ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 7, Issue – 4, July – 2022 , Page No. : 175 - 180

A Retrospective Study of Risk factors for Preterm Birth and its Perinatal Outcome

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Citation this Article: Dr. Ronak Bhankhar, Dr. Kishan Kumar Kanani, "A Retrospective Study of Risk factors for Preterm Birth and its Perinatal Outcome", IJMSIR- July - 2022, Vol – 7, Issue - 4, P. No. 175 – 180.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Preterm labour & birth are a leading cause of perinatal complication, morbidity & mortality. Hence it is of concern for both obstetrician as well as pediatrician to understand its risk factors to prevent & treat preterm birth.

Method: A retrospective study was carried out among 100 antenatal patients who delivered preterm between 28 – 36 weeks of gestation during a period of 12 months. Patients were evaluated for the risk factors by detailed antenatal history of Urinary Tract Infection, excessive vaginal discharge, previous preterm delivery, clinical examination & ultrasonography.

Results: Out of 100 patients 32% had PPROM (Preterm Premature Rupture of Membrane) being the most common factor leading to preterm labour and birth followed by uterovaginal infection with 28%. Maternal complications like preeclampsia, eclampsia also contributed significantly with 30% patients. Maternal anemia, malnutrition, poor weight gain lead to low birth weight in neonates. Amongst 110 neonates 82 required NICU admission, 38 had neonatal jaundice, 22 had birth asphyxia, while neonatal mortality was seen in 15.

Conclusion: Majority of the risk factors observed in the study like anemia, malnutrition, genitourinary infection are preventable and their treatment with proper history, examination, antenatal care and use of corticosteroids can significantly improve perinatal outcome.

Keywords: Preterm labour, PPROM, Genitourinary infections.

Introduction

Preterm labour and birth is defined as onset of labour with birth of a baby after 20 weeks & before 37 weeks of gestation. Preterm birth causes complications like cerebral palsy & long-term motor, cognitive, hearing and learning disabilities in long term, hence it is necessary to identify the risk factors causing preterm birth to reduce the incidence of preterm birth. The incidence of preterm birth is 11.9% in developing countries.

Preterm labour is established, when regular uterine contractions are at least 4 in 20 minutes or 8 in 60 minutes, with progressive changes in cervix in form of effacement of ≥80% & cervical dilatation of more than 1 cm. Preterm birth can be followed by spontaneous onset of preterm labour following PPROM or it can be induced/iatrogenic preterm birth by induction of labour

or elective cesarean birth before 37 completed weeks of gestation for maternal or fetal indications. 40-45% preterm birth occurs following spontaneous labour, 30% due to PPROM & 30% are iatrogenic termination for maternal/ fetal indication.

The earlier the onset of labour, infection is more likely to be implicated in the pathogenesis. Amongst molecular basis progesterone with drawl, oxytocin stimulation, ascending infection & premature decidual activation are important ones. Other obstetric risk factors include previous preterm birth, cervical insufficiency, over distension of uterus due to hydramnios or multiple pregnancy, antepartum hemorrhage. While preterm termination can be due to medical & obstetrics indications like severe pre-eclampsia, eclampsia, intrauterine growth restriction, abruption placentae & intrauterine fetal death.

The risk of recurrence is from 17-40% depending upon the number of previous preterm deliveries. Cervical incompetence, history of one or two first trimester abortions, interval between the pregnancies ≤12 months increases the risk of preterm labor. One of the major factor contributing to increasing rate of preterm birth is increased rate of multiple birth with greater use of assisted reproductive techniques & increased proportion of birth among women ≥35 years.

Earlier the gestational age of preterm labour, more are the chances of infective etiology. Ascending infection such as abnormal vaginal flora, bacterial vaginosis, & aerobic vaginitis are associated with increased risk of preterm birth. As symptomatic bacteriuria, systemic infections like pyelonephritis, pneumonia, acute appendicitis often leads to increased uterine activity & preterm labour.

Methods

The study was carried out among 100 antenatal patients who delivered preterm at department of obstetrics & gynecology from 1st January 2021 to 31st December 2021 at G.M.E.R.S. General Hospital & Medical College Junagadh. The patients were studied by their history, examination & ultrasonography to identify the risk factor for preterm labour & preterm birth and to know the fetal outcome.

Inclusion criteria

- ACOG guideline was used to identify patient with preterm labour- 4 uterine contractions in 20 minutes or cervical dilatation ≥1cm or cervical effacement ≥80%.
- Patients who had preterm labour & delivered preterm were included in study.
- WHO guideline was used to define a preterm delivery which is delivery before 37 weeks of gestation.

Exclusion criteria

Patients with intrauterine fetal death and fetal anomaly were excluded from study.

