Paediatrics Section

Risk Factor Evaluation of Preterm Labour/Births in Rural Medical College Hospital

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ABSTRACT

Introduction: Preterm Birth (PTB) is a major problem associated with neonatal morbidity and mortality globally. In developing countries magnitude of the problem is much more.

Aim: The present study was undertaken to find out the incidence of preterm labour/births, to evaluate different related risk factors and to assess the neonatal mortality in PTBs.

Materials and Methods: This cross-sectional study was conducted in a Maternal and Neonatal Units of Rural Teaching Hospital among all cases who delivered during study period of two months from mid-February 2019 to mid-April 2019. Probable maternal risk factors for preterm labour, neonatal clinical profile and risk factors for neonatal mortality were recorded. Frequencies and proportion of variables were computed.

Results: The incidence of PTB/labour was 8.5%. Pregnancy duration of less than 34 weeks was observed in 35.6% mothers. It was observed that major factors contributing to PTBs were hypertensive disorders of pregnancy, maternal medical illness/severe anaemia, Bad Obstetric History (BOH)/ previous preterm labour and Ante-Partum Haemorrhage (APH). Survival rate amongst preterm babies was 90.5%.

Conclusion: The morbidity amongst newborns is mainly caused by PTB. The study found lower incidence of PTB as compared to previous studies conducted in this region. Many of the risk factors evaluated are modifiable. Risk factor modifications and timely interventions will help in the reduction of PTBs and associated mortality.

INTRODUCTION

The Preterm Birth (PTB) is defined as birth before 37 completed weeks of pregnancy. It is the most important single determinant of adverse outcome in terms of both survival and quality of life in later life [1]. Pre-term birth is significant public health concern and leading cause of infant mortality and morbidity world-wide. Of estimated 130 million babies born every year globally, approximately 15 million are born preterm. India shares the largest burden of PTBs in Asian region and contributes to two thirds of such births in the region [2]. The incidence of PTB in India has been reported to be from 6.1 to 23.3% [3-8]. Cause of PTB is unknown in approximately 45-50% cases, while mechanisms of preterm labour remain poorly understood. Many factors like Premature Rupture of Membrane (PROM), medical diseases, and obstetrical complications like pre-eclampsia and APH are thought to be mainly responsible for onset of preterm labour [9,10]. Preterm infants are more prone to short and long-term neurocognitive and motor impairments together with increased risk of malnutrition, chronic diseases and early deaths [11]. Understanding the risk factors associated with these deliveries is essential to estimate the problem and formulate preventive protocols. The present study was conducted in teaching hospital situated in rural part of Maharashtra; catering obstetric services to nearby rural/tribal population to find out the present incidence, evaluation of related risk factors and immediate neonatal outcomes in PTB.

MATERIALS AND METHODS

This was a cross-sectional study. It was carried out in Maternal and Neonatal Units of Rural Hospital attached to medical college situated in rural Maharashtra over a period of two months from mid-February 2019 to mid-April 2019. The study population included all the Preterm newborn babies born with gestational age <37 weeks during the study period. The study excluded babies with known congenital anomaly in the fetus and intrauterine fetal demise.

Ethical clearance was obtained from the Institution's Ethics and Research Committee (RMC/UG-PG/2019/58/5.2.2019). Verbal informed consent was taken from the mother. PTBs were further categorised as very preterm (28-31/6 weeks),

moderate preterm (32-33/6 weeks), and late preterm (34-36/6weeks). Data were extracted from the folders of all preterm babies. Data collection was done by recording the required information from case sheets and by interview technique. Data collected on maternal profile included maternal age, parity, antenatal care and obstetric risk factors like antepartum haemorrhage, previous history of preterm labour/BOH and hypertension during pregnancy. Neonatal clinical profile and outcome were also recorded.

STATISTICAL ANALYSIS

The data were entered into the spreadsheet and analysed using Statistical Package for Social Sciences (SPSS) version 16.0 for Windows. Frequencies and proportion of variables were computed. The study estimated the incidence by dividing all live PTBs by all live births during the study period; other results were calculated by percentage method.

RESULTS

During study period of two months, there were 132 preterm labours and 147 preterm live babies. Maternal characteristics have been depicted in [Table/Fig-1]. A 42% mothers were younger (age less than 22 years) and one third mothers had lower education level.

