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Research Article

Assessment of Risk Factors and Management Associated with Preterm Deliveries and their Outcomes in Tertiary Care Teaching Hospital

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Abstract

Background: Preterm is a major obstetrical challenge of health care. It is the top most cause of perinatal morbidity and mortality of neonatal deaths. The births of these neonates are at a greater risk of developmental disabilities, health and growth problems than neonates of full term.

Aim and objective: To assess the risk factors and management associated with preterm deliveries and their outcomes.

Materials & Methods: "A prospective observational cohort study" was conducted over a period of 6 months on 80 Preterm subjects, who were enrolled based on inclusion and exclusion criteria. A detailed questionnaire was used to record socio-demographic, clinical profile and prescribing management. Statistical analysis was performed by percentage method using parameters like mean, standard deviation.

Results: The impact of incidence range in the present study was 31.52%. Maximum preterm deliveries were observed in the age group of 18-23 years (44%). Multiparous woman was at more risk for preterm i.e., about 51%. The commonest risk factor for preterm was Anemia (45%) followed by Pre-eclampsia (24%). The treatment prescribed for preterm was Betamethasone, Tidilon, Magnesium sulphate, Progesterone. The commonest neonatal outcome was found to be low birth weight with KMC and supplements of vitamins, iron, calcium as a therapy for their better recovery.

Conclusion: The study suggests an urgent need for strengthening effective guidelines and appropriate counselling for prevention of preterm. Maintenance of good hygiene, adequate bed rest and proper antenatal care visits for the better outcomes.

Keywords: preterm, multiparous, risk factors, neonatal outcomes, antenatal care, cohort.

INTRODUCTION:

Preterm birth additionally referred to as premature birth that states as "Babies born prematurely at intervals 24 weeks of gestation and before the 37 weeks of gestation (<259 days) reckoning from morbidity the primary day of the last menstrual period"¹. Preterm birth is the vital reason behind 75% perinatal and >70% mortality². Adolescents have a higher risk of preterm birth with 19.0 and 12.7 % of all births being preterm in <15-years old and 15 to 19-years old respectively compared with slightly below 11 % among women in their twenties³. India has the highest range of deaths due to PTDs accounting for 35% of neonatal deaths⁴. Moreover, the economic and social value of PTB is high as it may cause short-term and long-term consequences^{5,6}. In concerning 50%, the explanation for preterm labor isn't renowned. Hormone metabolism disorders or uteroplacental ischemia, predisposing genetic attributes⁷, preterm premature rupture of the membrane (PPROM)^{7,8}, placental Previa, a previous history of preterm birth⁶, placental

abruption^{9,10}, recurrent UTI^{9,11}, anemia^{6,8}, gestational diabetes⁸, pre-eclampsia and eclampsia^{7,10}, multiparity^{7,11}, previous cervical surgery⁸, oligo/polyhydramnios⁸, advanced maternal age¹⁰, previous history of miscarriage and abortions¹² and lifestyle habits such as smoking⁴, alcohol, illicit drug use are the precise risk factors of preterm births⁷. Birth canal infections appear to play a key role within the etiopathogenesis of premature delivery¹³. Maternal, fetal, or placental such as premature rupture of membranes, oligohydramnios or hydramnios, cervical incompetence, and malformation of the uterus are the complications that will occur due to preterm births^{7,1}. Diagnosis of preterm labor relies on signs of labor, the length of the pregnancy, biochemical predictors, and ultrasound scan¹. Bed rest, Adequate hydration suggested for preventing preterm birth^{1,14}. Tocolytics: Isoxsuprine hydrochloride, Nifedipine, Nitroglycerine, Oxytocin, Cervical cerclage, antenatal corticosteroids, antibiotics for PPRM, magnesium sulfate, progesterone therapy and Kangaroo Mother Care are

recommended for reducing the outcomes of preterm birth^{15,16}.

AIM AND OBJECTIVES:

- To evaluate the risk factors and management of Pre-Term Deliveries (PTDs) and their outcomes
- To estimate its incidence at the study site.
- To assess the management and its outcomes in PTD.
- To educate and to provide awareness among the pregnant who are at risk of preterm.

