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Evaluation of Risk Factors for Preterm Labour

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ABSTRACT
Background and objectives:
Of all pregnancies 5-10% end in preterm labour and of these about two thirds are associated with preterm premature rupture of membranes. The present study was undertaken with the objective of knowing the aetiology and outcome of preterm labour and formulating measures to prevent onset of preterm labour and deal with complications arising from preterm labour.
Methods:
A total of 200 patients with preterm labour were included in the study. The investigations required to certain the aetiology and also other routine investigations were carried out.
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. Positive urine culture was obtained in 38 cases and positive vaginal culture in 36 cases. Focus on maternal health & nutrition in the preconception and antenatal period can reduce the incidence of preterm labour. There is significant improvement in neonatal outcome in steroid covered group if gestational age is less than 34 weeks.
Key words: Preterm, gestational age,neonatal, labour

I. INTRODUCTION

Currently preterm labour is one of the most challenging problems confronting the obstetricians and perinatologists, as this unfortunate episode in the course of woman's pregnancy takes a heavy toll of perinatal mortality which accounts for 50- 75% of the perinatal mortality[1]. Preterm labour is defined as the onset of labour in patients before 37 weeks of gestation. The incidence of preterm labour is 5-10% of all pregnancies, but there are variations with different population and variable on socioeconomic status. There are several causes of preterm labour. However, no obvious cause can be found in 30-40% of the cases. The incidence of preterm labour widely varies between 5-10%. But has increased in the recent past because of medically induced prematurity (either because of medical conditions or ART). The seriousness of the situation depends upon length of gestation, fetal weight, fetal presentation, duration of the latent period, development of chorioamnionitis and most important is the management of patients. Currently most practitioners have adopted a plan of treatment with treatment of infection and delay of delivery until fetal pulmonary maturity is demonstrated by the use of tocolytics i.e., if tocolytics are not contraindicated. Labour is not preventable in established preterm labour cases. The neonatal morbidity and mortality are due to respiratory distress syndrome, septicemia, birth asphyxia and intracranial haemorrhage. The maternal morbidity associated with preterm labour is due to intrapartum and postpartum sepsis due to chorioamnionitis.The present study was under taken to study the etiology and outcome of preterm labour which is an important obstetric problem and to formulate measures to prevent onset of preterm labour and to deal effectively with complications arising from preterm labour.

II. OBJECTIVES

Primary Objective
1) To identify etiological factors of preterm labour.
Secondary Objectives
2) To assess the neonatal mortality and morbidity associated with 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.

III. MATERIAL AND METHOD

This prospective cohort study was conducted in Hi-Tech Medical College & Hospital where from 1st November 2019 to 31st October 2021 for duration of 2 years. Total 200 Patients who came in preterm labour with or without ruptured

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membranes were included in the study. Detailed history was taken. Demographical parameters were recorded. Detailed clinical examination findings & routine investigations & USG were also recorded. They were admitted & followed up till delivery.

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

IV. RESULTS

Observation and discussion:

A clinical study of maternal and fetal outcome of preterm labour was performed between November 2019 to October 2021 at Hi-Tech Medical College & Hospital. In this study 200 cases of preterm labour were analysed.

TABLE – 1: AGE WISE DISTRIBUTION OF CASES

Maternal age in years	Number of cases(N)	Percentage (%)
20 – 24	124	62
25--29	68	34
30--34	08	04
TOTAL	200	100

Table 1 shows the age wise distribution of patients in present study. The maternal age associated with preterm labour in this study ranged from 20-34 years. Highest incidence was found in the age group of 20 –24.

