 25–30 years.
- Education: Most of the mothers (43.33%) had secondary education; 26.67% had primary education and 23.33% were illiterate; only 6.67% were graduates.
- Occupation: 96.66% of mothers were homemakers, while only one was self-employed.
- Residence: 93.33% belonged to rural areas, and only 6.67% were from urban settings.
- Socioeconomic status: The highest proportion (30%) belonged to the upper middle class, followed by 26.67% in the lower middle class.

2) Findings Related to Risk Factors of Preterm Birth:

- PROM was the most common risk factor, present in 63.33% of mothers.
- Anemia was reported in 33.33% of cases.
- Antepartum hemorrhage (APH) was seen in 20% of the mothers.
- Pregnancy-induced hypertension (PIH) was present in 10%.
- GDM (Gestational Diabetes Mellitus) and pre-existing medical conditions were found in 6.67% of mothers each.
- Bad obstetric history was found in 10% of participants.
- Nutritional status showed 43.33% of mothers were underweight.

3) Findings Related to Antenatal Care (ANC) and IFA Supplementation:

- 76.67% of mothers completed their ANC visits.
- 86.67% had their first ANC visit within 12 weeks of gestation.
- 93.33% received Iron and Folic Acid (IFA) supplementation.

4) Findings Related to Association Between Risk Factors and Demographic Variables:

a) A statistically significant association was found between:
- Gravida and age of the mother ($p < 0.05$)
- Nutritional status and socioeconomic status ($p < 0.05$)

b) No significant association was found between:
- Anemia, PROM, ANC/IFA and variables like education or residence

5. Discussion

On the basis of the findings and objectives of the present study, a discussion is held. The present study is supported by the following other studies given below:

Chang-Xiang Ye et al. (2021) conducted a study in China on maternal factors of preterm birth. They reported that most mothers with preterm deliveries were below 25 years, had low education, and were from rural areas. This supports the present study where the majority of mothers were aged 19–24 years, had secondary education, and lived in rural areas.

A study carried out by Yi-Jie Zhang et al. (2022)[16] found that PROM (Premature Rupture of Membranes) and anemia were the leading causes of preterm birth in their hospital-based study. In the present study also, PROM was the most common risk factor (63.33%) followed by anemia (33.33%).

Dereje Zewdu et al. (2023)[26] conducted a cross-sectional study on maternal risks and identified APH (Antepartum Hemorrhage) as a significant contributor to preterm birth. This supports the present finding, where 20% of mothers had APH.

Adugna G.D. (2022) reported a strong association between low socioeconomic status and maternal undernutrition, particularly in rural women. This supports the current study's finding that nutritional status was significantly associated with socioeconomic class ($p < 0.05$).

Érica Cesário Defilipo et al. (2022)[21] also highlighted that mothers with poor nutrition, particularly in low-income groups, had a higher risk of preterm birth. In the present study, 43.33% of mothers were found to be underweight.

Ting Xiong et al. (2021) concluded that ANC visits and IFA intake alone are not enough to prevent preterm birth if the mother has risk conditions such as anemia, GDM, or PIH. This aligns with the current study, where 76.67% of mothers completed ANC visits and 93.33% received IFA, yet still experienced preterm births.

6. Limitation

The study was limited to only one hospital in West Bengal.

- The sample size was small (N = 30), which may affect generalizability.
- The study used non-probability sampling, which may introduce selection bias.
- Only quantitative data was collected; no qualitative insights were explored.

7. Conclusion

From the findings of the study, it can be concluded that PROM was the leading cause of preterm birth. Anemia, APH, and PIH also contributed significantly. Despite high coverage of ANC and IFA, preterm births remained common. Gravida and age were significantly associated, indicating that maternal age influences pregnancy history. Nutritional status was significantly associated with socioeconomic status, reflecting that low-income mothers were more vulnerable to under nutrition.

Hence, early detection and management of obstetric risk factors, improved nutrition, and targeted care in rural areas are essential to reduce preterm birth rates.

8. Future Scope

- The study can be replicated in large size.
- A comparative study may be conducted between rural and urban mother.
- A study may be conducted incidence and prevalence of preterm birth.

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