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Analysis of Cases of Preterm Labour to assess Maternal and Fetal Risk Factors and Outcomes in a Tertiary Care Hospital

Swati Kagne[1], GaneshTondge[2], Poonamkalyankar[3]*
[1]*Assistant Professor,* [2]*Associate Professor and Head,* [3]*P.G, Final Year, Department of OBGY, S.R.T.R.GMC AmbajogaiIndia*
**Corresponding Author and reprint request to: Dr. Dr.Poonamkalyankar, S.R.T.R.GMC AmbajogaiIndia431517*

Abstract
Background*: Preterm delivery (PTD) is a significant public health problem associated with higher risk of mortality and morbidity in infants. Over 60% of the preterm births occur in Africa and south Asia.*
Objective: *To detect risk factors involved in preterm labor and to assess fetal outcomes in preterm labor.*
Methods*: A Prospective observational study was conducted among 300 cases of preterm labour admitted in Department of Obstetrics and Gynecology of a tertiary care centre during January 2021 to June 2022.*
Results: *among 300 preterm babies 90 needed NICU admission with morbidity rate of 30% with complications like; 34% (102) had jaundice, 15% (45) of them had RDS, 12% (36) of them had sepsis, 3% (9) had intraventricular hemorrhage, 5% (15)of them had birth asphyxia and 1% (3) of them had anomaly.*
Conclusions: *Preterm labour is significant cause of neonatal mortality 20%, and morbidity 30%,*
Keywords*: Preterm Labour, Maternal and Fetal Risk Factors, Outcomes,*

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I. Introduction:

Preterm birth (PTB) is an important cause of perinatal morbidity and mortality.[1.] Preterm birth is, worldwide, the most challenging problem in obstetrics, but the prevention of prematurity has been difficult and ineffective because of its multifactorial and partly still unknown etiology.[2] However, infections alone may be associated with up to 40% of spontaneous preterm births, especially those taking place at an early gestational age.[3] During the past two decades, the association between maternal genital tract infections and ascending infection in the choriodecidual interface leading to preterm birth has been of special interest.[4]

It has been widely recognised that early prediction, prevention and/or effective management of preterm labour will not only improve neonatal outcome and will also have a profound impact on society and long-term public healthcare costs. One of the most important unresolved issues currently confronting obstetricians is the prevention of preterm birth. The treatment of preterm labor, preterm delivery, and premature birth aremajor problems in obstetrics and pediatrics and also have major economic, psychological, and social impact.

Preterm labour complicates 5-10% of pregnancies and is a leading cause of neonatal morbidity and mortality worldwide.[5]It is a major public health problem in terms of neonatal mortality long-term morbidity (cerebral palsy, blindness, deafness, chronic lung disease) and health care costs both in the developing and the developed countries.Preterm birth is the single largest cause of perinatal mortality and morbidity in the world. 70% of all the perinatal deaths in infants without anomalies are due to preterm birth. Although the overall rate of preterm birth has been similar over the last 30 years, the survival rate of preterm infant has improved.It is estimated that up to 90% of all mortality among preterm infants without lethal malformations is due to immaturity.[6] The major diseases of the preterm infant are due to organ immaturity, with their incidence and severity inversely related to gestational age.[7]

Neonatal intensive care is one of the most expensive health care system interventions. Modern perinatal technology and care has increased the survival rate of extremely low birth weight (ELBW) infants in developed countries from 20% to60%. This favourable development in mortality has led to a concurrent increase in major neurological sequelae including cerebral palsy and mental retardation as long-term consequences, which occur in 10% to 25% of infants born at an early gestational age.[8]

To improve the outcome of very preterm neonates, it is needed to expand our knowledge on the etiology, prevention, and treatment of preterm labor and preterm delivery. Ideally, markers are needed to screen general pregnant women as a part of antenatal care to identify those at risk for preterm delivery and focus

preventive care on them. We also need to convince policy-makers by performing health-economic analyses. During the past two decades, there has been increased knowledge towards the etiology of spontaneous preterm birth, but there is still need for better markers to identify women at risk for preterm delivery.

Taking these factors into consideration, the present study was undertaken to identify the various factors responsible for preterm labour

II. Materials and Methods

A Prospective observational study was conducted among 300 cases of preterm labour admitted in Department of Obstetrics and Gynecology of a tertiary care centre during January 2021 to June 2022. The study was approved by Institutional Ethics Committee.Informed consents were obtained from subjects involved and participation-information sheet was filled out. Based on the inclusion and exclusion criteria, the subjects were selected.