GRAPH-1 AGE WISE DISTRIBUTION OF CASES

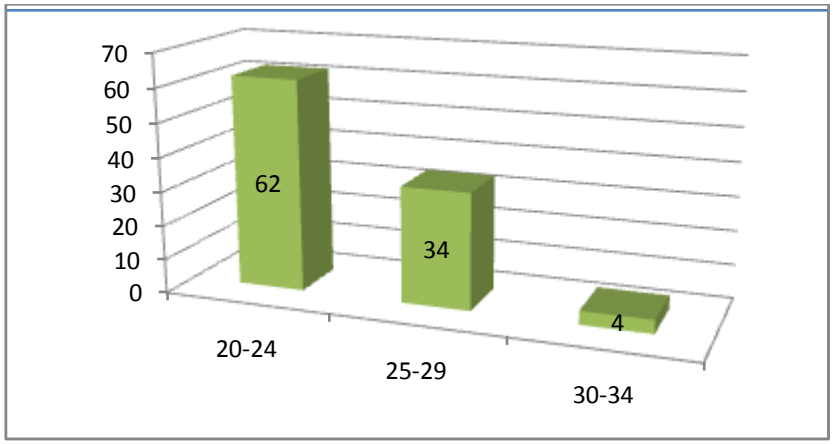

TABLE – 2 : GRAVIDA WISE DISTRIBUTION OF CASES

Gravida	Number of cases	Percentage
Primi	92	46
Multi	108	54
Total	200	100

Table 2 shows preterm labour details gravida wise. Highest incidence was found in multigravida (54%) and remaining in primigravida (46%). The previous obstetric history among miltigravida included a normal labour, preterm labour or history of 1 to 3 spontaneous abortions. Among these, 14 patients had previous history of preterm labour

TABLE – 3 : GESTATIONAL AGE

Gestational age	Number of patients	Percentage
<28	12	6
28 – 29wks 6 d	12	6

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30 – 31wks 6 d	44	22
32 – 33wks 6 d	64	32
34 – 36wks 6 d	68	34
TOTAL	200	100

Table 3 shows gestational age distribution of patients at the onset of preterm labour. The gestational age in 68 patients was 34-36wks6d (constituting 34% of patients), in 64 patients was 32 – 33 weeks6d (constituting 32%), in 44 patients was30-31wks 6d (constituting 22%), in 12 patients was 28 – 29 wks6d (constituting 6%),in 12 patients was <28 weeks (constituting 6%).

GRAPH 2- GESTATIONAL AGE WISE DISTRIBUTION OF CASES

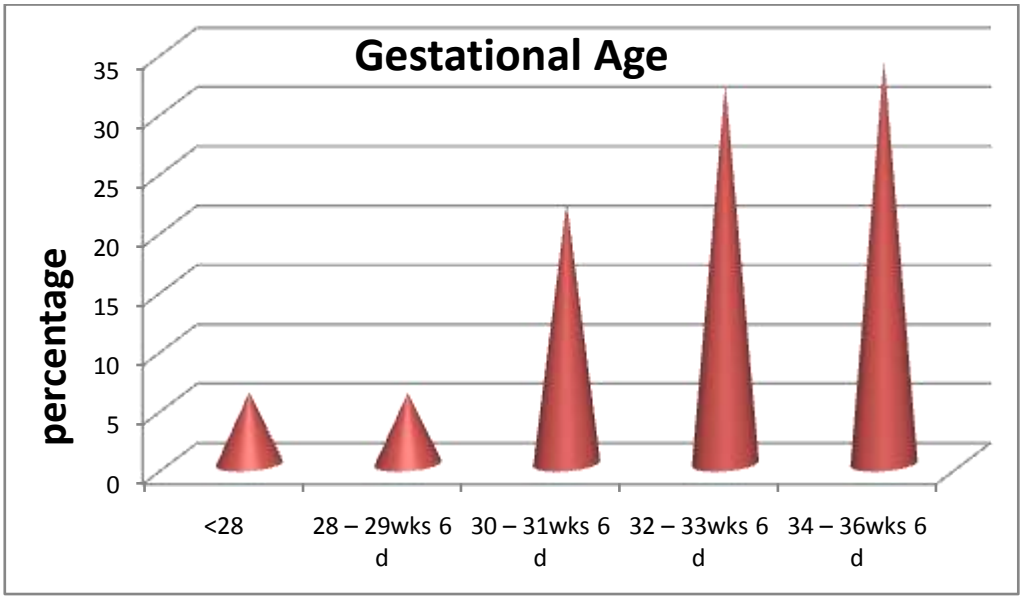

TABLE – 4: CHIEF COMPLAINTS WITH WHICH PATIENTS IN PRETERM LABOUR PRESENTS

Complaints	Number	Percentage
Leaking P/V	68	34
Bleeding P/V	28	14
UTI	40	20
Hypertensive disorders	44	22
Labour pains only	20	10

