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A Prospective Study to Monitor Maternal-Neonatal Disorders, Complications and Therapies Associated with Term and Preterm Birth at a Government Hospital, Palakkad, Kerala

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ABSTRACT

The study was conducted to monitor the maternal-neonatal disorders, complications, and therapies in term and preterm birth in a Government hospital, Palakkad District. In this prospective study, a total of 343 cases were collected. All the babies admitted in Special Newborn Care Unit and their mothers were included. The sociodemographic profiles, clinical data, therapies and other information needed for the study were collected by using specially designed data entry form and questionnaire. There were 280 (81.53%) term babies and 63 (18.36%) preterm babies. It was observed that pregnancy histories like abortions, IUD's, family history, use of drugs like painkillers, birth control pills, OTC medications, use of coffee-tea >3 to 4 cups per day, exposure to smoking, overweight, obesity etc affects the pregnancy of the mother, which might be the reasons for the complications. Anaemia was found to be the major disorder among both term and preterm delivered mothers. In neonates, jaundice and respiratory problems were the most seen complications which were followed by sepsis. Low birth weight babies encounter a major percentage of term and preterm births. Even though the sociodemographic factors are approximately same, the rate of complications in mothers and neonates were more in preterm births than in term births. The mothers and neonates were given individualized therapies depending upon the severity of the complications.

INTRODUCTION

Pregnancy complications are problems that occur only during pregnancy. They may affect the woman, the foetus, or both and may occur at different times during the pregnancy. Nowadays, many babies are born with complications at birth or soon after birth. Preterm birth is defined as babies born alive before 37 weeks of pregnancy. Almost 1 million children die each year in the world due to complications of preterm birth. Both term and preterm babies are hospitalized in newborn care units with many complications. According to WHO, The most common causes of neonatal deaths are preterm birth complications, newborn infections, and birth asphyxia. They account for over 80% of all global neonatal deaths. Delay in the identification of the problem or in providing the correct management may be fatal. Such infants need special care, including additional attention to breastfeeding and breastmilk feeding and to keeping them warm at home and in health facilities. This study aims to monitor the maternal neonatal disorders and complications in term and preterm birth. The main objectives of the study include compare the maternal disorders and complications in term and preterm birth, to find out the most commonly occurring complications in mothers as well as in neonates and to compare the treatment strategies. It is necessary to find out whether maternal disorders or complications lead to neonatal complications or not.

MATERIALS AND METHODS

The study was performed in a Government Hospital, Palakkad District, Kerala. The study was designed as a prospective study. The duration for data collection was 6 months. A total of 343 cases were included in the study. *Inclusion criteria:* All babies admitted with neonatal jaundice in Special Newborn Care Unit (SNCU) & their mothers. *Exclusion criteria:* Mothers unwilling to participate and babies referred to higher centres for treatment. A predesigned Data Entry Form (Mothers data sheet , Neonatal data sheet) and Questionnaire was used to obtain and evaluate the data.

RESULTS

A total of 343 cases was collected, out of which 199 (58.01%) were male babies and 144 (41.98%) were female babies. There were 280 (81.53%) term babies and 63 (18.36%) preterm babies.

Table 1: Distribution of mothers according to sociodemographic characteristics in term and preterm birth.

Variables	Frequency and percentage(%) in term birth, n=280	Frequency and percentage(%) in preterm birth, n=63
Age		
<20	24 (8.57%)	5 (7.93%)
21 – 25	114 (40.71%)	22 (34.92%)
26 – 30	111 (39.64%)	23 (36.50%)
31 – 35	22 (7.85%)	8 (12.69%)
>36	9 (3.21%)	5 (7.93%)
BMI (weight in Kg/ height in m^2)		
<18.5	13 (4.64%)	6 (9.52%)
18.5 – 24.9	84 (30.00%)	23 (36.50%)
25.0 – 29.9	142 (50.71%)	25 (39.68%)
>30	41 (14.64%)	9 (14.28%)
Past pregnancy history		
Abortion history	74 (26.42%)	32 (50.79%)
History of IUD	6 (2.14%)	2 (3.17%)
Family history	83 (29.64%)	37 (58.73%)
Undergone Fertility treatment	8 (2.85%)	4 (6.34%)
Gravida		
Primigravida	60 (21.42%)	39 (61.90%)
Multigravida	220 (78.57%)	24 (38.09%)
Parity		
Primiparous	182 (65.00%)	45 (71.42%)
Multiparous	98 (35.00%)	18 (28.57%)
Social history		
Educational status		
School	17 (6.07%)	19 (30.15%)
Diploma	77 (27.50%)	24 (38.09%)
Degree	86 (30.71%)	20 (31.74%)
Occupation		
Yes	133 (47.50%)	35 (55.55%)
No	147 (52.50%)	28 (44.44%)
Food habits		
Vegetarian	4 (1.42%)	4 (6.34%)
Non-vegetarian	276 (98.57%)	59 (93.65%)
Others		

