International Journal of Contemporary Pediatrics
Doddamani RM et al. Int J Contemp Pediatr. 2023 Dec;10(12):1778-1782
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: https://dx.doi.org/10.18203/2349-3291.ijcp20233510

Original Research Article

A descriptive study on the risk factors of preterm birth with its maternal and fetal outcomes at a tertiary care hospital

Raghavendra M. Doddamani[1]*, Tejaswi V. Pujar[2], Gayathri L. Patil[2], Achala K. P.[2], Rakshith B.[2]

[1]Department of Paediatrics, Sambram Institute of Medical Science, KGF, Kolar, Karnataka, India
[2]Department of Obstetrics and Gynecology, S. S. Institute of Medical Sciences, Davangere, Karnataka, India

Received: 06 October 2023
Revised: 26 October 2023
Accepted: 27 October 2023

***Correspondence:**
Dr. Raghavendra M. Doddamani,
E-mail: drraghu.md@gmail.com

ABSTRACT

Background: India contributes to greatest number of preterm births all over the world. The global annual prevalence of preterm birth ranges from 9-12%. It is the most common indication for antenatal hospitalization and is the leading cause for under-five mortality. Aims and objectives were to study the incidence, risk factors, clinical presentation, effectiveness of timely intervention and, maternal and fetal outcomes of preterm birth.
Methods: A Prospective hospital based cross-sectional study was done from February 2021 to February 2022.
Results: The incidence of preterm labour in the study was 24%. Majority of cases presented with symptoms of UTI (47%), vaginal discharge (43%) and leaking per vagina (13%). Infections were the most common aetiology, 40% of cases had positive urine and vaginal swab culture. The most common neonatal complications were respiratory distress syndrome (7%) and neonatal sepsis (7%), others included seizures (2%), birth asphyxia (1%), enterocolitis (1%), hypoxic ischemic encephalopathy (1%), intracranial hemorrhage (1%), meningitis (1%) and pulmonary hemorrhage (1%). 5% of neonatal deaths were noted.
Conclusions: Urogenital infections were the commonest etiology for the onset of preterm labour, followed by gestational hypertensive disorders, previous history of preterm birth and anaemia in pregnancy. We conclude that in established preterm labour, aggressive management with antenatal corticosteroids, Magnesium sulphate for neuroprotection when indicated, antibiotic coverage and use of tocolytics with early in-utero transfer of mother to centres with equipped neonatal care units will improve the neonatal outcome.

Keywords: Preterm-labour, Urogenital-infections, Antenatal steroids, Preterm neonate

INTRODUCTION

Preterm birth is defined as babies born before 37 completed weeks of gestation, after the period of viability. In developed nations, the conventional lower limit of gestation is 20 weeks; in developing nations, it is 28 weeks. India is the number one country contributing to the greatest number of preterm births all over the world accounting for 35,19,100 births annually.[1] The global annual prevalence of preterm birth ranges from 9-12%.[2] Between 5 and 10 percent of pregnancies end prematurely. Preterm birth accounts for significant perinatal morbidity and mortality. It is the most common indication of antenatal hospitalization and is the leading cause of under-five mortality.[3] Approximately one million children die each year due to complications of preterm, of the survivors, many face a lifetime of disability including the

respiratory, gastrointestinal, immunologic, central nervous system, behavioural, and growth problems.[1-3]

Identification of risk factors and causes aids in the early diagnosis and risk-specific interventions, thereby improving the outcomes and reducing the burden on the healthcare system.[1,4]

The study aims at identifying risk factors for the onset of preterm labor based on detailed history taking, clinical examination, lab investigations, and its maternal and fetal outcomes. As the current medical interventions such as tocolysis, antibiotic therapy for infective etiology, antenatal steroids for lung maturity, and MgSO4 for neuro-protection have proven to decrease the adverse effects of preterm labor, establishing these risk factors will aid in early detection and possibly improving the outcomes through ideal interventions.[5,10,12,13]

Objectives

Objectives were to study the Incidence of preterm labour in women attending Obstetrics department, to analyse the risk factors and associated factors of preterm labor, to determine the effectiveness of timely intervention and to study maternal and fetal outcomes of preterm birth.