Table 4 shows how patient with preterm labour presents with variety of complaints. This table shows that 68 patients came with complete leak P/V and among them 2 cases were taken for LSCS in view of severe oligohydramnios (low BPP). Oligohydraminos was due to leak P/V and there were no fetal deformation due to oligohydraminos 28 patients came with complaints of bleeding P/V either due to placenta praevia or abruptio placentas. Among 200patient with preterm labour, 40patients came with complete UTI. Total number of patients with symptoms of PE were 44 in number

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GRAPH 3 - CHIEF COMPLAINTS WITH WHICH PATIENTS IN PRETERM LABOUR PRESENTS

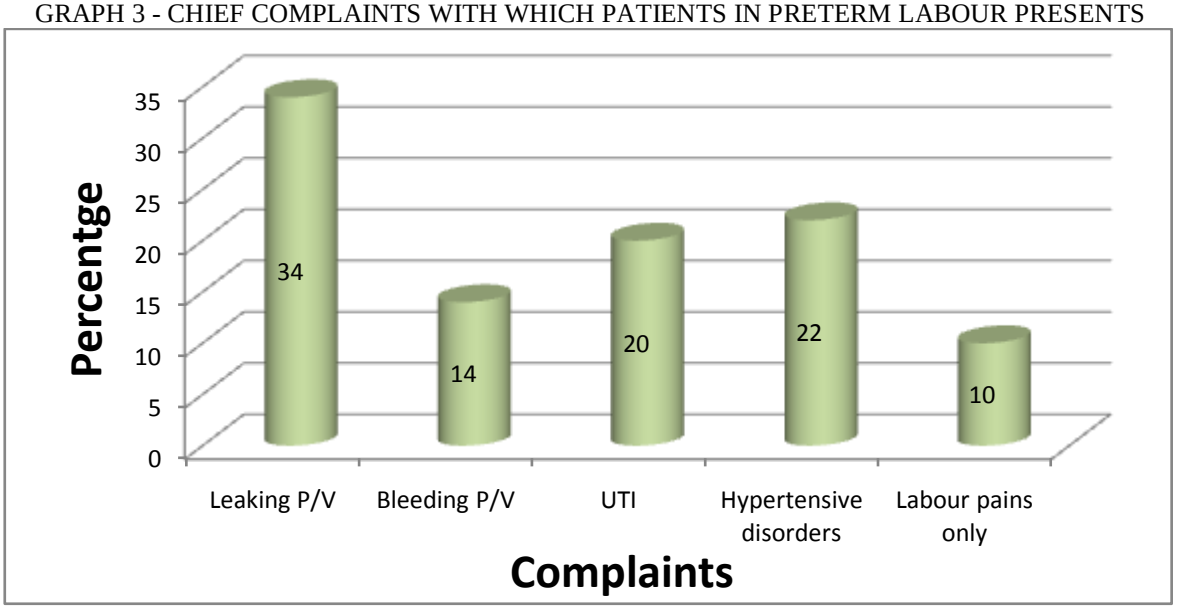

TABLE – 5 : FETAL PRESENTATION

Presentation	Number	Percentage
Vertex	180	90
Breech	16	8
Transverse /Oblique	04	2
Total	200	100

Among the type of presentation, vertex was commonest. It was seen in 180 patients. 16 were breech and 04 was Transverse /Oblique

TABLE – 6 : EVALUATION OF BACTERIOLOGICAL PROFILE IN VAGINAL AND URINE SAMPLE

Organisms	Vaginal swab culture		Urine culture	
	Number	Percentage	Number	Percentage
E coli	28	14	52	26
Acinetobacter	12	6	0	0
Group B streptococcus	24	12	0	0
Klebsiella	0	0	20	10
No Growth	136	68	128	64
Total	200	100	200	100

Table 6 shows the distribution of various organisms recovered from patients with preterm labour in this study series. The commonest bacteria isolated was**E coli**.