Coffee-tea (>3 to 4 cups per day)	164 (58.57%)	39 (61.90%)
Use of betel-tobacco	12 (4.28%)	7 (11.11%)
Exposure to smoking	191 (68.21%)	27 (42.85%)
Use of drugs		
Painkillers	96 (34.28%)	21 (33.33%)
Birth control pills	32 (11.42%)	8 (12.69%)
Other OTC drugs	147 (52.50%)	27 (42.85%)
Prescribed drugs only	83 (29.64%)	12 (19.04%)

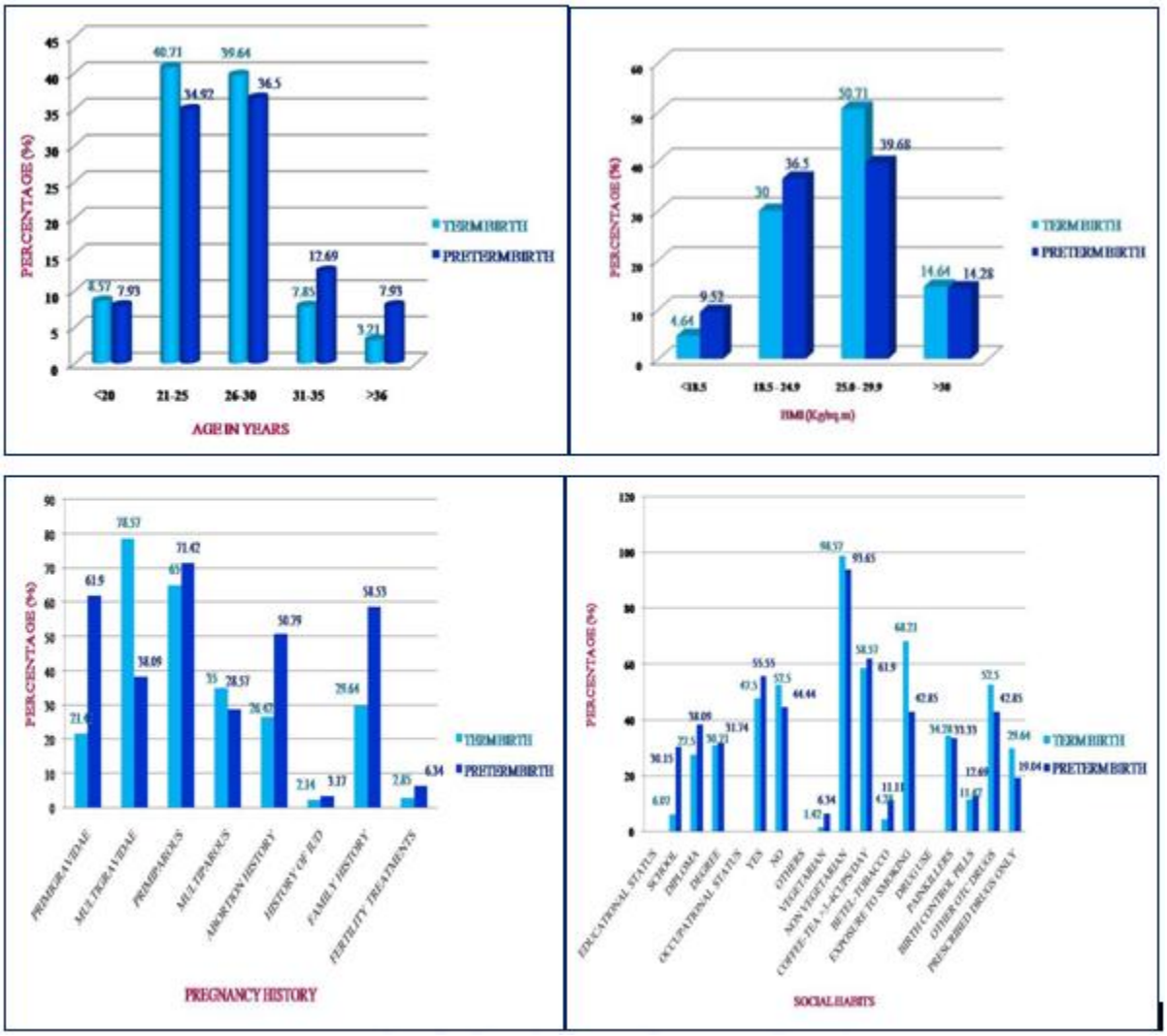

Figure 1: Distribution of mothers according to sociodemographic characteristics in term and preterm birth.

Table 1 and Figure 1 shows the sociodemographic characteristics of the mothers whose babies had neonatal complications and admitted in Special Newborn Care Unit. 40.71% mothers with term delivery and 34.92% with preterm delivery were in the age group 21-25. By evaluating the BMI of mothers, a major group was overweight and obese which encounters up to 65.35% in term and 53.96% in preterm. The pregnancy history indicates that 21.42% of term mothers and 61.90% of preterm mothers were primigravidae and 65% of term mothers and 71.42% of preterm mothers were primiparous. 26.42% of term mothers and 50.79% preterm mothers had abortion history. A family history of congenital problems, premature birth, low birth weight babies, abortion, and IUD were in 29.64% of term and 58.73% of preterm mothers. While analyzing