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EVALUATION OF THE ETIOLOGIES AND OUTCOME OF PRETERM LABOUR

Obstetrics & Gynaecology

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ABSTRACT

Objective : This is a Prospective cohort study carried out in department of Obstetrics and Gynaecology, Hi-Tech Medical College & Hospital, Bhubaneswar, a tertiary care centre, with the objective of knowing the etiology and outcome of preterm labour and formulate measures to prevent the onset of preterm labour and deal with complications arising from preterm labour.

Materials and methods : A total of 112 patients with preterm labour were included in the study. The investigations required to identify the etiology and also other routine investigations were carried out . The study was conducted over a two year period i.e. from November 2018 to October 2020 at Hi-Tech Medical College & Hospital, Bhubaneswar.

Results : Majority of the patients were in the age group of 20-24 years. Among them, majority of the patients belonged to the gestational age group of 28-34 weeks . Infection was the commonest cause of preterm labour. There is significant improvement in neonatal outcome in steroid covered group if gestational age is less than 34 weeks .

Conclusion: Preterm labour has major impact on neonatal mortality and morbidity. Hence identification of risk factors and etiologies of preterm labour and timely interventions in the form of investigations and management and preparedness to tackle the maternal and neonatal complications are vital for a good maternal and neonatal outcome.

KEYWORDS

Preterm, gestational age, neonatal, labour.

INTRODUCTION

Preterm labour is currently one of the most challenging problems confronting the obstetrician and perinatologists, as this unfortunate episode in the course of a woman's pregnancy takes a heavy toll on the health of the fetus/newborn and accounts for 50-75% of the perinatal mortality.

Preterm labour is defined as the onset of labour in patients before 37 weeks of gestation. The lower limit of gestation is accepted to be 20 weeks in developed countries, but it is 28 weeks in developing countries. The incidence of preterm labour is 5-10% of all pregnancies.[1] There are several causes of preterm labour. However no obvious cause can be found in 30-40% of the cases.

Various risk factors are also associated with preterm labour which include low socio-economic status, maternal age less than 20 years and greater than 40 years, previous history of preterm delivery, previous history of abortion or any associated uterine anomaly.[4,6,8,9]

The incidence of preterm labour widely varies between 5-10% of all live births, but has increased in the recent past because of medically induced prematurity (either because of medical conditions or due to ART).[2] The seriousness of the situation depends upon length of gestation, fetal weight, fetal presentation, duration of the latent period, development of chorio-amnionitis and most important is the management of the patients. The management depends upon gestational age, likelihood of infection and the availability of neonatal intensive care facilities.[5,7]

Currently most practitioners have adopted a plan of treatment with treatment of infection and delay of delivery until pulmonary maturity is demonstrated by the use of tocolytics, i.e if tocolytics are not contraindicated. [3] But the progress of labour is seldom preventable in established preterm labour cases.

The neonatal morbidity and mortality are due to respiratory distress syndrome, septicaemia, birth asphyxia and intracranial haemorrhage. The maternal morbidity associated with preterm labour is due to intrapartum and postpartum sepsis due to chrio-amnionitis.[4]

OBJECTIVES

Primary objective

1. To identify etiological factors of preterm labour.

Secondary objectives

2. To assess the neonatal mortality and morbidity associated with the preterm labour and delivery.
3. To formulate timely measures to prevent onset of preterm labour.
4. To formulate effective measures to deal with complications associated with preterm labour.

METHODOLOGY

This prospective cohort study was conducted at Hi-Tech Medical College and Hospital from November 2018 to October 2020 for a duration of 2 years. Total 112 patients who came with preterm labour (with or without ruptured membranes) were included in the study. Detailed history was taken. Demographical parameters were recorded. Detailed clinical examination findings, routine investigations and USG were also recorded. They were admitted and followed up till the end of their (mother and baby) hospital stay.

INCLUSION CRITERIA

- All mothers who presented with preterm labour < 37 completed weeks after excluding the exclusion criteria.