Inclusion criteria- Women hospitalized for preterm labor

Exclusion criteria- Patients who are not willing to give consent for the study

A detailed history including age, parity, obstetric history with special reference to the exact time of rupture of membranes, history of preterm labour in previous pregnancy, complaints of fever, foul smelling discharge, duration of labour pains (when patients presented in labour).Also menstrual history with reference to regularity of cycle, and the date of last menstrual period were recorded.

Special attention was paid to presence or absence of conventional risk factors for preterm labour. Leaking per vagina i.e, rupture of membranes was diagnosed by speculum examination.

In all patients general examination and systemic examination was done with reference to temperature, pulse, B.P, and in obstetric examination fundal height, presentation, lie, position, and attitude of fetus, amount of liquor, size of the fetus and confirmed by USG.

After cleaning the external genitalia, a sterile speculum examination was undertaken to reveal the presence or absence of amniotic fluid leak through cervix. High vaginal swab was collected and sent to the laboratory for culture.

Per vaginal examination was done to note the cervical effacement, dilatation, consistency, presence or absence of membranes, presenting part, station of the presenting part, pelvic assessment was also done.

All patients with ruptured membranes were given prophylactic antibiotics. Hourly pulse rate, Blood pressure, fourth hourly temperature chart, presence or absence of uterine contractions and fetal heart rate were recorded.

Gestational age assessment was done by the knowledge of the date of last menstrual period, findings of initial antenatal examination and by ultrasonographic examination.

Injbetamethsone 12 mg was given at the time of admission and then after 12 hours. Tocolytics were given only to gain time for coverage of steroids administered and was not given for those in active phase of labour,where signs and symptoms of chorioamnionitis present , and for those with antepartumhaemorrhage and fetal distress. Tocolytic given was Nicardia orally.

In patients with fetal distress and malpresentation cesarean section was done. The condition of the baby at birth was noted by Apgar scoring at 1 and 5 minute, soalso the weight of the baby. The babies were followed up in the neonatal period for evidence of infection, respiratory distress, and pyrexia. Babies with birth asphyxia and respiratory distress were kept in NICU for observation, and babies were treated with antibiotic and i.v. fluids.Prophylactic antibiotics were administered to babies who were born, with latent period of membrane ruptured for more than 24 hrs.

Statistical Analysis: For statistical analysis of difference between groups, independent sample t test and Chi square test or analysis of covariance will be applied when appropriate. Statistical significance will be accepted when $p<0.05$.

III. Results:

In present study the prevalence rate of preterm of120 cases in age group between 18-20 years is 40%, 105 cases in 21-25 years (35%), 60 cases in 26-30 years (20%), 6 cases in 31-35 years (2%) and 9 cases in >35 years (3%).

In present study 28-30 weeks of gestational age group has the highest prevalence rate of 150 cases (50%), compared to 31-33 weeks of gestation 90 cases (30%) and 34-36 weeks of gestational age of 60 cases (20%).

Preterm labour cases are high in unregistered cases of 210 (70%) compared to registered cases 90 (30%).

Primigravida has the highest prevalence rate of 195 cases (65%) compared to multigravidas of G2 – 90 cases (30%), G3 – 12 cases (4%) and G4 – 3 case (1%).

Among the 300 patients 74%(222) of the patients had high risk factors. Commonest among them were indicated preterm birth for hypertensiv disorders in pregnancycomprising 15%(45), other risk factor like malpresentation12%(36) , premature rupture of membranes 10% (30), Antepartumhaemorrhage 5%(15),multiple pregnancy5%(15),oligohydramnios 8%(24), polyhydramnios4%(12), h/o preterm birth 5%(15), medical risk factor 10% (30). 26% (78) cases had no known risk factors. Anaemia is present in 4%(12),Urinary tract infection is present in 3% (9) and diabetes in 1%(3), heart disease in 1% (3) and chronic hypertension in 1% (3).

Table 1: pregnant patients with high risk factors

RISK FACTOR	NO. OF CASES	PERCENTAGE
HYPERTENSION	45	15
PROM	30	10
APH	15	5
MULTIPLE PREGNANCY	15	5
OLIGO	24	8
POLY	12	4
MALPRESENTATION	36	12
H/O PRETERM	15	5
MEDICAL RISK FACTOR	30	10
UNKNOWN	78	26
TOTAL	300	100

TABLE 2- Distribution of cases as per Medical risk factors

MEDICAL RISK FACTOR	NO. OF CASES	PERCENTAGE
HYPERTENSION	3	1
HEART DISEASE	3	1
DIABETES MELLITUS	3	1
UTI	9	3
ANEMIA	12	4
TOTAL	30	10

In our study only 5%(15) of them had previous history of preterm labour.