METHODS

A descriptive clinical study was done to analyse the factors contributing to the onset of preterm labour and its outcomes.

Data collection

The main source of data for the study were patients admitted to SS institute of medical sciences & research centre, Labor room, Davangere. A Prospective study over a period of 2 years, from February 2021 to February 2022 was done.

Inclusion criteria

Inclusion criteria were; women of age group 18-49 years, Gestational age of 28weeks 0 days to 36 weeks 6 days, Patients with signs and symptoms suggestive of preterm labor, Patients with Premature Preterm Rupture of membranes, Patients in preterm labor with complaints of urogenital infections, Patients with underlying medical conditions like cardiac disease, gestational hypertension, GDM/ overt diabetes mellitus, anemia etc and Patients in preterm labour with Mullerian anomalies, polyhydramnios or multifetal gestation.

Exclusion criteria

Exclusion criteria were; intra uterine death, Major fetal congenital anomalies, Patients not willing to consent for the study.

Procedure

An informed consent was obtained from the patient and demographic profile of the patient was collected and detailed history taking was done. A general physical examination was performed, and various systemic examinations, a complete obstetric examination was done. In case of patients in labour, progress is tracked and monitored for any signs of maternal and foetal distress with electronic fetal monitoring machine. Based on clinical judgement Tocolysis was given to obtain time for second dose of steroid coverage, Tab Nifidepine 20 mg stat followed by TID was given as tocolysis. Patients with less than 34 weeks of gestation also received MGSO4 for neuroprotection. In patients who set into spontaneous labour, augmentation of labour was done irrespective of gestational age. In patients with fetal distress and malpresentation cesarean section was done. The babies were followed up in the neonatal period for evidence of infection, respiratory distress, NICU admission and pyrexia. Mothers were followed in the immediate puerperium during their hospital stay for evidence of post-partum ailments.

Sample size and design

100 cases were included in the study. Sample size was calculated using following equation:

$$n = Z2.p.q/d2$$

Where; Z=Standardized Normal deviate (Z value) (Associated at 95% confidence interval=1.96), P=prevalence=10, q=(100-p)=(100-10)=90, d=Clinically expected variation= 6%. Therefore calculated sample size was n=96.04 (rounded off to 100).

Statistical analysis

Data was entered in the excel spread sheet. Descriptive statistics of the explanatory and outcome variables was calculated by mean, standard deviation for quantitative variables, frequency and proportions for qualitative variables.

RESULTS

The incidence of preterm labour in the study was 24%. Highest incidence of preterm labour was noted in patients aged 19 to 25 years, it was more in lower middle class, indicating the low socio-economic status as a risk factor for preterm labour. The higher prevalence was reported in Multigravidas (55%). Majority of preterm births in the study belonged in the late preterm range of 34 to 36 weeks (59%) (Table 1).

Complaints on admission of the study population is shown in (Table 2). Twin pregnancies were 3% and singleton pregnancies was 97%. 8 among 100 subjects had conception following treatment for infertility. 11%

patients among the study population had a history of previous preterm labour.

Table 1: Gestational age.

Gestational age (weeks)	N	%
VPT (very preterm), 28 to 30	6	6.0
EPT (early preterm), 30 to 32	18	18.0
LPT (late preterm), 32 to 34	17	17.0
LPT (late preterm), 34 to 36	59	59.0
Total	100	100.0

Table 2: Complaints on admission.

Complaints on admission	N	%
C/O leak PV	13	13.0
C/O bleeding PV	5	5.0
Imminent symptoms	3	3.0
H/O fever	5	5.0
Acute GE	5	5.0
Acute pancreatitis	1	1.0
Threatened scar rupture	1	1.0
Twins	3	3.0
C/O vaginal discharge	43	43.0
Symptoms of UTI	53	53.0
C/O pain abdomen	55	55.0

Table 3: History of gestational HTN, preeclampsia, gestational diabetes and associated medical disorders.