EXCLUSION CRITERIA

- Pregnancy beyond 37 completed weeks of gestation
- Pregnancy with previous H/O caesarean section for CPD
- Twin or higher order pregnancy

Sample size – 112

Discharge per vagina i.e rupture of membranes was diagnosed by speculum examination and confirmed by ferning test. Special attention was paid to presence or absence of conventional risk factors for preterm labour. A detailed history including age, parity, obstetric history with special reference to the exact time of the rupture of membranes, history of preterm labour in previous pregnancy , complaints of fever, foul smelling discharge, duration of labour pains (as patients presented in labour). Also menstrual history were recorded.

In all patients general examination, systemic examination and obstetric examination was done and noted.

With all aseptic measures and after cleaning the external genitalia, a speculum examination was performed to reveal the presence of absence of amniotic fluid, discharge through cervix.

When there was no frank leaking, mild fundal pressure was applied or patient was asked to cough to see the drainage of amniotic fluid. Also the colour and amount of amniotic fluid was noted. A high vaginal swab and midstream urine sample 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 to exclude CPD or contracted pelvis. All patients with ruptured membranes were given prophylactic antibiotics (ampicillin/amoxicillin/cloxacillin combination). Hourly pulse rate, fourth hourly temperature chart, presence or absence of uterine contractions and fetal heart rate were recorded.

Gestational age assessment was done basing on previous LMP and USG reports.

Clinical diagnosis of chorio-amnionitis was made when patients developed fever with uterine irritability and tenderness. Presence of foul smelling liquor was noted. All other relevant investigations were done. The time interval between onset of leaking and onset of labour pain/delivery was noted.

All those with < 34 weeks gestation were given 12 mg betamethasone intramuscularly at the time of admission and again after 24 hours or at 12 hours when the labour was sufficiently progressed.

Women with ruptured membranes were kept on strict bed rest. The type of antibiotic was changed after urine and vaginal culture and sensitivity reports. Tocolytics like isoxuprine/nifedipine were given only to gain time for coverage of steroids administered. But it was not given for those in active phase of labour or with signs and symptoms of chorio-amnionitis and those with antepartum haemorrhage .

The patients were observed after hospitalisation. Those patients who went into active labour irrespective of intervention were monitored for progress of labour. LSCS was done for any obstetric indication. Those patients who stopped having contractions and didn't progress into active labour were monitored with active feto-maternal surveillance.

During delivery the neonatal team resuscitated the baby. The condition of the baby at birth was noted by APGAR scoring at 1 and 5 minutes, so also the weight of the baby , and any congenital anomalies were noted . Features of prematurity in the babies were also looked for . 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, babies were treated with antibiotics and IV fluids.

Prophylactic antibiotics were administered to babies who were born with latent period of membrane ruptured for more than 24 hours. Any neonatal deaths were noted. Mothers were followed up in the immediate peurperium during their hospital stay for evidence of postpartum infection by maintaining temperature chart at intervals of 4 hours. The pattern of lochial discharge was observed. Change in normal colour or presence of foul smelling discharge were noted and treated accordingly. In patients who had undergone caesarean section, abdominal wound status was noted. Presence of other complications were noted and treated and followed accordingly.

In febrile patients, the other causes such as UTI, breast engorgement and respiratory tract infections were excluded clinically and also by investigations. Patients who developed temperature were put on higher antibiotics and investigations were done .

RESULTS

Table -1 Agewise Distribution Of Cases

Maternal Age in Years	Number of Cases (N)	Percentage (%)
20-24	69	61.6
25-29	38	33.9
30-34	5	4.5
Total	112	100

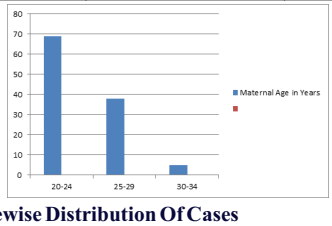

Figure -1 Agewise Distribution Of Cases

Table - 2 Gravida Wise Distribution Of Cases

Gravida	Number of Cases	Percentage
Primi	52	46.4
Multi	60	53.6
Total	112	100

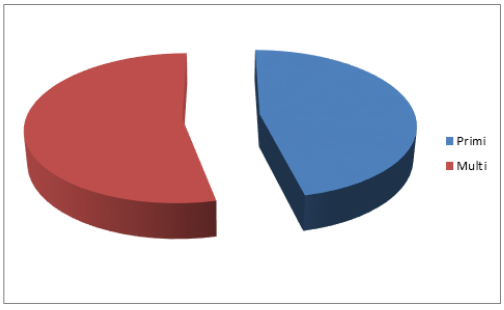

Figure -2 Gravida Wise Distribution Of Cases

Table -- 3 Gestational Age

Gestational Age	Number of Patients	Percentage
<28	6	5.3
28-29 wks 6 d	7	6.2
30-31 wks 6 d	25	22.3
32-33 wks 6 d	36	32.2
34-36 wks 6 d	38	34
Total	112	100