the occupational status, 47.50% of term mothers and 55.55% of preterm mothers were working. Other important findings in the study were 58.57% of term and 61.90% of preterm mothers had taken >3 to 4 cups of coffee or tea per day and 68.21% of term mothers and 42.85% of preterm mothers had exposure to smoking. 34.28% of term mothers and 33.33% of preterm mothers has used painkillers.

Table 2: Distribution according to Gestational Age

Gestational age	Frequency (n=343)	Percentage (%)
<34	6	1.74
34 – 36 6/7	57	16.61
37 – 40	201	58.60
>40	79	23.03

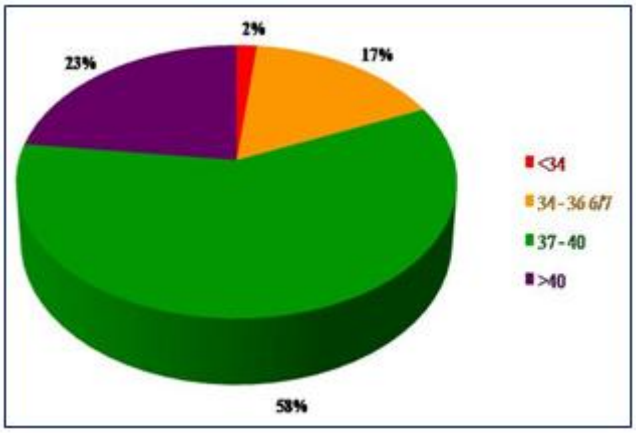

Figure 2: Distribution according to Gestational Age

Table 2 and Figure 2 show the distribution according to gestational age. 58.60% babies were born at 37- 40 weeks, which indicates 81.53% were born as term babies and 18.36% were born as preterm babies.

Table 3: Distribution according to Mode of Delivery and Birth weight (size) in term and preterm birth.

Variables	Frequency and percentage (%) in term birth, n=280	Frequency and percentage (%) in preterm birth, n=63
Mode of delivery		
NVD	151 (53.92%)	27 (42.85%)
AVD	14 (5.00%)	2 (3.17%)
C/S	115 (41.07%)	34 (53.96%)
Birth weight in kg (size)		
<2.5 (SGA)	140 (50.00%)	54 (85.71%)
2.5 – 4.5 (AGA)	136 48.57%)	9 (14.28%)
>4.5 (LGA)	4 (1.42%)	0

