A RETROSPECTIVE ANALYSIS OF MATERNAL AND FETAL OUTCOMES OF PRETERM DELIVERIES IN A TERTIARY CARE HOSPITAL IN SOUTH INDIA.

Obstetrics & Gynaecology

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ABSTRACT

Aim: To study preterm delivery outcomes in a tertiary care hospital in South India.

Methods: The study was conducted for a 7 month period from July 1, 2020 to January 31, 2021at JSS Hospital, Mysuru. Relevant details of every pregnant woman who underwent a preterm delivery and the subsequent neonate born were collected and followed till discharge.

Results: The prevalence rate of preterm births was 11.81%. There were 44 early preterm deliveries and 88 late preterm deliveries. The most common maternal complications that lead to preterm births PPROM and preeclampsia.36 early preterm and 29 late preterm neonates required an NICU admission. This included 7 pairs of twins in the early preterm and 1 pair of twins in the late preterm. In the NICU, the most common complications noted were RDS, and sepsis.4 neonates remained by mother's side soon after delivery in the early preterm subset, whereas 54 of late preterm neonates were kept by the mother's side soon after delivery. 31 of 40 early preterm, 86 of the 88 of late preterm neonates were healthy and fit for discharge.

Conclusion: The prevalence of preterm birth rate in our study stands comparable to the reported global average. Preterm births have a multifactorial etiology. Timely referral to higher centers, experienced obstetricians, and a good NICU facility proved helpful to both the mother and neonate. Thorough record keeping also allows a true picture of preterm prevalence on the basis of which, policies and decisions can be made to further improve preterm care.

KEYWORDS

preterm, neonatal morbidity, neuroprophylaxis, early preterm.

INTRODUCTION

The World Health Organization (WHO) defines preterm birth as one where the neonate is born alive before 37 completed weeks of gestation. WHO further classifies preterm babies as extremely preterm (<28 weeks), early preterm (28-32 weeks) and moderate preterm (32- <34 weeks) and late preterm (32- <37 weeks).[1] Preterm births could happen for a variety of reasons, most of which are potentially unfavorable for the mother and/or the new born. Preterm birth has recently been declared as one of the foremost causes of under-5 years mortality.[1]A preterm birth can lead to a neonate that may require special care. These are reasons enough for health care workers to keenly follow factors that lead to preterm births. Healthcare providers should be equipped to anticipate the complications such a neonate may have, in order to strive for ideal health outcomes.With this intent, we designed a retrospective observational study to comment on the outcomes of both mother and infants born preterm in a 7-month time period at a tertiary care hospital. This study also aims to suggest possible steps that could be taken to prevent and to better manage preterm deliveries. This, we believe could result in better neonatal outcomes at the time of discharge.

METHODS

Our study was set in JSS Hospital, Mysuru. It is a teaching hospital associated with JSS Medical College. It is an 1800 bedded hospital, which makes it one of the largest hospitals in the city of Mysuru, India. We used hospital registers for parturition details and NICU admissions to collect relevant data. We acquired data on all women who delivered preterm i.e. between 28-37 weeks of gestation, in a 7 month time period, starting from July 1, 2020 to January 31, 2021.We enrolled all neonates born to such mothers: live born, still born and cases of intrauterine fetal demise (IUFD). Ethical approval and administrative approval was obtained from the respective authorities for this study.

Data Collection

JSS Hospital (JSSH) maintains a parturition register which holds details of all deliveries that have occurred in the hospital premises. We identified all mothers that delivered preterm with the help of this register. With these details, we referred to the patient's individual case sheets to procure further information as mentioned below.

Demographic details such as age and level of education were collected. Thorough antenatal history and medical comorbidities were obtained. Obstetric history such as multiple pregnancies, prior preterm, antenatal complications were obtained from individual case sheets of the patients. Details of mode of delivery, onset, duration of labor were collected. Details on antenatal administration of steroids, magnesium sulphate too were obtained from individual case sheets. We then collected details of the neonate. For neonates that remained mother's side, details were collected from the parturition register. This was also done for cases of IUFDs and still borns. For neonates that required admission to the Neonatal Intensive Care Unit (NICU) all details were obtained from the NICU register.Details such as duration of stay in the NICU, neonatal morbidities and finally the outcome of the NICU stay were noted. We followed the neonates till the time they were deemed fit for discharge or had an adverse outcome of death.