METHODS:

This was a prospective observational cohort study. A total of 80 patients were included after confirmation through physical and USG abdomen examination in Gynaecology department, Government general hospital- RIMS, a 750 bedded tertiary care teaching hospital, Kadapa. Study was done for a period of 6 months. Our Study commenced after obtaining approval from the institutional ethical committee. A written informed consent form was obtained from all participating subjects. A data collection form was used to collect all the necessary data of the study subjects. Data includes demographic details, Chief complaints, past medical & medication history, marital history, obstetric history, height/weight, marital status, lifestyle & habits of the patients, family history, Objective Evaluation Data (General Examination, Physical Examination, and Systemic& Local Examination & Lab investigations like Hb), other investigations (USG), type of PTD diagnosed & treatment provided. The clinical profile assessment form includes parameters like Age of pregnancy, parity, past obstetric history, Inter-pregnancy interval, and cervical length. For educating the subjects regarding pre-term births Information leaflet was prepared. Later the Incidence of pre-term births, commonly affected age group, common risk factors of pre-term births, common neonatal complications, diagnostic procedures associated with PTD, and their management in PTDs were assessed.

The percentage method was used to analyze the subject's distribution based on various parameters by using MS Excel. The appropriate statistical parameters were used the calculate incidence of pre-term births. The statistical parameters like mean, standard deviation were used to analyze the data.

Inclusion Criteria:

- ✓ Women who had consulted the gynecology department with pregnancy.
- ✓ Women who had shown their eagerness to participate in the study.

- ✓ Women with past history or family history of PTD.
- ✓ Women with less than 37 weeks of gestation.

Exclusion criteria:

- ✓ Women who had not shown their willingness to participate in the study.
- ✓ Women with infections like HIV.
- ✓ Women beyond 37 weeks of gestation.

RESULTS:

In our study around 4,282 women have consulted the gynecology department, out of which, 135 were suspected and screened for the inclusion into the study, of them 80 were included after confirmation through physical and USG abdomen examination.

INCIDENCE:

The incidence of PTD at study site was found to be 31.52%.

DEMOGRAPHIC DETAILS OF THE PATIENTS:

Table 1: Distribution of overall Demographic details from the subjects

Total study subjects = 80	
Baseline characteristics	Number of subjects
Age (years)	
18-29	65 (81.25%)
30-41	15 (18.75%)
BMI	
Normal BMI	34 (43.5%)
Under BMI	15 (19.2%)
Over BMI	8 (10.2%)
Obese	1 (1.2%)
Place of residency	
Urban	29 (37.25%)
Rural	51 (63.75%)
Education	
Above primary	37 (46.25%)
Below primary	43 (53.75%)

CHARACTERISTICS OF PRETERM:**Table 2: Depicts the characteristics of preterm among the subjects**

VARIABLES:	NUMBER OF SUBJECTS (80)
CLINICAL PROFILE:	
Past medical history	8 (10%)
Without past medical history	72 (90%)
Gestational age:	
<28 weeks	1 (1%)
28-32 weeks	17 (21%)
>32 weeks	62 (78%)
PAST OBSTETRIC HISTORY:	
History of abortions	13 (16%)
Without history of abortions	67 (84%)
History of miscarriage	2 (3%)
Without history of miscarriages	78 (97%)
Previous history of PTB	9 (11%)
Without history of PTB	71 (89%)
DIAGNOSTIC PROFILE:	
Anemia	
Mild	23 (29%)
Moderate	48 (60%)
Severe	9 (11%)
USG report:	
Amniotic fluid index (AFI- in cms)	
<8	19 (24%)
8-18	59 (74%)
>18	2 (2%)
Cervical length (CL-in cms)	
1.2-2.3	43 (54%)
2.4-3.5	34 (42%)
3.6-4.0	3 (4%)

MANAGEMENT FOR SPECIFIC RISK FACTORS:**Table 3: Depicts the distribution of management for specific risk factors**

S. NO	RISK FACTORS	EXTENT OF RISK FACTOR IN % (N=80)	MANAGEMENT
1.	Anaemia	45	Blood transfusion
2.	Pre-eclampsia	23.75	Anti hypertensives, Magnesium sulphate
3.	Oligohydramnios	17.5	Aminoacids
4.	LSCS	17.5	Blood transfusion
5.	UTI	15	Antibiotics, Alkalisers
6.	PPROM	15	Blood transfusion, Antibiotics
7.	Placental previa	10	Blood transfusion
8.	Eclampsia	7.5	Anti hypertensives, Magnesium sulphate
9.	Twins	6.25	Blood transfusion
10.	IUGR	5	Blood transfusion
15.	GDM	2.5	Anti-diabetic drugs
11.	Polyhydramnios	1.25	Blood transfusion
12.	HELLP syndrome	1.25	Anti-hypertensives, magnesium sulphate
13.	Threatened preterm	1.25	Progesterone therapy
14.	Hypothyroidism	1.25	Anti-thyroid drugs