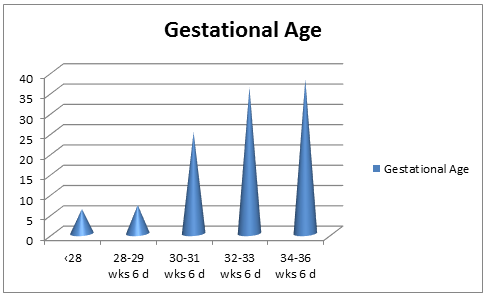

Figure - 3 Gestational Age

Table - 4 Chief Complaints With Which Patients In Preterm Labour Presents

Complaints	Number	Percentage
Leaking P/V	38	33.9
Bleeding P/V	15	13.4
UTI	22	19.6
Hypertensive Disorders	25	22.4
Labour Pains Only	12	10.7
Total	112	100

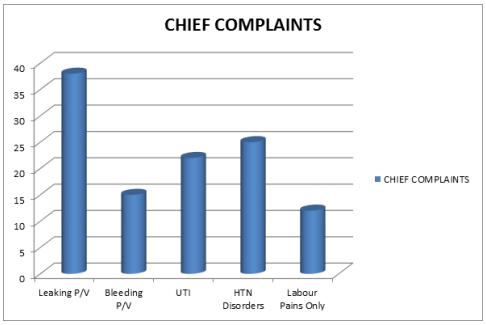

Figure - 4 Chief Complaints With Which Patients In Preterm Labour Presents

Table – 5 Fetal Presentation

Presentation	Number	Percentage
Vertex	105	93.8
Breech	5	4.5
Transverse/oblique	2	1.7
Total	112	100

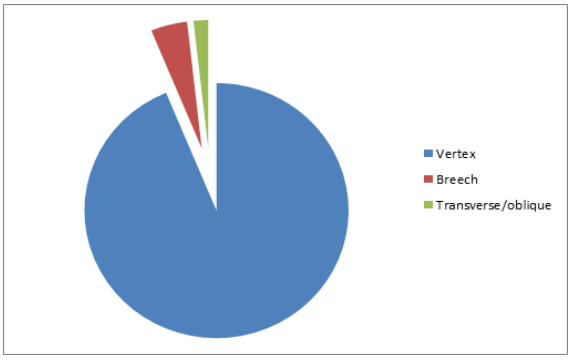

Figure - 5 Fetal Presentation

Table - 6 Evaluation Of Bacteriological Profile In Vaginal And Urine Sample

ORGANISMS	Vaginal Swab Culture		Urine Culture	
	Number	Percentage	Number	Percentage
E coli	16	14.3	29	25.9
Acinetobacter	7	6.2	0	0
Group B streptococcus	13	11.6	0	0
Klebsiella	0	0	11	9.8
No growth	76	67.9	72	64.3
Total	112	100	112	100