TABLE 3- Distribution of cases as per antecedent risk factor for preterm labour

RISK FACTOR FOR PRETERM LABOUR	NO. OF CASES	PERCENTAGE
YES	222	74
NO	78	26
TOTAL	300	100

78

In the present study majority of cases had an antecedent risk factor for preterm labour 74%(222).

TABLE 4- Distribution of cases as per vaginal swab

VAGINAL SWAB	NO. OF CASES	PERCENTAGE
POSITIVE	60	20
NEGATIVE	240	80
TOTAL	300	100

Table 6 shows the total no of patients with positive vaginal swab culture. Among the 300 patients 20% (60) of them had vaginal infection.

TABLE 5- Distribution of cases as per vaginal swab report

REPORT	NO. OF CASES	PERCENTAGE
CANDIDA	36	12
E COLI	18	6
STAPHYLOCOCCI	6	2
TOTAL	60	20

Commonest organism was Candida followed by Ecoli and Staphylococci.

Highest prevalence rate is seen in Spontaneous deliveries of 150 cases (50%) compared to Induced labour of 105 cases (35%) and Caesarean section of 45 cases (15%).Most of them 75% (225)were low birth weight (< 2.5 kg).

The no of neonates who required NICU admission. Nearly 30% (90) of the neonates required NICU admission.

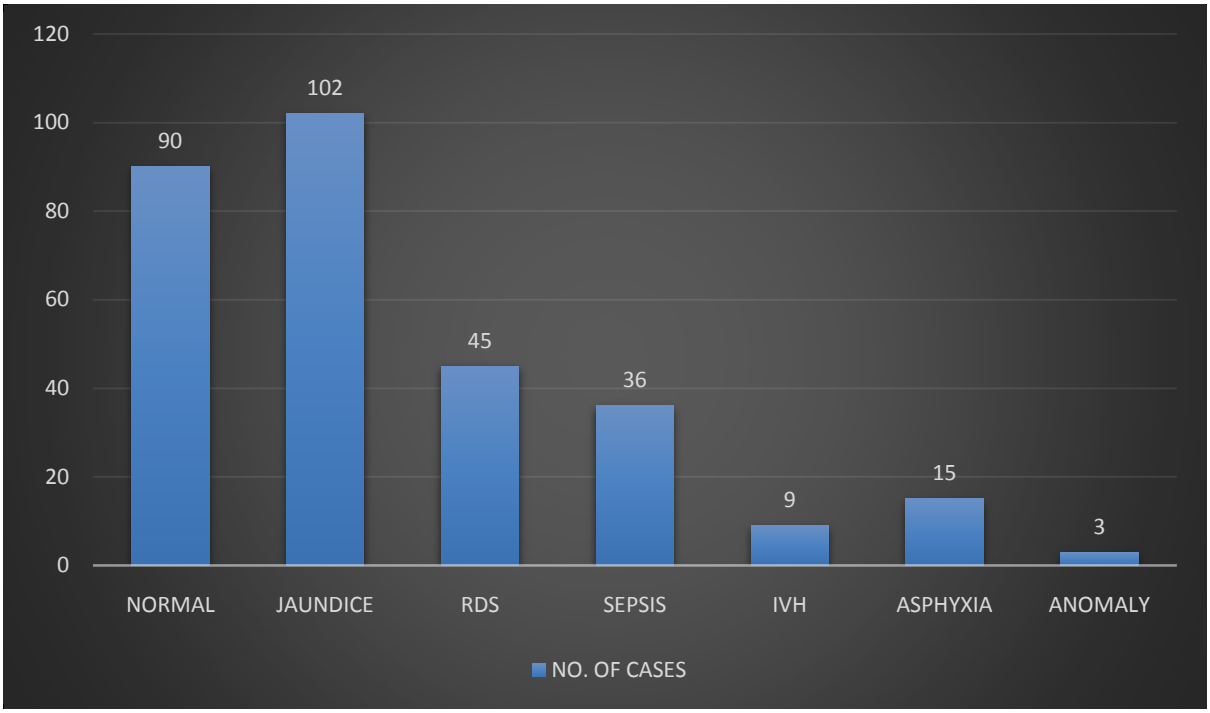

TABLE 6- Distribution of cases as per fetal outcome

FETAL OUTCOME	NO. OF CASES	PERCENTAGE
NORMAL	90	30
JAUNDICE	102	34
RDS	45	15
SEPSIS	36	12
IVH	9	3
ASPHYXIA	15	5
ANOMALY	3	1
TOTAL	300	100