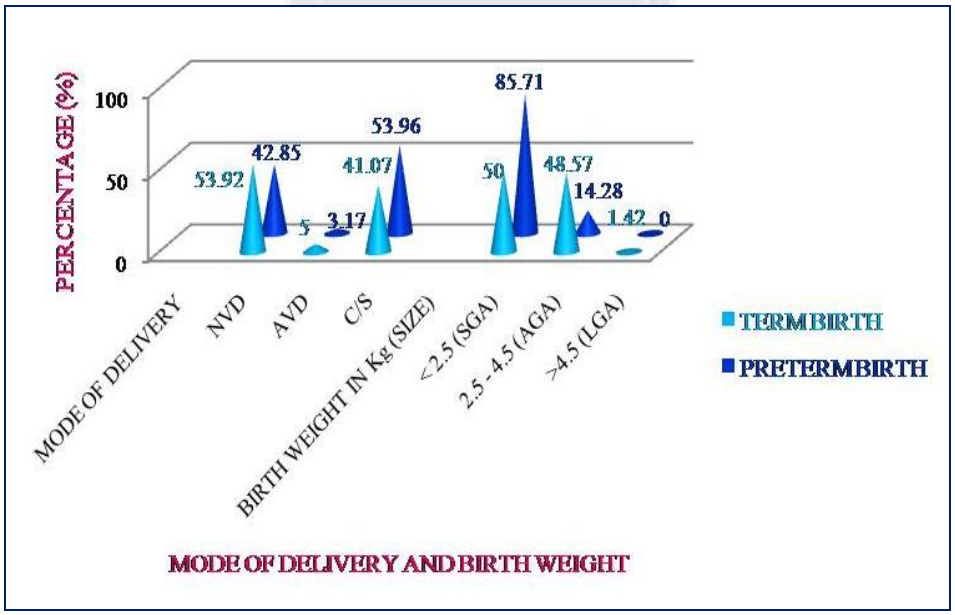

Figure 3: Distribution according to Mode of Delivery and Birth weight (size) in term and preterm birth.

Table 3 and figure 3 shows the distribution according to the mode of delivery and birth weight (size). 53.92% term mothers had Normal Vaginal Delivery and 53.96% Preterm mothers had Caesarian section. Evaluating the weight of babies, 50.00% of term babies and 85.71% of preterm babies had low birth weight or small for gestational age.

Table 4: Distribution of maternal disorders and complications in term and preterm birth.

Maternal disorders, complications	Frequency and percentage(%) in term birth, n=280	Frequency and percentage(%) in preterm birth, n=63
Anaemia	111 (39.64%)	53 (84.12%)
Pregnancy Induced Hypertension	20 (7.14%)	11 (17.46%)
Gestational Diabetes Mellitus	14 (5.00%)	6 (9.52%)
Hypothyroidism	9 (3.21%)	2 (3.17%)
Hyperthyroidism	1 (0.35%)	0
Infections	17 (6.07%)	21 (33.33%)
Oligohydramnios	21 (7.50%)	15 (23.80%)
Polyhydramnios	3 (1.07%)	0
Meconium Stained Amniotic Fluid	18 (6.42%)	8 (12.69%)
Premature Rupture of Membranes	10 (3.57%)	19 (30.15%)
Others	4 (1.42%)	1 (1.58%)