MANAGEMENT OF PRETERM:

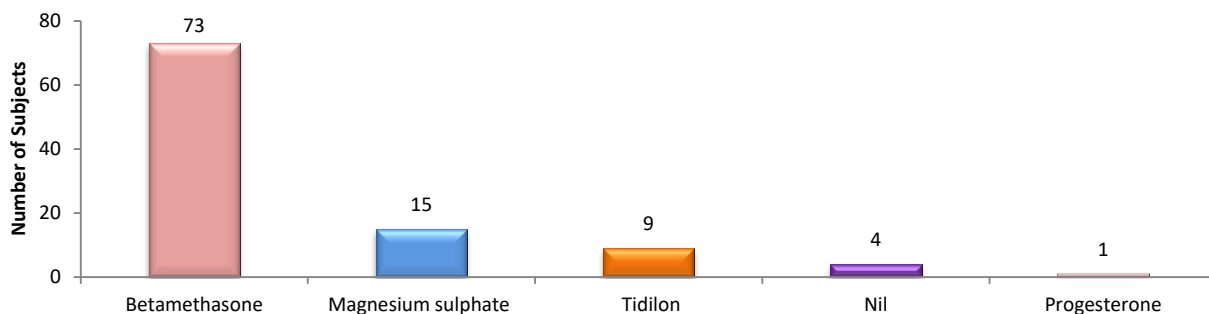


Figure 2: Distribution of subjects based On Management of Preterm

NEONATAL COMPLICATIONS:

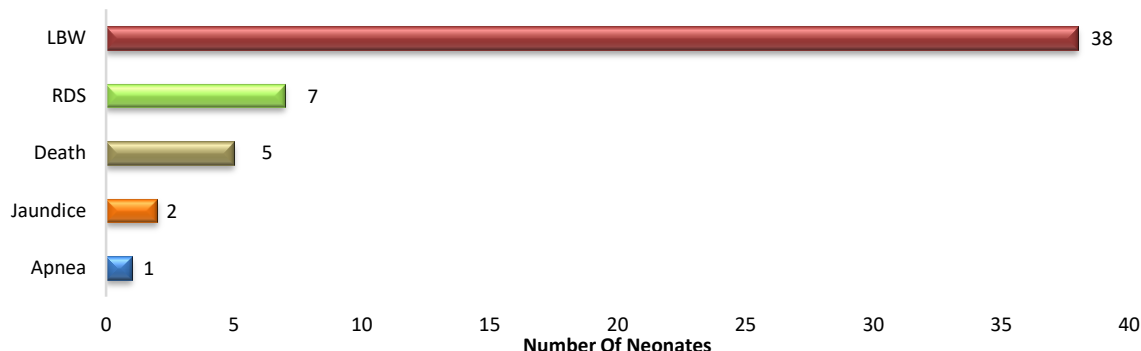


Figure 3: Illustrates the dominant complications in neonates

MANAGEMENT GIVEN FOR NEONATAL COMPLICATIONS:

Table 4: Distribution of neonates with specific management to their Complications

S.No.	Complication	Management	Number of Neonates
1	LBW	O ₂ Inhalation, Vitamin k	4
2	LBW	Paladai feeds, Calcimax, Vitamin D3	7
3	LBW	Paladai feeds, Calcimax, Vitamin D3, Zincovit	4
4	LBW, RDS	Paladai feeds, Calcimax, Vitamin D3, Zincovit, Nasoclear, Caffine, Rantac, KMC(kangaroo mother care)	1
5	Jaundice, LBW, RDS	Phototherapy, Paladai feeds, Calcimax, Vitamin D3, Zincovit, Nasoclear, Caffine	1
6	Jaundice	Phototherapy, Vitamin k, Intra Gastric Feeding	1
8	RDS, Apnea	Paladai feeds, Vitamin D3, Nasoclear drops	1
9	LBW	Vitamin k, KMC(kangaroo mother care)	1
10	LBW,RDS	Vitamin K, O ₂ inhalation, Dextrose10%, Taxim	1
11	LBW	Vitamin. k, Zinc, Vitamin D3, KMC (kangaroo mother care)	1
12	LBW	Vitamin K, zinc, Vitamin D3, Calcimax, KMC(kangaroo mother care)	10
13	LBW, RDS	Vitamin k, zinc, Vitamin D3, Calcimax, nasoclear drops,O ₂ inhalation, KMC(kangaroo mother care),Intra Gastric Feeding	3
14	LBW	Vitamin.K, Amikacin, Rantac, vitamin D3,Calcimax,Taxim,Paracetamol	1
15	LBW	Vitamin.K,O ₂ Inhalation ,zinc, calcimax, KMC(kangaroo mother care)	4

DISCUSSION:

Preterm births remain one in every of the foremost serious and significant obstetric problem. Efforts to predict and prevent the occurrence of preterm birth are difficult because of our lack of understanding of the chemical mechanism of labor and also the multiplicity of medical and socioeconomic factors related to preterm birth which showed similarity conducted by **Miskatul Mustafa Mishu et al**⁷. In our study, the incidence rate of PTD is 31.52% which showed similarity

conducted by **Shaveta Garg et al**¹² reported an incidence of 11.16%.