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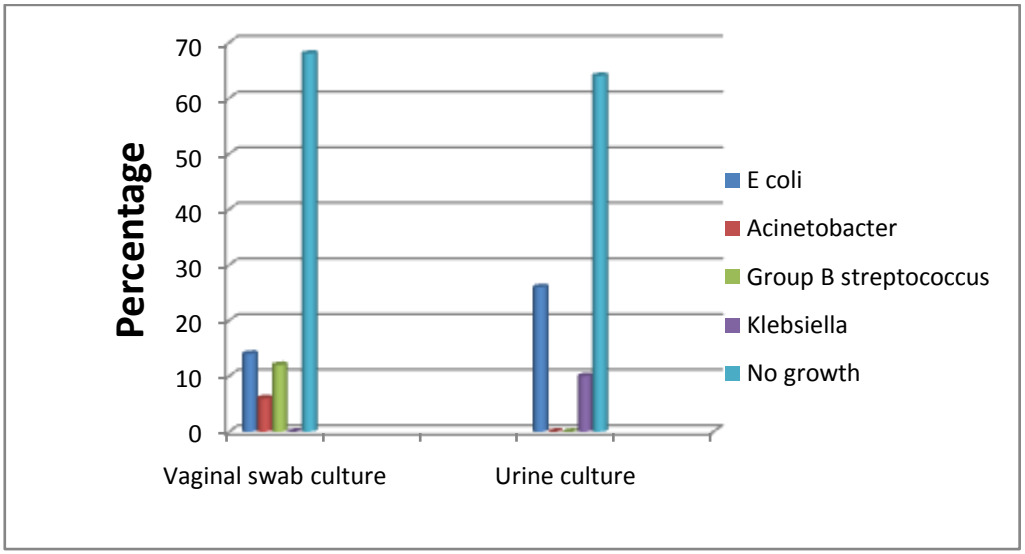

TABLE – 7 : USG FINDING AT ADMISSION

USG findings	Number	Percentage
1) Subseptate uterus	04	2
2) Polyhydramnios	08	4

In the present study only in 4 cases uterine anomalies was detected in USG and that was sub-septate uterus. Polyhydraminos was detected in 8 patients

TABLE – 8 : DILATATION OF THE CERVIX

Cervicaldilatation	Number	Percentage
<4CM	112	56
>4CM	88	44

TABLE – 9 : STATION OF FETAL HEAD

Station	Number	Percentage
– 1	08	4
– 2	64	32
– 3	64	32
– 4	28	14
0	32	16
+1	04	02

TABLE – 10 : MODE OF DELIVERY

Mode of delivery	Number	Percentage
1) Vaginal	32	16
2) Outlet forceps	20	`10
3) Preterm assisted breech	08	04
4) LSCS	140	70

In the present study, 32 patients delivered via vaginal route. 20 out of 200 patients had instrumental delivery (outlet forceps). Preterm assisted breech were 08 in number. Total number of LSCS was 140.