All the patients included in the study were evaluated with detailed history, clinical examination, laboratory investigations like complete hemogram, urine routine & micro scopic examination, vaginal & cervical swab culture to identify any infection. Treatment was given as per the reports. Patients were evaluated to identify the risk factors for preterm labour which includes obstetric, medical, socio-economic factors and were noted. Corticosteroids in form of betamethasone or dexamethasone were given to all patients before 34 weeks of gestation for fetal lung maturity after admission and they were followed up till delivery and discharge from hospital.

The outcome of the study was recorded in terms of risk factors associated with preterm labour & delivery,

gestational age at the time of delivery, mode of delivery, perinatal outcome and any associated complications if any were documented. Fetal outcome was documented with Apgar score at birth, birth weight, immediate neonatal complications and need for NICU admission.

Results

The study was carried out amongst 100 pregnant patients who delivered pre term at our institution & demographic, obstetric & medical risk factors were taken into consideration.

Table 1: Maternal Age Distribution

Maternal Age	N=100	%
<20	10	10
20-25	30	30
26-30	40	40
31-35	15	15
>35	5	5

Above table shows age distribution of patients who had pre term labour with mean age being 27 years. 70% patients were in 20-30 years age group, while 15% in 30-35 years.

Table 2: Distribution by Maternal Weight

Maternal Weight (Kg)	N=100	%
40-45	18	18
46-50	40	40
51-55	25	25
56-60	12	12
≥60	5	5

As per above table 83% patients had weight ≤55 kgs, as majority of the patients belonged to lower socioeconomic class and were malnourished.

Table 3: Distribution as per Parity

Obstetric Score	N=100	%
Primigravida	45	45
Para – 1	30	30
Para – 2	15	15
Para ≥ 3	10	10

Table 4: Maternal Hemoglobin & Pre term birth

Hemoglobin	N=100	%
<8 gm%	18	18
8-10 gm%	70	70
>10 gm%	12	12

As per table-3 in the present study 45% patients were primigravida, while 55% were multiparous amongst which 18 had history of pre term birth in previous pregnancy & 20 had history of abortion. As per table-4 in our study 88% patients were anemic with hemoglobin <10 gm% and majority of the patients were multiparous belonging to lower socioeconomic class with history of repeated child birth and less inter pregnancy interval contributing to preterm labour & birth.

Obstetric Outcome

Table 5: Distribution as per Risk Factors for Preterm Birth

Risk Factors	No. of Patients (%)	Fernandes SF et al[1]	Singh U et al[2]
PPROM	32 (32%)	-	25.9%
Cervical Incompetence	8 (8%)	-	-
Urinary Tract Infection	14 (14%)	13.65%	8.41%
Vaginal Infection	12 (12%)	-	12.25%
Preeclampsia/ Eclampsia	30 (30%)	21.07%	-
H/O Preterm birth	18 (18%)	-	-
H/O Abortion	20 (20%)	-	-
Active Preterm labour	25 (25%)	-	68.5%
Multiple Pregnancy	8 (8%)	9.77%	4.1%

Ante partum Hemorrhage	9 (9%)	10.9%	10.8%
Polyhydroamnios (AFI >25 cm)	5 (5%)	1.46%	3.4%

In our study 48% patients belonged to gestation age 34-36 weeks & 45 patients were primigravida whereas 55 patients were multiparous of which 30 were para-1, 15 patients were para-2 & 10 patients were para≥3 & 20 patients had previous history of abortion & 18 had history of preterm birth in previous pregnancy.

Amongst risk factors for preterm labour Preterm Premature Rupture of membrane was found in 32 patients while 28 patients had infection including both urinary tract and vaginal infection of which bacterial vaginosis was more frequent. Amongst obstetric risk factors 30 had preeclampsia/ eclampsia, 8 patients had multiple gestation of which 6patients had twin pregnancy & 2 had triplets,8 had cervical incompetence, while 5 had polyhydroamnios. 25 patients had spontaneous preterm labour without any risk factors or induction of labour.

In our study 68% patients had vaginal delivery while 32% had undergone cesarean section.

Neonatal Outcome

Table 6: Birth weight of Neonates

Birth Weight (gms)	No. of Neonates
<1000	12
1000-1499	30
1500-1999	34
2000-2499	26
≥2500	8

Table 7: Neonatal Morbidity in Pre term Baby

Neonatal Morbidity	No. of Neonates (%)	Garg Set al[3]
NICU Admission	82 (74.54%)	84%
Neonatal Jaundice	38 (34.54%)	30%
Neonatal Mortality	15 (13.63%)	14%
Birth Asphyxia	22 (20%)	18%
Respiratory Distress Syndrome (RDS)	14 (12.72%)	16%
Hypoglycemia	4 (3.63%)	6%
Hypothermia	6 (5.45%	12%
Septicemia	6 (5.45%)	9%

In our study with 100 antenatal patients there were 110 neonates due to multiple gestation with 6 twin pregnancy and 2 triplets. 60 babies had low birth weight (LBW), 30 had very low birth weight (VLBW) & 12 had Extremely low birth weight (ELBW) due to preterm delivery.