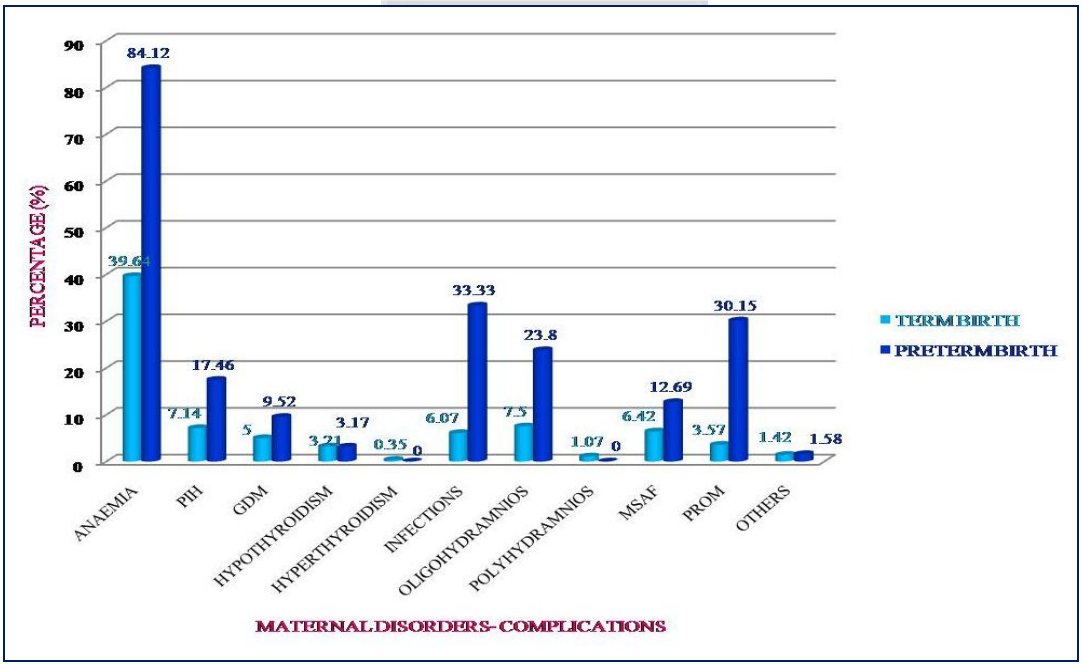

Figure 4: Distribution of maternal disorders and complications in term and preterm birth.

Table 4 and Figure 4 show the distribution of maternal disorders and complications in term and preterm birth. According to this study, anaemia was the most commonly seen disorder which encounters up to 39.64% of term mothers and 84.12% of preterm mothers. Pregnancy Induced Hypertension was seen in 7.14% in term mothers and 17.46% in preterm mothers. Gestational DM was the next complication that occurred in term and preterm mothers at a rate of 5.00% and 9.52% respectively. Hypothyroidism, Hyperthyroidism, infections, Meconium Stained Amniotic fluid, PROM, polyhydramnios, oligohydramnios were also observed in the mothers of babies who had admitted in the Special Newborn Care Unit with complications. About 7.50% of term mothers and 23.80% of preterm mothers had oligohydramnios in the last trimester of their pregnancy period.

Table 5: Distribution of Neonatal complications in term and preterm babies.

Neonatal complications	**Frequency and percentage(%) in term birth, n=280**	**Frequency and percentage(%) in preterm birth, n=63**
Neonatal jaundice	187 (66.78%)	44 (69.84%)
Respiratory disorders (RDS,TTNB)	97 (34.64%)	24 (38.09%)
MAS	1 (0.35%)	1 (1.58%)
Birth Asphyxia	4 (1.42%)	7 (11.11%)
Sepsis	56 (20.0%)	28 (44.44%)
Seizures	16 (5.71%)	11 (17.46%)
Hypoglycaemia	10 (3.57%)	6 (9.52%)
Congenital abnormalities	2 (0.71%)	1 (1.58%)
Conjunctivitis	1 (0.35%)	1 (1.58%)
IUGR	4 (1.42%)	6 (9.52%)
Difficulty in sucking breastmilk	25 (8.92%)	13 (20.63%)
Others	16 (5.71%)	7 (11.11%)
Death	2 (0.71%)	2 (3.17%)