Comorbid conditions	N	%
H/O gestational hypertension and mild preeclampsia	18	18.0
Severe preeclampsia or eclampsia	4	4.0
Chronic hypertension	3	3.0
H/O gestational diabetes	5	5.0
Overt diabetic	1	1.0
Asthma	2	2.0
Beta thalassemia trait	1	1.0

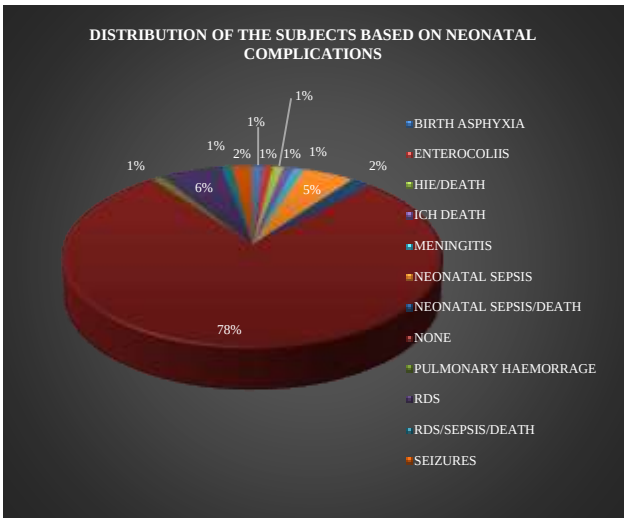

Figure 1: Neonatal complications.

History of bleeding in first and second trimester was seen in 10% cases. 3% patients had undergone prophylactic cervical encirclage at 16 to 20 weeks of gestation. Total 3% had IUGR and 3% had Doppler changes and 2% had oligohydramnios and two had polyhydramnios. Unicornuate uterus was seen in one patient, bicornuate uterus was seen in one patient and grade 3 placenta previa was seen in one patient. Anemia was present in 37% cases with preterm labour. Culture and sensitivity reports of high vaginal swab and urine are listed in (Table 4-5).

Table 4: Microbiological growth pattern on vaginal swab culture.

Vaginal swab culture	N	%
Acinetobacter	1	1.0
Candida SPS	3	3.0
E. coli	8	8.0
Group B streptococcus	2	2.0
Mixed growth	6	6.0
No growth	77	77.0
S. aureus	3	3.0
Total	100	100.0

Table 5: Microbiological growth pattern on urine culture.

Urine culture	N	%
E. coli	10	10.0
Klebsiella	1	1.0
Mixed growth	3	3.0
No growth	83	83.0
Proteus	1	1.0
Pseudomonas	1	1.0
S. aureus	1	1.0
Total	100	100.0

Table 6: Indications for LSCS.

Indications for LSCS	N
Non-reassuring fetal heart rate pattern	6
Prolonged PPROM	10
Twins with twin one in breech/transverse lie	3
IUGR with doppler changes	5
Oligohydramnios	2
Breech	2

Total 26% cases in the study presented in active preterm labour with cervical dilatation of more than 4 cms, 73% cases presented in early preterm labour. 89% patients had established contractions at admission. 72% patients delivered vaginally. 28% cases were taken up for emergency LSCS the indications of which are listed in (Table 6). Out of total 72 patients delivered who vaginally, in majority (48%) of patients, admission to delivery interval was 0 to 12 hours.

Total 21% cases received tocolysis with Tablet Nifedipine 20 mg stat dose followed by 10mg thrice daily, so as to

delay the progress of labour and permit time for corticosteroid therapy.

Table 7: Perinatal mortality.

Cause of neonatal death	N	Gestational age at birth
HIE	1	31 weeks 5 days
ICH	1	28 weeks 3 days
Neonatal sepsis	2	31 weeks and 30 weeks 4 days
RDS	1	31 weeks

Table 8: Number of days of NICU admission.

No of days of NICU admission	N	%
Mother side/Nil	58	58.0
1 day	3	3.0
2 to 14 days	24	24.0
>14 days	15	15.0
Total	100	100.0

All cases were given 1 dose of injection betamethasone 12 mg Intramuscular at admission and 79 subjects were given 2 doses of betamethasone. In the current study, the most common neonatal complications were, 7% cases born preterm had respiratory distress syndrome, 7% cases had neonatal sepsis, 5% neonatal deaths, 2% cases had seizures and others as shown in (Figure 1). Perinatal mortality and number of days of nicu admission for preterm birth have been shown in table 7 and table 8 respectively. The immediate post-natal complications in mothers included, 4% of atonic post-partum hemorrhage, 2% of perineal tears/para urethral tears, 2% had retained placenta and 1% had post-partum urinary retention.