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GRAPH 5- MODE OF DELIVERY

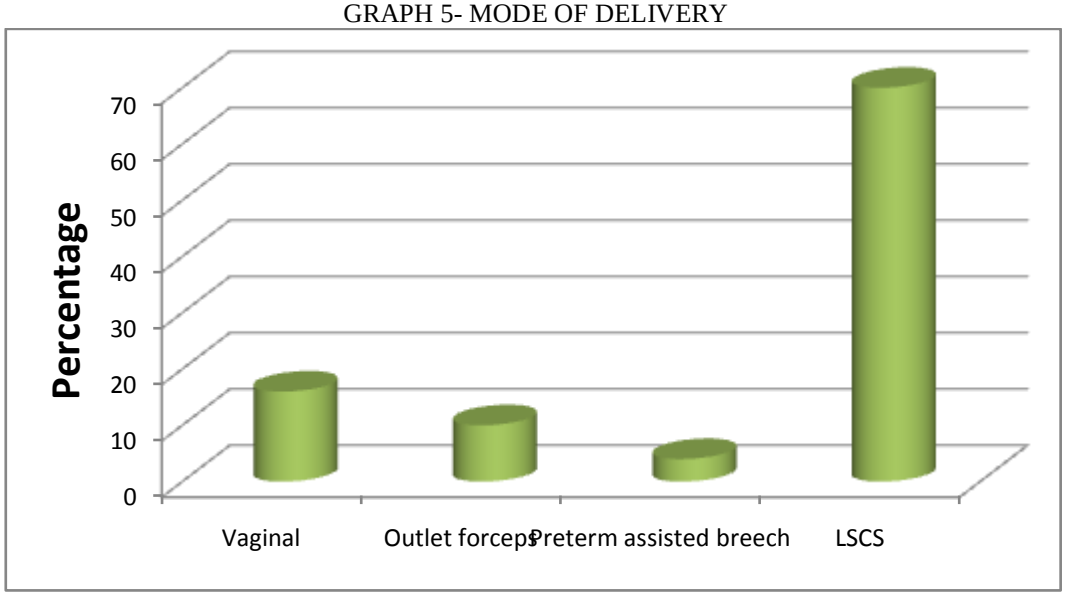

TABLE – 11 : SEX OF THE BABY

Sex of the baby	Number	Percentage
Male	132	61.1
Female	84	38.9
Total	216	100

In the present study, total number of male babies were 132 in number and female babies 84 in number.

TABLE – 12 : NEONATAL COMPLICATIONS

	Number	Percentage
RDS revived	52	24.1
RDS death	20	3.7
Septicemia	08	9.3
Birth asphyxia	12	5.5
ICH	16	7.4
Normal(Mother side)	108	50.0
Total	216	100.0

Table 12 shows the various neonatal complications in patients with preterm labour. Commonest among than is respiratory distress syndrome (27.8%).

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GRAPH 6- NEONATAL COMPLICATIONS

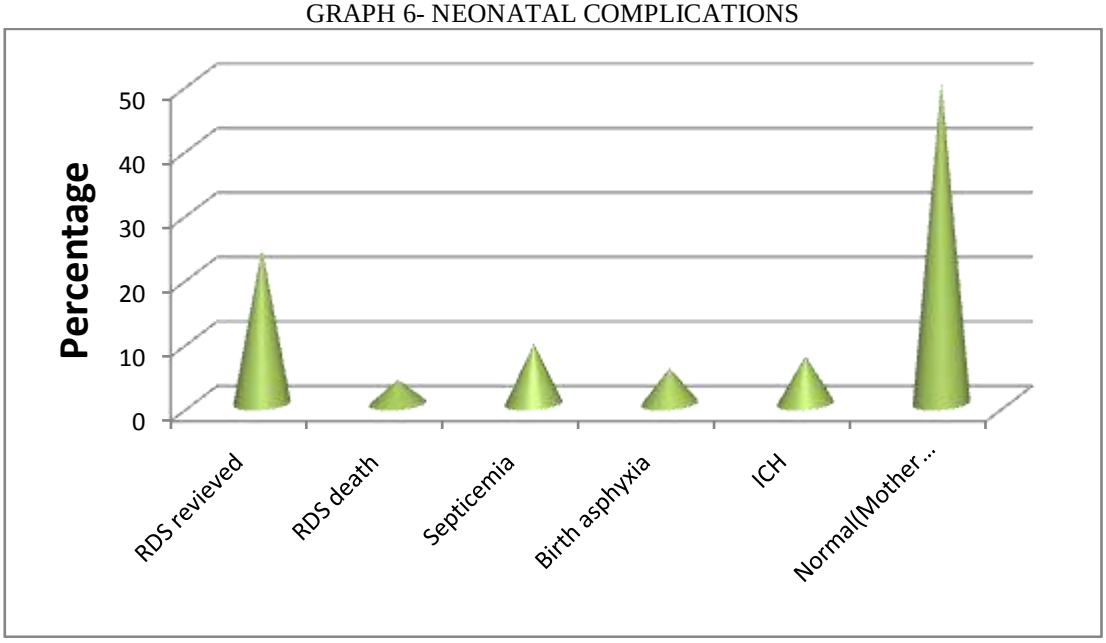

TABLE – 13 : PERINATAL MORTALITY

	Number of cases	Percentage	Number of death	Percentage
1) Septicemia	04	10	04	50
2) RDS	72	05	20	27.7
3) Birth asphyxia	12	10	04	33.3
4) ICH	16	30	12	75

This table shows the perinatal mortality in preterm labour. There were 40 deaths in the study. 4 cases of due to septicemia.20 cases due to RDS. 4 cases were due to birth asphyxia and 12 cases due to ICH.