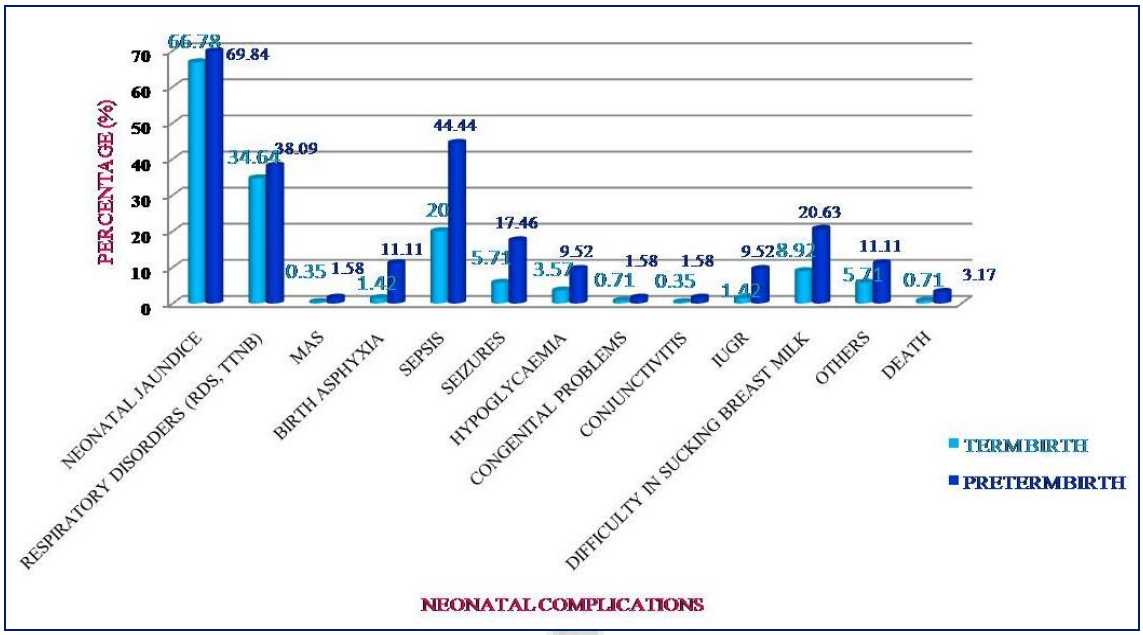

Figure 5: Distribution of Neonatal complications in term and preterm babies.

Table 5 and figure 5 shows the distribution of neonatal complications in term and preterm birth. Neonatal jaundice's the complications were seen at a rate of 66.78% in term birth and 69.84% in preterm birth. The second complications seen in neonates were respiratory disorders which constitute 34.64% in term babies and 38.09% in preterm babies. Sepsis is another complication seen in neonates, which constitutes about 20% of term babies and 44.44% in preterm babies. The results of neonatal complications reveal that the complications don't depends on the type of birth, but only a narrow increase was seen in preterm birth.

Table 6: Distribution of drugs prescribed during pregnancy

Drugs	Frequency and percentage of drugs prescribed in term birth, n=280	Frequency and percentage of drugs prescribed in preterm birth, n=63
Drugs prescribed routinely for conditions associated with pregnancy		
Folic acid-Iron-Calcium	276 (98.57%)	60 (95.23%)
Multivitamin	58 (20.71%)	22 (34.92%)
Antiemetics	89 (31.78%)	21 (33.33%)
Antacids	73 (26.07%)	24 (38.09%)
Inj.TT	272 (97.14%)	58 (92.06%)
Drugs prescribed for complications associated with pregnancy		
Antihypertensives	23 (31.78%)	11 (17.46%)
Antidiabetics	12 (4.28%)	5 (7.93%)
Thyroid drugs	10 (3.56%)	0
Antibiotics	17 (6.07%)	21 (33.33%)

Table 6 shows the distribution of drugs prescribed routinely during pregnancy and for the complications associated with pregnancy. The prescription pattern in both term and preterm mothers were the same. According to this study, 98.57% of term delivered mothers and 95.23% preterm mothers had given folic acid, iron and calcium supplements. But, 39.64% of term mothers and 84.12% of preterm mothers had anaemia during their pregnancy period.

Table 7: Drug therapy for the maternal complications

Drugs		**Frequency in term birth**	**Frequency in preterm birth**
Antihypertensive drugs	Methyldopa	19	10
	Nifedipine	2	0
	Labetolol	2	1
Antidiabetic drugs	Metformin	6	2
	Insulin	2	1
	Metformin + Insulin	4	2
Drugs for hypothyroidism	Thyroxine	9	2
Drugs for hyperthyroidism	Propyl Thio Uracil	1	0
Antibiotics	Cephalosporins	8	14
	Macrolide	4	3
	Amoxicillin-Clavulanic acid	2	1
	Aminopenicillin	3	3

Table 7 shows the drug therapy for maternal complications. The most commonly prescribed drugs for each category was analysed. Methyldopa was the drug mostly prescribed for pregnancy Induced Hypertension, Metformin was commonly prescribed for Gestational Diabetes Mellitus, Thyroxine was prescribed for Hypothyroidism, and Cephalosporins were given for infections during pregnancy.