Among neonatal morbidities 82 neonates required ICU admission with neonatal jaundice being most common complication in 38 neonates followed by birth asphyxia in 22 babies & respiratory distress syndrome in 14 neonates. Neonatal mortality was seen in 15 babies and all of them had birth weight <1500 Gms and complications due to low birth weight showing significant impact of birth weight and prematurity on mortality rate. Hypoglycemia was found in 4 neonates while 6 neonates had hypothermia and septicemia.

Discussion

In our study 70% patients were in the age group of 20-30 years which is comparable to study by Fernandes et al[1] with 69% patients. 88 % patients had hemoglobin <10 gm% as majority of the patients belonged to lower socio-economic class & had poor nutrition, similarly study by Singh et al[2] showed that risk for preterm delivery is higher in patients belonging to lower socioeconomic class with low BMI & poor nutrition.

There were 45% primigravida, while 55% patients were multiparous, which is coma parable to study by Singh et al[2] where 49.4% were primigravida & 50.6% were multiparous. Only 10% patients belonged to grand multipara comparable with study by Fernandes et al[1]. There were patients with high-risk pregnancy with preeclampisa, eclampia, antepartum hemorrhage,

multiple gestataion as majority of the patients were referred to our tertiary centre for management. The decreasing number of grand mulitpara is probably due to increasing rate of contraception practice as more number of couples are motivated to accept contraception.

Amongst obstetric risk factors for preterm labour & delivery Preterm Premature Rupture of Membrane (PPROM) was the most common factor found in 32% patients, comparable to study by Singh et al[2] & Pool et al[4] with 25.9% & 30% respectively. 2nd common risk factor was gestational hypertension complicated by preeclampsia & eclampsia with 30% patients who needed preterm delivery for maternal or fetal risk compared to 21.07% patients by Fernandes et al[1] & 14% by Tas keen et al[5].

Cervical incompetence (cervical length ≤2.5cm) is a new risk factor for preterm labour. Genitourinary infection account for 26% in study with urinary tract infection 14% & vaginal infection 12% respectively and patients presented with history of increased frequency of micturation, itching & discharge per vaginum. Study by Singh et al[2] showed 20.7% patients with genitourinary infection as risk factor for preterm birth. Ascending vaginal infection is a common route for genitourinary infection and it may also lead to neonatal sepsis. In a study by McDonald et al[6] bacterial vaginosis and infection by E. coli, mycoplasma, urea plasma are commonly associated with spontaneous preterm birth.

Preterm birth is associated with significant neonatal morbidity. 74.5 % neonates required NICU admission with most common complication being hyper bilirubinemia & neonatal jaundice amongst 34.54% neonates followed by 20% with birth asphyxia & 12.7% with respiratory distress syndrome. In study by Garg et al[2] 84% neonates required NICU admission with neonatal jaundice in 30% neonates followed by asphyxia in 18% and RDS in 16%. Chauhan et al[7] had higher incidence of jaundice in 32.3%, RDS in 22.6% and asphyxia in 13.7%.

Antenatal corticosteroids were given to all the patients who presented with preterm labour, but only those who delivered after 24 hours of steroid coverage were considered steroid covered. 20 patients delivered steroid uncovered of which 14(12.72%) neonates developed RDS.

Neonatal mortality rate was 13.63% comparable to study by Singh et al[2] with 12.7% neonatal mortality. Majority of neonatal deaths had gestational age <34 weeks with birth weight <1500 gms, which explains direct correlation between gestation age & birth weight and early neonatal complications which lead to neonatal deaths. Hence it is very important to prolong pregnancy beyond 34 weeks of gestation and to give antenatal corticosteroids to mother for fetal lung maturity to prevent neonatal complications due to preterm birth.

Conclusion

Preterm birth poses significant risk of morbidity and mortality to neonates, hence it is of utmost importance to identify the risk factors and prevent them and to have timely diagnosis of preterm labour. From the study we can conclude that early disgnosis of anemia, malnutrition & proper antenatal history of previous abortion/preterm delivery, and history uterovaginal infections which is one of the most common risk factor can help in early diagnosis and identify patients at risk of preterm labour and early treatment of infection can prevent it. Identifying patients with cervical incompetence and treating them with cervical cerclage has proved to be effective in prolonging pregnancy to term. Corticosteroids and injection Magnesium sulphate have

proved to be effective in preventing neonatal complications due to preterm birth like RDS and cerebral palsy when administered at least 24 hours prior to delivery. Hence along with mother intensive neonatal care should also be available as there is significant association of preterm birth with low birth weight, need for NICU admission and tackling neonatal neonatal complications.

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