GRAPH 7- PERINATAL MORTALITY

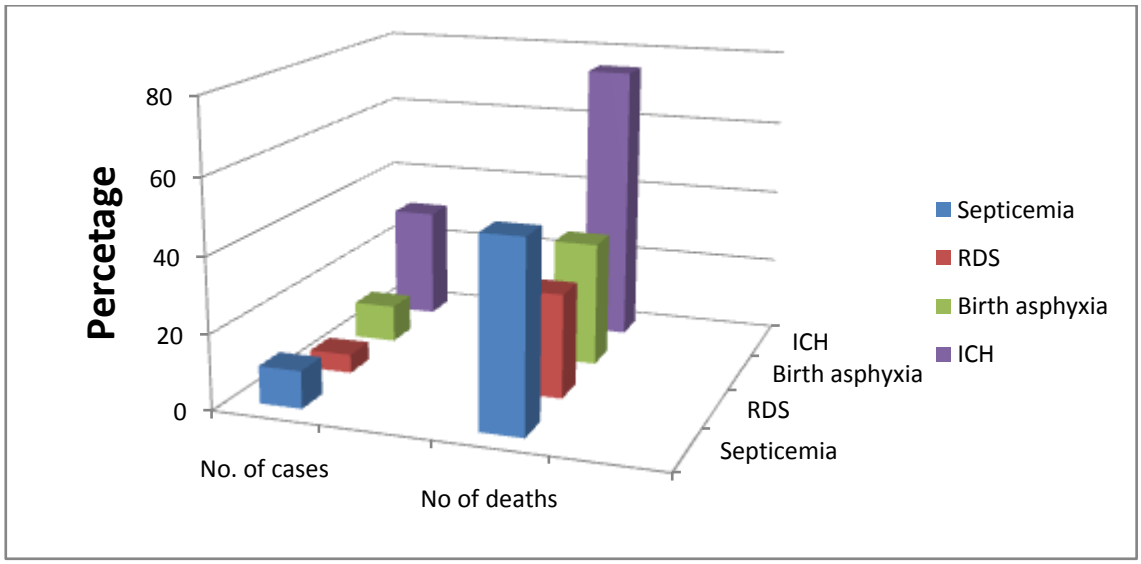

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TABLE – 14 : MATERNAL COMPLICATIONS

	Number	Percentage
PPH	24	12
Fever	20	10
Nil	156	78

This table shows the incidence of maternal morbidity during the study was 22%. Puerperal rise of temperature was noted in 20 cases.

V. DISCUSSION

Preterm labour and delivery are not rare. The incidence of preterm labour increases in inverse proportion to maternal weight, age and socioeconomic status. Young patients and especially of young age appears more prone to preterm labour and are at increased risk of preterm delivery. According to Mary L Hediger, Theresa O Scholl, Joan I Schall, Paul M Krueger, there is 2 fold risk[2]and this risk is attributable to biologic immaturity. Preterm deliveries occurred in < 4% of births among mothers younger than 35 years, which was almost half the frequency observed in older mothers (35 yrs).[3] According to Lansac the rate of prematurity nearly doubles (5.7% births to women <35 yrs of age versus 8.2% after 35 yrs). This new prematurity results from induction of birth for medical problems occurring during pregnancy in older mothers.[4] In the present study as seen in table 1, age group of 20–24 yrs constitute a majority of preterm births whereas in age group of 30 – 35 yrs only 08 patients are seen. In the present study total number of multigravidas were 108 which was slightly more compared to primigravidas. This increase was seen because previous history of preterm delivery is associated with 2.5fold risk of preterm labour in the next pregnancy. Car Hill and Hall[5]have shownthat in women with history of one preterm delivery there is 15% chance of next preterm delivery and after 2 preterm deliveries there is 32% chance. Recurrence risk is 17.2% and 28.4% respectively after 1 and 2 previous preterm births respectively.[6]This is similar to the present study where there is a recurrence rate of 14%.Bygestational age, 5% of preterm births occur at less than 28 wks (extreme prematurity), 15% at 28 – 31 wks 6d (severe prematurity), 20% at 32 – 33 wks 6d(moderate prematurity) and 60 – 70% at 34 – 36 wks 6d (near term).[7]In the present study also majority of preterm births are seen near term (34-36 wks) ie, 34%, followed by at 32 – 34 wks (32%). majority of the patients in the present group were from low socioeconomic status and infection of genital tract and UTI formed the main etiology.Table 4 shows various complications associated with preterm labour. In the present study, oligohydramnios, polyhydraminos, abruptio placenta and placenta praevia (bleeding P/V), UTI, preclampsia were the associated complications. Leaking P/V (PROM) is the cause of preterm labour in 30% of cases.[8] In the present study it is 34%. According to Lyons, premature rupture of membranes is followed by labour within 24 hours in 50% of preterm patients.[9]There were 8 cases of placenta praevia and 20 cases of abruption placentae in the present study. In the present study antepartum haemorrhage accounts for 10 – 12% of preterm deliveries. Authors like Pritchard (1970) showed an increased incidence of preterm deliveries associated with placenta praevia.[10] Placenta previa is associated with maternal and neonatal complications, including preterm delivery and postpartum haemorrhage. [11]According to another study placenta previa is a significant contributor to preterm delivery, low birth weight and perinatal mortality.[12]Oligohydraminos seen in present study were due to leaking P/V and it was not associated with fetal anomalies.80 cases of severe oligohydraminoswere taken for LSCS due to fetal distress. Polyhydramnios is one of the causes for preterm labour because of uterine over distension. There were 2 cases of polyhydraminos and no associated anomalies with it.