Table 8: Therapies for Neonatal Complications

Neonatal complications	Therapies	Frequency in term birth	Frequency in preterm birth
Neonatal Jaundice	Phototherapy + Breastfeeding	171	16
	Breastfeeding only	21	28
Low birth weight	Kangaroo Mother Care (KMC)	106	49
Respiratory disorders	Oxygen therapy	97	24
	Antibiotics:		
	Ampicillin + Gentamycin	69	18
Birth asphyxia and Meconium aspiration	Oxygen therapy	5	8
Sepsis	Ampicillin + Gentamycin	43	21
	Ceftriaxone + Amikacin	11	6
	Ceftriaxone + Gentamycin	2	1
Infections	Ampicillin + Gentamycin	58	23
	Ceftriaxone + Amikacin	6	2
	Ceftriaxone + Gentamycin	2	2
	Tobramycin	31	20
	Mupriocin	47	21
Seizures	Phenobarbitone	16	11
	Phenytoin	12	10
	Lorazepam	2	4
Vitamins		278	62

Table 8 shows the therapies given for neonatal complications. Neonatal jaundice was relieved by giving phototherapy and breastfeeding. Kangaroo mother care was given to almost all the low birth weight babies which constitute up to 106 term babies and 49 preterm babies. For respiratory problems, Oxygen therapy was the first therapy adopted. In the case of infections and sepsis, antibiotics were given for the term and preterm babies. Ampicillin – Gentamycin were the most prescribed antibiotics. For seizures, Phenobarbitone and Phenytoin were the drugs of choice.

Vitamins were given for all the babies admitted in the Special Newborn Care Unit, either during hospital admission or during discharge which includes 278 term babies and 62 preterm babies.

DISCUSSION

The main aim of the study was to monitor the maternal-neonatal disorders, complications, and therapies associated with term and preterm birth. A total of 343 cases were collected from the study site as per the inclusion and exclusion criteria using the specially designed data entry form and questionnaire.

Table 1 shows the distribution of mothers according to sociodemographic characteristics in term and preterm birth. Mothers in the age group 21-25 years were more prone to complications in term birth (40.71%) while in preterm birth, the age group was 26-30 years (36.50%). Martina Persson *et al* conducted a study and the result was in between the age group 30-34 years. The epidemiological variations and study populations might be the reason for this change. The BMI indicates that both preterm and term delivered mothers were overweight and obese. Martina Persson et al, Sven Cnattingius et al studies regarding this and concluded that the risk for preterm delivery and complications is high. A major percentage mothers were primiparous 65.00% term and 71.42% preterm, Martina Persson et al concluded the chances for complications is more.

Another important finding in the study was 58.57% and 61.90% of term and preterm mothers had taken >3 to 4 cups of coffee-tea per day, in a study conducted by Justin. C. Konje demonstrated that maternal caffeine intake is associated with an increased risk of fetal growth restriction. This may be considered as a factor that leads to neonatal complications. In another study by Verena Sengipel *et al* Caffeine intake was consistently associated with decreased birth weight and increased odds of SGA. 68.21% and 42.85% of term and preterm mothers had exposure to smoking either in their home or in workplaces. Many studies established that smoking or exposure to smoke will adversely affect the foetus and may cause many neonatal complications. 34.28% of term mothers and 33.33% of preterm mothers has used painkillers. Many mothers were taken birth control pills and other OTC drugs which can encounter a negative effect on pregnancy. Eurica Migliore studied about prenatal paracetamol exposure.

Table 2 shows the distribution of mothers according to gestational age. 58.60% babies were born at 37- 40 weeks, which indicates 81.53% were born as term babies and 18.36% were born as

preterm babies. Jani.R.Jenson et al studied about maternal and neonatal complications in early term delivery and concluded that the complications were seen high during early term delivery. F.Nili et al studied premature babies were more prone to complications.

Table 3 shows the distribution according to the mode of delivery, birth weight in term and preterm birth. The percentage of normal delivery and caessarian section were almost equal in term and preterm births. Aiat Shamsa *et al* concluded that mode of delivery has no effect on the occurrence of complications. The birth weight among term babies were 50% and 85.71% in preterm babies, which indicates low birth weight babies were at a higher risk for complications. Shaheena Kamal *et al* and Babita Agarwal concluded that prematurity is a risk factor for neonatal jaundice. There was 58.44% low birth weight or SGA babies, Mahmud Hossain et al established that low birth weight babies have a significantly higher tendency to develop neonatal complications.