Characteristics	Frequency (132)	Percentage
Age of mother (Years)		
<20	17	12.88%
20-22	38	28.79%
23-25	37	28.00%
26-30	29	21.97%
>30	11	08.33%
Education of mother		
Illiterate	07	05.30%
Literate or primary	37	28.03%
Secondary	78	59.09%
Graduate	10	07.58%

[Table/Fig-1]: Maternal characteristics.

Neonatal characteristics have been shown in [Table/Fig-2]. Of the total of 147 preterm babies, 71.43% had birth weight between 1.5-2.5 kg. There were more preterm males than female babies. One-third neonates were very/moderate preterm. Majority were delivered vaginally.

Risk factors for PTB have been shown in [Table/Fig-3]. Primary diagnosis was only considered for aetiological factor. Majority of deliveries showed no known aetiological factor and were labeled idiopathic. Medical, obstetric factors identified were hypertensive disorders of pregnancy, APH, BOH or previous history of preterm labour, and multiple gestations.

Characteristics	Frequency	Percentage
Gestational age (Weeks)		
<32	21	14.28
32-<34	27	18.37
34-<37	99	67.35
Birth weight (gm)		
<1000	04	2.72
1000-1499	38	25.85
1500-2499	105	71.43
Weight class for Gestational Age (GA)		
Small for GA	25	17
Appropriate for GA	118	80.28
Large for GA	04	2.72
Gender		
Male	76	51.7
Female	71	48.3
Gestation type		
Singleton	118	89.4
Twin	13	9.85
Triplet	01	0.75
Mode of delivery		
Vaginal	83	56.46
Caesarian Section (CS)	64	43.54

[Table/Fig-2]: Distribution of neonatal factors.

Aetiology	Frequency (132)	Percentage
Idiopathic	72	54.55%
Gestational problems- Hypertension, Pre-eclampsia etc.,	18	13.63%
Maternal Medical Illness/Severe Anaemia/Infections etc.,	14	10.6%
Multiple Gestations	14	10.6%
Previous history of preterm labour/ Bad obstetric history	8	6.06%
Haemorrhage (APH), Placental problems	6	4.55%

[Table/Fig-3]: Frequency of preterm labour/birth according to the aetiology.

Other risk factors which may have contributed to preterm labour/birth have been shown in [Table/Fig-4]. One or more than one other risk factor/s were found to be associated with PTB. Out of total 147 babies 133 survived. Risk factor evaluation for neonatal mortality with different variables has been shown in [Table/Fig-5].

DISCUSSION

The study describes the incidence, related risk factors and mortality associated with PTBs based on data collected from a

Risk factors	Frequency
Maternal malnutrition	47
<3 antenatal (ANC) visits	33
Working/Excessive physical activities	35
Low socioeconomic status	91
Tobacco use	08
Remote Place of residence during present pregnancy	13

[Table/Fig-4]: Other risk factors associated with preterm labours.

Variable	Survival (133)	Death (14)
Gestational age (Weeks)	34±2.2	32±3.6
Birth weight (Kg)	1.73±0.3	1.29±0.35
<1000 (gm)	2	2
1000-1499 (gm)	31	7
1500-2499 (gm)	100	5
Small for Gestational Age (SGA)	18	7
Appropriate for GA	111	7
Large for GA	4	0
Length of Stay (days)	7.23±4.38	14.5±9.78

[Table/Fig-5]: Risk Factors for mortality.
GA: Gestational age

teaching Hospital situated in rural part of Maharashtra. During the study period of two months, 132 women with preterm labour who delivered live baby/ies were included. Out of the total 1553 deliveries, 132 were preterm deliveries. Hence, the incidence of preterm labour/delivery in the present study was 8.5%. Many researchers have reported incidence varying from 6.1 to 23.3% amongst rural population [3,4,8]. Incidence was lower than reported in this region of Maharashtra [7,12]. Wide variation in the incidence may be due to population catered, the availability antenatal care and differences in risk factors.

Incidence of PTB was 13.2% in a study conducted in 2012 by Department of Gynaecology and Obstetrics. Decrease in proportion of PTB over last seven years is may be due to improvement in antenatal care through public health programmes, early identification of maternal risk factors and appropriate interventions [7]. In the present study, 14.28% of total PTBs were less than 32 weeks of gestation, 18.37% preterm babies were between 32-34 weeks of gestation and 67.35% babies were more than 34 weeks of gestation. Similar results have been reported in another study [13]. Majority of women (42%) were in the age group of 18 to 22 years. Gurung A et al., has reported young mothers as the risk factor for PTBs [14]. Several other studies have also reported linking both younger and older maternal age with PTBs [15,16]. However, a study conducted in Bangladesh found women aged <20 years to be protective for preterm, contrary to present findings [17].