DISCUSSION

Pre-term labor is one of the leading causes of infant mortality and morbidity in the world. The condition has lifelong effects on neurodevelopmental functioning and increased risk of chronic diseases in adulthood. The incidence of preterm labour at our institute was 24%, higher when compared to studies done by Rao et al, Trivedi et al as our institute is a tertiary care center with a greater number of referred cases needing NICU care. In the study the majority of the cases in preterm labour belonged to lower middle class (61%), signifying that the poor socio-economic status could lead to undernutrition, poor sanitation and infections which could mark as an important risk factor in the onset of preterm labour. Similar results were seen in the study conducted by Trivedi et al.[4]

According to Shehla Jamal et al the incidence of preterm labour was higher (86.6%) in multies, similar results were noted in the current study. In the study majority of preterm births are seen near term (34 to 36 wks) which is 59%, the results of which is similar to the study done by Jamal et al and Roozbeh et al. 59% of preterm births occurred at 34 to 36 weeks. Majority of the patients in the study presented with complaints of pain abdomen, white discharge PV followed by leaking PV. 53% participants had symptoms of UTI. The similar findings were noted in study conducted by Verma et al in which urogenital infection was 2.1 times more in women with preterm labour compared to term labour.[6] In the study a total of 40% cases collectively had positive urine culture and positive vaginal swab and a significant correlation was found between urogenital infections as a risk factor for onset of preterm labour.[11] Lamont concludes that infection is responsible in 40% of cases and earlier the abnormal genital tract colonization is detected the greater is the risk of adverse outcome.[7]

Total 72% patients delivered vaginally in the current study, the admission to delivery interval was less than 12 hours in 48% of the cases as comparable to the study done by Min jiang et al where 51.67% cases progressed into spontaneous preterm labour and there was no significant difference between delivery mode in preterm and term pregnancy as per the same study.[8] 74% of preterm babies in the study had birth weight in the range of 1.5 to 2.5 kg which is comparable to the study conducted by Jiang et al where the average birth weight was 2.3 kg±604 gms.[8] The incidence of respiratory distress syndrome was high. In the study made by Sehgal et al which reported that neonatal hyperbilirubinemia (78%) and RDS (65%) were the common causes for morbidity in extremely low birth weight babies.[9] The most common cause of death was RDS which accounted for 7% of NICU admissions less as compared to study done by et al which proved the efficacy of antenatal corticosteroids in preventing neonatal RDS.[14] Incidence of perinatal mortality in present study is 5%, all of which was seen in extremely low birth weight babies proving the importance of early and effective management in early and late preterm babies. The maternal morbidity during the study was 9% immediate post-natal and 24% early postnatal complications. Most common among them was post-partum hemorrhage followed by retained placenta in 2 cases common in cases with placental insufficiencies as quoted by Sehgal et al.[15]

Limitations

Limitations were; the study being a descriptive study conducted in a tertiary care centre with majority of referred cases, the results might not truly reflect the statistics in wider population and small sample size.

CONCLUSION

Preterm birth is the most important cause of neonatal mortality and morbidity. Early detection and prompt intervention can minimize the adverse outcomes of prematurity. Regular antenatal checkups, identifying risk factors and at-risk pregnant women with medical conditions like preeclampsia, treating infections early and creating awareness and providing health education about preterm labour helps in reducing preterm births. Aggressive management has shown to lower neonatal complications in preterm neonates, hence a proper plan on in utero transfer to units with NICU care must be done

based on the individual cases to improve neonatal outcomes.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Doddamani RM, Pujar TV, Patil GL, Achala KP, Rakshith B. A descriptive study on the risk factors of preterm birth with its maternal and fetal outcomes at a tertiary care hospital. Int J Contemp Pediatr 2023;10:1778-82.