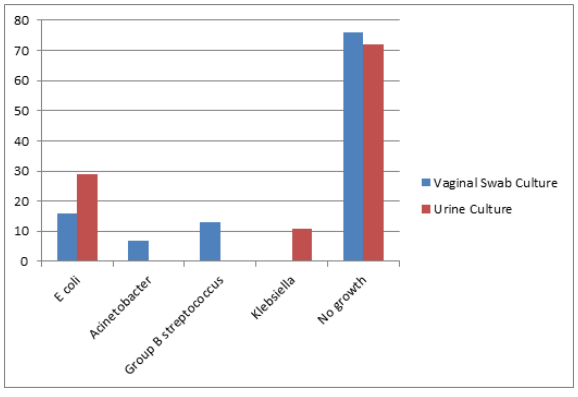

Figure - 6 Evaluation Of Bacteriological Profile In Vaginal And Urine Sample

Table -- 7 Usg Finding On Admission

USG Findings	Number	Percentage
Subseptate Uterus	2	2.2
Polyhydramnios	5	4

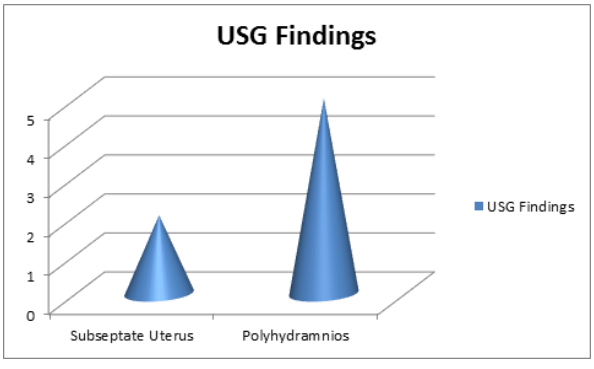

Figure -- 7 Usg Finding On Admission

Table – 8 Mode Of Delivery

Mode of Delivery	Number	Percentage
Vaginal	18	16.1
Outlet Forceps	11	9.8
Preterm Assisted Breech	5	4.5
LSCS	78	69.6
Total	112	100

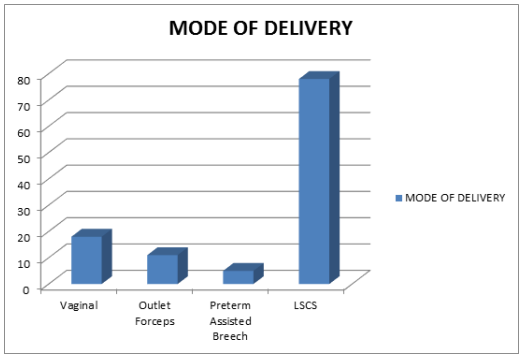

Figure -- 8 Mode Of Delivery

Table -- 9 Sex Of The Baby

Sex Of The Baby	Number	Percentage
Male	68	60.7
Female	44	39.3
Total	112	100

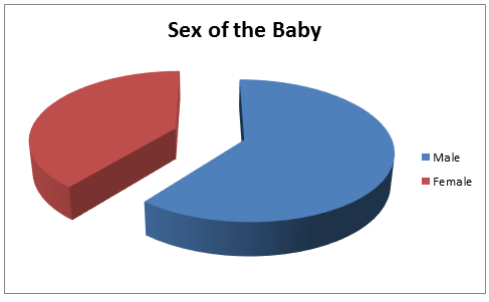

Figure - 9 Sex Of The Baby

Table -- 10 Neonatal Complications

	Number	Percentage
RDS	40	35.7
Septicemia	5	4.4
Birth Asphyxia	7	6.2
ICH	9	8
Normal (Mother side)	51	45.7
Total	112	100

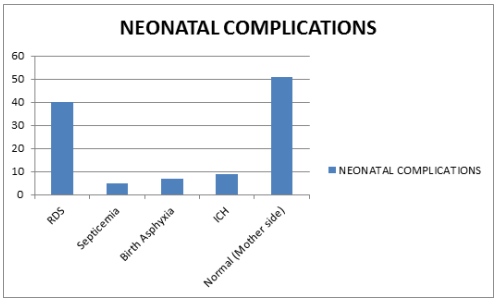

Figure – 10 Neonatal Complications

Table – 11 Perinatal Mortality

	Number of Cases	Number of Deaths	Percentage
Septicemia	5	2	40
RDS	40	11	27.5
Birth Asphyxia	7	2	28.6
ICH	9	6	66.7