One third mothers were either illiterate or just literate. Other studies have also shown similar associations related to lower education levels [14,17]. This suggests that better educational status of mothers has a protective effect on birth outcomes. The present study showed that the risk of preterm was higher among nulliparous mothers. This finding is supported by another study [18]. In contrast, a study has reported that multi-gravida were having more PTBs as compared to primigravida [7,12]. There were more preterm males with male to female ratio of 1.07:1. In contrast a study done by Gupta A et al., showed more preterm females than males [19]. In present study out of 132 preterm labour cases; 54(41%) women underwent Caesarean Section (CS) while 78 (59%) women delivered normally. In previous study, conducted in this institute, it has been reported that 84% cases delivered vaginally [7]. Increase in proportion of CS was indicated for the presence of risk factor/s for PTB. A study has observed higher risk of being preterm in a baby who is delivered by CS [20].

The aetiology of PTB is multifactorial. As mentioned in Bulletin of WHO, approximately 45-50% preterm labours are idiopathic; it has been observed in present study that in more than half cases of the preterm labour cases no specific aetiology could be identified. In previous study, conducted in this institute, it has been reported that aetiological factors were not found in 43% cases [7]. Major contributory aetiological factors identified were hypertensive disorders of pregnancy, Infections/Severe anaemia, multiple pregnancies, BOH/Previous preterm labour and APH (10%). In previous study conducted in this institute, it has been reported that aetiological factors were APH, over distension of the uterus and hypertension in pregnancy [7]. Other factors were maternal malnutrition, less than optimal antenatal care and low socio-economic status. Paudel L et al., in their study concluded that PROM was the most common risk factor followed by Hypertensive Disorders in Pregnancy (HDP) and APH [21].

Preterm delivery is one of the adverse outcomes believed to be resulting from ante-partum and perinatal hypoxia following acute or chronic utero-placental insufficiency in mothers with HDP [22]. Multiple pregnancies were the next common risk factor for preterm delivery in the present study. Similar observation has been reported in another study [19]. This could be due to over distension of the uterus caused by multiple pregnancy; which may stimulate premature uterine contractions resulting in preterm delivery [23]. In the present study, severe anaemia during pregnancy has been found to be contributory for PTB. The finding is corroborated by other studies [24,25]. Some associated risk factor responsible for preterm labour observed were less optimal or no antenatal care, low literacy level, tobacco use and low socioeconomic status. Rural residence definitely adds to the risk due to

paucity of the trained personnel, poor transport and lack of communication.

In the present study, maximum neonates delivered were in the gestational age group of late preterm. An 18.94% PTBs were below 32 weeks and (71.4%) had birth weight of >1.5 kg. 90.5% babies survived and discharged after variable period of hospital stay. Thus, proportion of neonatal mortality was 9.5%. It is much less than reported in other studies [5,13,21]. Higher neonatal mortality (27.27%) has been reported in previous study conducted by Department of Gynaecology and obstetrics [7]. Increase in survival among preterm babies may be due to use of steroids prior to delivery, better labour room care for babies born and improvement of neonatal care. Lower gestational age and birth weight, Intra-Uterine Growth Retardation (IUGR)/ SGA and shorter stay in neonatal care unit were the risk factors observed for neonatal mortality.

Limitation(s)

The study period was short. The identifiable risk factors were not compared with in pregnant women who delivered at term. Further studies are warranted to develop key intervention strategies to prevent both short and long term effects of PTBs.

CONCLUSION(S)

In the present study, the incidence of preterm labour was 8.5%. Survival rate amongst preterm babies was 90.5%. It has been observed that hypertensive disorders of pregnancy, multiple gestations, bad obstetrical history or previous preterm labour and APH were major aetiological factors for preterm labour. The other factors such as Younger maternal age, low literacy level, tobacco use, delay in seeking ANC services, and severe anaemia contributed to PTB. Frequent contacts with health facility throughout pregnancy to identify and manage gestational/medical problems, infections, and timely correction of other risk factors could help to reduce preterm labours, mortality of such preterm babies.

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