The complications of the preterm babies. 34% (102) had jaundice, 15% (45)of them had RDS, 12%(36) of them had sepsis,3% (9) had intraventricular hemorrhage, 5% (15)of them had birth asphyxia and 1%(3) of them had anomaly.
30% (90) babies had no complications

CHART 10 A- Distribution of cases as per fetal outcometable10b- distribution of cases as per perinatal mortality

FETAL OUTCOME	NO. OF CASES	PERCENTAGE	NO. OF DEATHS	PERCENTAGE
NORMAL	90	30	3	1
JAUNDICE	102	34	15	5
RDS	45	15	21	7
SEPSIS	36	12	6	2
IVH	9	3	6	2
ASPHYXIA	15	5	6	2
ANOMALY	3	1	3	1
TOTAL	300	100	60	20

In the present study there were 102 neonates who had jaundice among them 15 died,45 neonates had RDS among them 21 died, 36 neonates had sepsis among them 6 neonate died,9 neonates had intraventricular hemorrhage among them 6 died, 15 neonates had Birth asphyxia among them 6 died. 3 neonates died due to anomaly.90 normal neonates with no complications, among them 3 died.

IV. Discussion:

As per Chaudhary et al study the age with maximum preterm labour is 20-25 years comprising 85%.[9] As per Preeti et al study the age with maximum preterm labour is 21-30 years comprising 65%.[10]As per Shehla et al study the age with maximum preterm labour is 25-29 years comprising 44%.[11]

As per Tellapragada et al study the mean gestational age for preterm labour is 35.6+/-2.3 weeks.[12]As per Shehla et al study the gestational age with preterm labour is 32-36 weeks comprising 55.7%.[11]As per Mamatha et al study the gestational age with preterm labour is 34-36 weeks comprising 53%.

As per Pandey et al study the % of unregistered preterm labour is 77.93%.[13]As per Chaudhary et al study the % of unregistered preterm labour is 53%.[14]As per Preeti et al study the % of unregistered preterm labour is 77.93%.[10]

As per Chaudharyet study the %of primigravida with preterm labour is 60%.[14]As per Preeti et al study the %of primigravida with preterm labour is 52%.[10]

As per Present study the %of primigravida with preterm labour is 65%.As per Chaudhary et al study the % of mode of delivery for preterm labour is 96% for vaginal delivery and 4% for lscs.[14]

As per Laxmi et al study the % of low birth weight (<2.5kg) in preterm labour is 33.3%.[9]As per Akhter et al study the % of low birth weight (<2.5kg) in preterm labour is 42%.[15]As per Preeti et al study the % of low birth weight (<2.5kg) in preterm labour is 90%.[10]

As per Chaudhary et al study the % of NICU admission is 46% and mortality is 12% and the most common cause for mortality is asphyxia.[14]As per Laxmi et al study the % of NICU admission is 43.33% and mortality is 20%.[9]As per Akhter et al study the % of NICU admission is 83% and mortality is 35% and the most common cause for mortality is RDS.[15]

As per Pandey et al study the most common cause of preterm labour is infection comprising 65.51%. H/o preterm birth was seen in 14.14%. Positive vaginal swab was seen in 32.41% with most common organism.[13]

As per Tellapragada et al study the most common cause of preterm labour is infection comprising 8.9%. H/o preterm birth was seen in 5.37%. Most common organism seen on vaginal swab is candida.[12]

As per Shehla et al study the most common cause of preterm labour is PROM comprising 26.6%. H/o preterm birth was seen in 6.5%. Positive vaginal swab was seen in 42.3% with most common organism candida.[11]

As per Shannon et al study the most common cause of preterm labour ishypertension comprising 21.07%. H/o preterm birth was seen in 12.11%. Positive vaginal swab was seen in 8.29% with most common organism candida.[16]As per Mamatha et al study the most common cause of preterm labour is hypertension comprising 32.9%. H/o preterm birth was seen in 6.4%.[17]

As per Present study the most common cause of preterm labour is hypertension comprising 15%. H/o preterm birth was seen in 5%. Positive vaginal swab was seen in 20% with most common organism candida.

Conclusion: Perinatal survival improvement can be achieved by improving antenatal check upscontrol of hypertension, prevention and treatment of anemia,treatment of infections,judicious use of cervical encirclage ,good NICU care,use of tocolysis and steroids along with timely referral to higher centres.

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