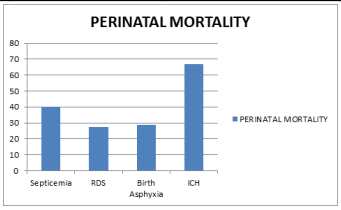

Figure - 11 Perinatal Mortality

Table -- 12 Maternal Complications

	Number	Percentage
PPH	13	11.6
Chorioamnionitis	11	9.8
NIL	88	78.6

A clinical study of maternal and fetal outcome of preterm labour was performed between November 2018 to October 2020 at Hi-Tech Medical College and Hospital . In this study 112 cases of preterm labour were analysed. Table-1 shows the agewise distribution of patients. The maternal age associated with preterm labour in this study ranged from 20-34 years. Highest incidence was found in the agr group of 20-24 years. Table-2 shows preterm labour details gravidawise. The highest incidence was found in multigravida (53.6%) and the remaining in primigravida (46.4%). Table -3 shows agewise distribution of patients at the onset of preterm labour. The gestational age in 38 patients was 34-36 weeks 6 days(34%), in 36 patients , it was 32-34 weeks 6 days(32.2%), in 25 patients, it was 30-31 weeks 6 days(22.3%), in 7 patients, it was 28-29 weeks 6 days (6.2%) and in 6 patients it was <28 weeks (5.3%). Table-4 shows how patients with preterm labour presents with a variety of complaints. 38 patients came with complaint of leaking per vaginum, 15 patients with bleeding per vaginum,, 22 patients with symptoms of urinary tract infections and 25 patients came with symptoms of pre-eclampsia. Table-5 shows that among the type of presentation, vertex was the commonest. It was seen in 105 patients, 5 in breech and 2 were in transverse/oblique lie. Table-6 shows the distribution of various organisms recovered from patients with preterm labour. The commonest bacteria isolated was E.coli. Table-7 shows that 2 patients had subseptate uterus on ultrasonography and polyhydramnios was detected in 5 patients. Table-8 shows that 18 patients delivered via vaginal route. 11 out of 112 patients had instrumental delivery (outlet forceps). Preterm assisted breech were 5 in number. Total number of LSCS was 78. Table-9 shows that the total number of male babies were 68 and female babies were 44 in number . Table-10 shows the various neonatal complications in patients with preterm labour . Commonest among them was respiratory distress syndrome [RDS](35.7%). Table-11 shows the perinatal mortality in preterm labour. There were 21 deaths in the study, 2 due to septicaemia, 11 due to RDS, 2 die to birth asphyxia and 6 due to intracerebral hemorrage. Table-12 shows that the incidence of maternal morbidity in the study was 21.4%. Postpartum haemorrhage was seen in 13 cases and chorio-amnionitis in 11 cases.

DISCUSSION

Preterm birth is a complex syndrome, and it is complicated by heterogeneities in every facet of its understanding. Preterm birth is the most important factor determining neonatal morbidity and mortality, and has a major impact on it. Preterm deliveries are seen more commonly in younger age group and in mothers with advanced age (>35 years).[10,12] In the present study as seen in Table – 1, age group of 20-24 years constitute a majority of preterm births whereas in age group of 30-35 years , only 5 patients are seen .[35] In the present study total number of multigravidas were 60 which was slightly more compared to primigravidas. This increase was seen because previous history of preterm delivery is associated with 2.5 fold risk of preterm labour in the next pregnancy. Car Hill and Hall have shown that recurrence risk is 15% and 32% respectively after 1 and 2 previous preterm births respectively.[11] This is similar to the present study where there is a recurrence rate of 14%.

5% of preterm births occur <28 weeks (extreme prematurity), 15% at 28-31 weeks 6 days (severe prematurity), 20% at 32-33 weeks 6 days (moderate prematurity), 60-70% at 34-36 weeks 6 days (near term). In the present study also majority of preterm births are seen near term (34-36 weeks) i.e. 34%, followed by 32-34 weeks (32%), majority of the patients in the present group were from low socio-economic status and infection of genital tract and UTI formed the main etiology.

In the present study, oligohydramnios, polyhydramnios, abruption placentae and placenta previa (bleeding P/V), UTI, pre-eclampsia were the associated complications. Leaking P/V (PROM) is the cause of preterm labour in 30% of cases. In the present study it is 34%.