Among 200patients with preterm labour, 40 patients came with complaints of UTI. According to others it is as follows:

Authors	Percentage
Singh Uma, Singh Nisha, Singh Shika	8.4
Present study	20

As told by Romero et al, asymptomatic bacteriuria is associated with an increased rate of prematurity.[13]In the present study 36% 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 and earlier the

abnormal genital tract colonization is detected the greater is the risk of adverse outcome.[14]

Total number of patients with preeclampsia in this study were 44 (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.[15,16] The risk of pre-eclampsia related preterm delivery was 54.4 times higher in women with a previous related preterm delivery than in women with a previous termdelivery.[17]As seen in table 6, 90% of patients in preterm labour have vertex presentations and remaining 10% non- vertex presentation. According to Lewis et al, patients with PPROM with non-vertex presentation, appear to have a significantly higher risk for prolapsed umbilical cords, low APGAR scores, and/or lower umbilical cord blood pH values when compared with vertex counterparts.[18]Table 6 shows the distribution of various organisms recovered form vaginal and urine samples of patients with preterm labour. In the vaginal swab culture,commonest bacteria isolated was E coli, no growth in 56 patients (28%) and commensals in 80 patients (40%). Data analysis showed that two specific groups of bacteria were significantly associated with preterm labour. These groups were enteropharyngeal organisms (Escherichia coli, Klebsiella species, Haemophilus species and Staphylococcus aureus), and the bacterial vaginosis group (normally found populating the vagina) and Gardenerella and Bacteroides 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.[19] Infection with some of these organisms produce no symptoms, while colonization with other bacteria leads to inflammation and other effects. According to another study vaginal infection has been found out in 72.9% of cases of preterm labour. E coli was the commonest organism isolated (44%) followed byKlebsiella andStaphylococci.[20]The commonest inhabitant of vagina is Ecoli. Healthy vagina contains many of the bacteria both aerobic and anaerobic as a part of normal flora. All of these are potentially pathogenic for both mother and the fetus. Infection ascends from the vagina to the liquor and ultimately affects the fetus. 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 infection during antenatal period must be done and prompt treatment must beinstituted.
Table 7 shows that only 4 uterine anomaly detected among 200 patients.

Table 8 shows the effacement and dilatation of cervix in these 200patients studies. Almost all patients have cervical length of less than 1 cm and dilatation of 2 cms or more. There is increased risk of preterm labour if cervical length is less than 3 cms, internal os is patulous and cervix is funnelled.