Table 4 shows the distribution of maternal disorders and complications in term and preterm birth. It was found that anaemia was seen in 39.64% of term delivered mothers and 84.12% of preterm mothers. Judith Angelitta *et al* established that anaemia contributes to maternal mortality and morbidity. J.B.Sharma *et al* conducted a study and concluded that anaemia had raised as a serious problem during pregnancy. The other complications seen in mothers were pregnancy induced hypertension, gestational Diabetes Mellitus, hypothyroidism, oligohydramnios, premature rupture of membranes etc. F.nili *et al* conducted a study on neonatal complications of PROM. Charlotte *et al* studied about the association of gestational diabetes mellitus with obesity in mothers and birth weight in neonates. The variations in the results might be due to the study populations, climate changes, epidemiological variations etc.

Table 5 shows the distribution of neonatal complications in term and preterm birth. Neonatal jaundice were the complications seen at a rate of 66.78% in term birth and 69.84% in preterm birth. Shiyam *et al* conducted a study based on the incidence of neonatal jaundice and the percentage was high. The second complications seen in neonates were respiratory disorders which constitute 34.64% in term babies and 38.09% in preterm babies. The results of neonatal complications reveal that the complications don't depend on the type of birth, but only a narrow increase was seen in preterm birth. Jani *et al* studied about both maternal and neonatal complications in early term deliveries. Tara.M.Randis studied about complications in preterm

babies and a similar result was obtained. There were certain variations and might be due to the change in study settings.

Table 6 shows the distribution of drugs prescribed during pregnancy. The prescription pattern in both term and preterm mothers were the same. According to this study, 98.57% of term delivered mothers and 95.23% had given folic acid, iron and calcium supplements. But, 39.64% of term mothers and 84.12% of preterm mothers had anaemia during their pregnancy period.

Table 7 shows the drug therapy for maternal complications. Methyldopa was the drug mostly prescribed for pregnancy Induced Hypertension, 19 term delivered mothers and 10 preterm mothers. Metformin was commonly prescribed for Gestational Diabetes Mellitus. Thyroxine was prescribed for Hypothyroidism; no other drugs were prescribed for hypothyroid patients. Cephalosporins were given for infections during pregnancy.

Table 8 shows the therapies given for neonatal complications. Neonatal jaundice was relieved by giving phototherapy and breastfeeding. Phototherapy was given to 171 term babies and 16 preterm babies. Kangaroo mother care was given to 106 term babies and 49 preterm babies. Low birth weight can be managed by KMC. Joy.E.Lawn et al conducted a study on KMC and concluded that Neonatal deaths can be prevented to a large extent by kangaroo mother care. For respiratory problems, Oxygen therapy was the first therapy adopted. Oxygen therapy was given to all the babies admitted with respiratory problems, asphyxia and meconium aspiration. In the case of infections and sepsis, antibiotics were given for the term and preterm babies. Ampicillin – Gentamycin was the most prescribed antibiotics. For seizures, Phenobarbitone, and Phenytoin were the drugs of choice. Vitamins were given for all the babies admitted in the Special Newborn Care Unit, either during hospital admission or during discharge which includes 278 term babies and 62 preterm babies.

CONCLUSION

The study was conducted to monitor the maternal-neonatal disorders, complications, and therapies associated with term and preterm birth. Out of 343 cases, there was 81.53% term birth and 18.36% preterm birth. According to the results, the sociodemographic factors like age, BMI, abortion history, family history, parity, tea-coffee intake, exposure to smoking, use of drugs like painkillers, birth control pills, and other OTC drugs have the greatest impact on the pregnancy

and this might be a reason for maternal-neonatal complications. Even though the sociodemographic factors are approximately same, the rate of complications in preterm delivered mothers was high and preterm, early term babies were more prone to neonatal complications in which low birth weight babies encounters a major percentage. Anaemia was the major maternal disorder. Neonatal jaundice and respiratory problems were the major neonatal complications. The mothers and neonates were given individualized therapies depending upon the severity of the complications.

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