In our study period, the more premature deliveries were within the age group of 18-29 years, i.e., around 65 (81%) and this coincides with studies conducted by **Shehla Jamal et al**¹³ as they reported that maximum preterm deliveries occur within the age group of teenagers and elderly. In this study, we observed that more premature deliveries within the normal-weight woman having 18.5-24.9 kg/m², i.e., around 49 (61%) and it had been supported by a study of

Anna Clara F. Vieira et al¹⁷ as they describe that woman weighing 23.6 kg/m² are more liable to PTD. In this study, we observed the more premature deliveries from rural areas i.e., around 51 (64%), this data supported by the studies conducted by **Mahajan et al**⁶ as they describe that women from rural areas are at the risk of PTD than urban. We observed more premature deliveries within the subjects with below primary education, i.e., around 43(54%), this data supported the study conducted by **Poonam Trivedi et al**⁴ as they describe that literature is one of all the barriers to the progress of premature deliveries. [Table-1]

In this study, we observed more premature deliveries i.e., around 69% of subjects with no past medical history and this data doesn't accept as true with the study conducted by **Sarah Vause et al**¹⁸, as they summarize that previous medical record is one in all the risks factors for PTDs.

In our study majority (78%) were late PTDs, and these findings are correlated with the studies conducted by **Shaveta Garg et al**¹² and **Farhin Radhanpuri**¹⁹ as they showed that women with a gestation of >34 weeks or quite woman with 28-30 weeks. Around 16% of our study subjects have undergone abortions and this study correlates with **Mahajan et al**⁶ concluded that women (25%) with a history of abortions were at more risk for PTDs. We found that the majority of the women were having no history of miscarriage and only 2 women had a history. So, miscarriage isn't a reason/risk factor for PTDs in our study subjects. But studies conducted by **Sarah Vause et al**¹⁸ and **C. Oliver-Williams et al**²⁰ said that the presence of a previous history of miscarriage is one of all the dangerous factors to occur PTD.

In our study, 14% had a history of PTD, our findings correlate to the study conducted by **Mahajan et al**⁶ as they concluded that women with PTD history are at more risk for PTDs than term deliveries. We observed majority (44 %) of the study subjects were diagnosed with low hemoglobin level i.e. ≤ 8 gm/dl. Hence our findings are kind of like the study conducted by **Farhin Radhanpuri**¹⁹ as they concluded that women with the presence of moderate anemia were at high risk for PTDs. In our study, 17.5% of the subjects were found with oligohydramnios with an AFI of <8cm and 1.25% were with polyhydramnios (AFI >18 cm) and is correlated with the study conducted by **Mahajan et al**⁶ reported that 14% of their subjects were having oligohydramnios and polyhydramnios.

As per our study, we observed that the cervical length of maximum subjects is low (54%) i.e., between 1.2-2.3 cm. Our data is coinciding with the study administered by **Kristen Rundell et al**¹⁶ as they reported that a shorter cervix (<2.5cm) is one of the riskiest of preterm. [Table-2]

In our study, common risk factors among our subjects include anemia (45%) were prescribed with blood transfusion who was in danger and this data coincides with the study conducted by **Farhin Radhanpuri et al**¹⁹. Anti-hypertensives and prophylactic Magnesium sulfate were prescribed for preeclampsia women (24%), these findings are associated with the study conducted by **Baha M. Sibai et al**²¹ as they said that prophylactic magnesium sulfate improves the neuronal development of the fetus and prevents seizures. Arginine, alanine, and amino acid infusions were prescribed for oligohydramnios (17%) to elevate the AFI thereby promotes the maternal nutrition status, thus improves the fetal growth and this data coincides with the studies conducted by **Ashima Taneja et al**²² as they reported that amino acid infusions are needed to for the higher neonatal outcomes.