In the present study antepartum haemorrhage accounts for 13 % of preterm deliveries.[26,27]

UTI as a chief complaint was seen in 19.6% cases in the present study. According to others it is as follows :

Authors	Percentage
Singh Uma, Singh Nisha, Singh Shika	8.4%
Present study	22%

As told by Romero et al , asymptomatic bacteriuria is associated with an increased rate of prematurity.[13] In the present study 35.7% of patients had a positive urine culture report and 32% had a positive vaginal culture report. Therefore, infection was the major etiology of preterm labour in the present study. Lamont concludes that infection is responsible in 40% of cases. [25]

Abnormal ultrasound findings were detected in few cases as polyhydramnios and septate uterus .[14,15,17]

Total number of patients with pre-eclampsia in the study were 25(22%), which is fairly high than in full term delivery. Maternal medical conditions increase the risk of preterm birth, and often labour has to be induced for medical reasons, such as conditions including high blood pressure, pre-eclampsia. The risk of pre-eclampsia related preterm delivery was 54.4 times higher in women with a previous preterm related delivery than in women with a previous term delivery.[30] 94% of patients in present study with preterm labour had vertex presentation and remaining 6% non-vertex presentation.[31]

In the vaginal swab culture, commonest bacteria isolated was E.coli, no growth in 76 patients (68%) and commensals in 40 patients (40%).[19] Data analysis showed that two specific groups of bacteria were significantly associated with preterm labour. These groups were enteropharyngeal organisms (Eschericchia coli, Klebsiella species, Haemophilus species and Staphylococcus aureus), and the bacterial vaginosis group (normally found populating in the vagina) and Gardenerella and Bacteroids species. For each of these organisms, the percentage of women who had the organism present was higher for preterm labour group than full term labour group and rates of infection were especially increased for women in labour before 34 weeks of gestation. According to another study, vaginal infection has been found out in 72.9% of cases of preterm labour.[16,18,20,21] E. coli was the commonest organism isolated (44%) followed by Klebsiella and Staphylococcus .The commonest inhabitant of vagina is E.coli. Healthy vagina contains many of the bacteria both aerobic and anaerobic as a part of normal flora . Infection ascends from the vagina to the liquor and ultimately affects the fetus.[28,29] As infection of the lower genital tract and inflammation of membranes are incriminated for the early rupture of membranes, proper screening for early detection of genital tract infections during antenatal period must be done and prompt treatment must be instituted.[32,33]

In the present study, 70% of cases delivered by LSCS, 10% by forceps delivery, vaginal delivery in 16% and preterm assisted breech delivery in 4%.

In the present study, 39% were female babies and 61% were male babies. Overall ratio between male and female babies was 1.5:1. Hall and Car Hill found an increased incidence of male babies born to women with preterm labour. Male babies are known to have a significantly higher risk of being preterm than female babies (4.4 Vs 4%). In agreement with this are previous reports of Mcgregoretan (1992) and Cooperstock and Campbell (1996).

Incidence of perinatal morbidity in present study is 34%. Out of these, 6 babies had birth asphyxia, 4 had septicemia and 36 had respiratory distress syndrome. The incidence of respiratory distress syndrome was high, but with respect to individual cases mortality was high in ICH. Out of 9 cases of ICH , 6(67%) died and among 4 cases of septicemia, 2(50%) died. Among the 36 babies with RDS, 32 babies received a course of steroids. RDS in the present study constituted 76% of the total morbidity. This is comparable to 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 . In cases of septicemia, mother had fever with chills and foul smelling discharge and latent period was more than 24 hours in one case.

Neonatal morbidity was significantly high in betnesol uncovered group (76% vs 38.8%). Incidence of RDS was high in babies without steroid coverage (56% vs 22.2%).[24] This is comparable to the study by

Singh Uma et al where neonatal morbidity was significantly high in betnesol uncovered group (52.1% vs 37.5%).[34]

The maternal morbidity during the study was 21.4%. Chorio-amnionitis was noted in 11 cases (9.8%), but was amenable to treatment.[22,23] The maternal mortality in the present study was nil.

CONCLUSION

Preterm labour is a significant obstetric problem which requires detection, careful antenatal monitoring, prompt treatment of infection, administration of cortcosteroids if < 34 weeks of gestation or tocolytics to buy time to achieve pulmonary maturity and pelvic examination under strict aseptic technique.

Preterm labour has major impact on neonatal mortality and morbidity. It turns a pregnancy into a high risk situation and increases the need for neonatal resuscitation in the delivery room as well as admission in neonatal intensive care unit if needed. Hence identification of risk factors and etiologies of preterm labour and timely interventions in the form of investigations and management and preparedness to tackle the maternal and neonatal complications are vital for a good maternal and neonatal outcome.

ETHICALAPPROVAL :

The study was approved by the Institutional Ethics Committee.

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