Table 10 shows the mode of delivery in preterm labour. 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%.The 8 cases of breech (one extended breech and another one complete breech) were delivered vaginally as these patients had come in advanced labour. The mode of delivery for the preterm fetus is determined by some extent by the presentation (breech versus cephalic), fetal weight and gestational age. For infants born between 28 and 31 wks the increase in caesarean section has beenfrom 21% to 36%. Controversy still exists about the vaginal versus caesarean delivery, especially if the fetus is in a breech presentation.[21]

Table 11 shows the sex distribution of babies. Among 216 babies (8 twins), 39% were female babies and 61% were male babies. Over all ratio between male and female babies was1.5:1. Hall and Car Hill found an increased incidence of male babies born to women with preterm labour. [22]Male babies are known to have a significantly higher risk of being preterm than female babies (4.4 versus 4%).[3]In agreement with this are previous reports of McGregoretal(1992) and Cooperstock and Campbell(1996)[23]

Table 12 shows the various neonatal complications. Incidence of perinatal morbidity in present study is 34% (out of 54 babies – 2 were twins). Out of these, 3 babies had birth asphyxia, 2 babies had septicemia and 18 babies had respiratorydistress syndrome. The incidence of respiratory distress syndrome was high. But with respect to individual cases mortality was high in ICH. Out of 4 cases 3 died i.e., 75% died and among 2 cases of septicemia 1 died which accounted for 55%.Among the 18 babies with RDS, 13 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 Sehgalet al[24]which reported that neonatal hyperbilirubinemia (78%) and RDS (65%) were the common causes for morbidity in extremely low birth weight babies. Cases of septicemia, mother

had fever with chills and foul smelling discharge and latent period was more than 24 hrs 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%). This is comparable to the study made by Singh Uma et al[25]where neonatal morbidity was significantly high in Betnasol uncovered group (52.1% vs 37.5%). Similarly incidence of RDS was high in babies without steroid coverage than in those with (26.8% vs10%).

Delay in delivery and steroid coverage decreases neonatal morbidity due to RDS but overall mortality is not reduced if baby is delivered before 34 wks.Also neonatal morbidity was significantly high in Betnasol uncovered group (63.63% vs 20%). Incidence of RDS was high in babies without steroid coverage (50% vs 13.3%).This is comparable to the study made by Singh Uma et al3 where neonatal morbidity was significantly high in Betnesol uncovered group (52.1% vs 37.5%).Delay in delivery and steroid coverage decreases neonatal morbidity due to RDS but overall mortality is not reduced if baby is delivered before 34 wks.The maternal morbidity during the study was 20.3%. Most common among them was puerperal rise of temperature. Puerperal rise of temperature more than 100.40C was noted in 20 cases (45.5%), but was amenable to treatment. The maternal mortality in the present study was nil.

VI. CONCLUSION

Preterm labour is a significant obstetric problem which requires detection, careful antenatal monitoring, prompt treatment of infection, administration of corticosteroids if < 34 weeks of gestation or tocolytics to buy time to achieve pulmonary maturity.For patients whose gestational age is less than 34 weeks it is advisable to follow an expectant line of management unless they are associated with other complications or with established labour. By this it is possible to obtain reduced incidence of RDS which is the major cause of neonatal morbidity and mortality. For pregnancies at 34 weeks or beyond, women with preterm labour are monitored for labour progression and fetalwell-being. For active labour, an antimicrobial is given for prevention of neonatal group B streptococcal infection.Preterm labour has a major impact on neonatal mortality and morbidity. It turns a pregnancy into 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. The outcome of neonate primarily depends upon the gestational age, the birth weight, whether there was coverage of corticosteroids and antibiotics, the mode of delivery and the availability and quality of NICU facilities.

VII. SUMMARY

In the present study 200 cases of preterm labour admitted to Hi-Tech Medical College over a period of 2 years were analysed. From this study the inference got is as follows:

The majority of the patients (62%) were in the age group of 20-24 years and incidence of PPROM was higher in multigravida (54%) than in primigravida (46%). The commonest etiology of preterm labour was infection of lower genital tract and UTI. Positive vaginal cultures were obtained in 64 cases. The commonest organism isolated was E.coli. Positive urine cultures were obtained in 72 cases and among them E coli was the commonest (26%). There was a preponderance of number of male babies over female babies. The ratio was 1.57: 1. Among the neonatal complications RDS was the commonest (27.8%). This was followed by septicaemia (9.3%), ICH (7.4%), birth asphyxia (5.5). The overall early neonatal mortality was 20%. Morbidity was high in case of infection, birth asphyxia and RDS. Also Neonatal morbidity was significantly high in Betnesol uncovered group (63.63% vs. 20%). Incidence of RDS was high in babies without steroid coverage (50% vs. 13.3%). The maternal mortality in this study was nil.

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