Blood transfusion was prescribed for the subjects with LSCS (17%), to prevent excessive blood loss and this data correlates with the study done out by **Fatima M. Akinlusi et al**²³ as they describe that a blood transfusion may recover the pregnant from massive bleeding. UTI (15%) will be treated with antibiotics, alkaliser, antispasmodic, as these can decrease the infection, reduce the acidic nature of the urine, burning micturition, and reduces the symptoms like leaking of urine respectively, this data correlated with the study carried out by **Oscar Storms et al**²⁴. Antibiotics and blood transfusion was prescribed for PPRM (15%), placental previa (10%), and these findings are correlated with the study administered by **N Medley et al**²⁵, **Lawrence Oppenheimer et al**²⁶ as they said that antibiotics are needed for PPRM, placental previa respectively. Eclampsia (7%) can be treated by antihypertensives and magnesium sulfate and these findings are associated with the study conducted by **Baha M. Sibai et al**²¹ as they reported that it should decrease the elevated blood pressure level and scale back the tone of the myometrium.

IUGR (5%) may cause retardation of fetal development because of reduction of blood supply and this data was the same as the study carried out by **Deepak et al**²⁷ as they reported that IUGR may result because of malnutrition and ends up in restriction of the fetus, so there is a desire of blood transfusion. Antidiabetics like insulin were prescribed for Gestational Diabetes Mellitus (2%) and this data correlates with the study conducted by **David K et al**²⁸ as they said that providing insulin may reduce the possibilities of operational deliveries in women. In our study, HELLP syndrome was managed by antihypertensives and magnesium sulfate to manage high BP and seizure activity, these findings were like the study conducted by **Baha M. Sibai et al**²¹ as they said that giving prophylactic magnesium sulfate may reduce the incidence of seizure. [Table-3]

In our study, prescribed management for preterm mothers includes, betamethasone as in 91% of pregnant women to enhance perinatal outcomes and this data correlates with the study conducted by **Kristen Rundell et al**¹⁶ as they said that it's going to decrease the possibilities of neonatal complications; Isoxsuprine hydrochloride in 11% pregnant women to cause uterine relaxation and prolongs the pregnancy and this data relates with the study conducted by **Vaja Pradyuman et al**²⁹ as they reported that it's going to delays the delivery up to 48 hrs. Magnesium sulfate is given to 19% of pregnant women to reinforce neural protection in the fetus, these findings are correlated to the study of **Kristen Rundell et al**¹⁶ as they conclude that antenatal magnesium sulfate may reduce the chance of preterm and improve neonatal development and progesterone therapy was given just for 1% of subjects to prevent the recurrent preterm. This data was supported by the study allocated by **Rupsa C. Boelig et al**³⁰. [Figure-1]

In our study, we observed the Low birth weight is the common neonatal complication i.e., around 47% and this data coincides with the studies carried out by **Lerna Desalegn Hailu et al**³¹ as they summarize that LBW is one of the common complications in neonates who born prematurely. Other complications found in premature neonates include apnea (1%), RDS (9%), deaths (6%), jaundice (2%), and these data findings are correlated with the study conducted by **Shaveta Garg et al**¹² as they reported that jaundice, RDS, neonatal morbidity were the other complications who delivered prematurely. [Figure-2]

At our study site, neonatal complications like LBW, neonatal illness were treated with KMC, paladai feeds and O₂ inhalation, this study correlates with the studies conducted by **Shehla Jamal et al**¹³. Amikacin, Taxim, and Rantac were

prescribed in 2 neonates to reduce infection and inhibit gastric acid secretion respectively, 2 were prescribed with Caffeine to stimulate effective breathing, and these findings coincided with the study carried out by **Mohammed Bahari et al**³². Phototherapy was advised for managing complications like jaundice and this data correlates with the studies conducted by **Shehla Jamal et al**¹³. [Table-4]

CONCLUSION:

This study concluded that preterm birth is an important reason for neonatal poor prognosis and death. The incidence rate of preterm birth was occurring in teenagers and the elderly due to several risk factors, which is due to poor literacy rate and low economic status. Low birth weight was found to be the commonest complication. Provider-initiated preterm birth can be minimized by early detection of risk factors. Therefore, early detection and treatment of a disease may reduce the risk of preterm birth. The risk of PTD and neonatal complications can manage by improving the quality of health of the mother with the help of medication. Health education, counseling will encourage pregnant women to seek antenatal care. Maintaining appropriate oral hygiene, adequate rest, and refrain from sexual activities, which may reduce the risk of preterm birth and improve better outcomes in neonates. There is a need for strengthening existing guidelines for the prevention of preterm birth and for managing neonatal outcomes.

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CONFLICTS OF INTERESTS:

None

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