RESULTS

Of the 132 preterm deliveries that were conducted at JSS Hospital between 1 July 2020 to 31 January 2021, these have been our following observations. 44 of the 132 deliveries were early preterm i.e. between weeks 28-34, whereas 88 were late preterm i.e. between weeks 34-37. Amongst the 44 early preterm deliveries conducted, 36 of early preterm neonates required an NICU admission including 7 pair of twins. 4 neonates remained by the mother's side,10 were cases of IUFD and 1 was a still born. Amongst the 88 late preterm deliveries conducted, 29 of them required an NICU admission including one pair of twins, 54 of them remained by the mother's side, 5 of them were cases of IUFD and 1 was a still born. Of the early preterm neonates delivered, 32 were declared active and healthy. Of the late preterms delivered, 86 of them were declared active and healthy. Prevalence rate of preterm births between July 2020 to January 31 2021 at JSSH is 11.81% i.e. 115 live births/ 973 live births.

Maternal Population Characteristics

Maternal population details have been enlisted in table 1. The average maternal age was 26.6 years. Most of the mothers who delivered preterm were between ages 26-30 years. The youngest women to deliver preterm were 19 years of age. There were 5 such patients. The oldest woman to deliver preterm was age 41 years. About 96% of the pregnancies were booked. There was a slightly higher frequency of multigravid women (~55%) who delivered preterm compared to primigravid women (~45%). Preterm Prelabor Rupture of Membranes (PPROM), preeclampsia and previous abortions were noted to be the most common risk factors associated with preterm deliveries. 33 mothers were eligible for antenatal corticosteroid prophylaxis. Of this, 13 received the full course, 12 received the stat dose and 8 of them did

not receive any antenatal steroid prophylaxis. 37 mothers were eligible for magnesium sulphate prophylaxis. Of this, 9 received the full course, i.e. both loading and maintenance dose.18 received loading dose only, whereas 10 did not receive any neuroprotective prophylaxis.

Table – 1 Maternal Population Characteristics

Characteristics	Subgroups	Frequency	Percentage (%)
Age (in years)	18-20	10	7.58
	21-25	47	35.61
	26-30	51	38.64
	31-35	21	15.91
	36-40	2	1.52
	41-45	1	0.76
	Total	132	100
Education	Uneducated	24	18.18
	Primary	28	21.21
	Secondary	43	32.58
	Tertiary	37	28.03
Parity	Gravida 1	60	45.45
	Gravida 2	54	40.91
	Gravida 3	15	11.36
	Gravida 4	1	0.76
	Gravida 5	1	0.76
	Gravida 6	0	0
	Gravida 7	1	0.76
	Total	132	100
Period of gestation (in weeks)	<28	2	1.52
	28-32	22	16.67
	32-34	20	15.15
	34-36	88	66.67
	Total	132	100
Risk Factors	PPROM	35	26.52
	Pre-eclampsia	34	25.76
	Previous abortions	33	25
	Previous LSCS	32	24.24
	Hypothyroidism	17	12.88
	Malpresentations	14	10.61
	Multiple pregnancies	13	9.85
	Oligohydramnios	13	9.85
	Gestational Diabetes Mellitus/Diabetes Mellitus	11	8.33
	Intrauterine growth restriction	11	8.33
	Antepartum haemorrhage	7	5.3
	Anemia	4	3.03
	Liver disorders	3	2.27
	Hyperthyroidism	2	1.52
	Cervical incompetence	1	0.76

Neonatal population characteristics

Neonatal characteristics have been enlisted in table 2. NICU admissions were ascertained on the basis of clinical indication and NICU protocols of preterm care. In the early preterm category, there were 7 multiple gestations, of which one pair of twins expired in the NICU. In the late preterm category, there were 6 multiple gestations, of which only one pair was admitted to the NICU and were discharged without any complications, while the rest were mother's side and healthy. The most common complications in the NICU were Respiratory distress syndrome (RDS), Unconjugated Hyperbilirubinemia (UCHB) and sepsis. The mean duration of stay in the NICU amongst the early preterms was 11.08 days whereas in late preterm, the mean duration of stay was 6.96 days. The maximum duration of stay in the NICU was 52 days in an early preterm neonate. On the whole, 77.5% of the early preterm neonates and 95.45% late preterm neonates were discharged and declared active and healthy.

Characteristic	Category	Early preterm	Percentage(%)	Late preterm	Percentage (%)
Mode of delivery	Emergency LSCS	33	75	65	73.86
	Vaginal	10	22.73	20	22.73
	Operative vaginal delivery	1	2.27	3	3.41
	Total	44	100	88	100
Intrauterine deaths	Yes	10	22.73	5	5.68
Still borns	Yes	1	2.27	1	1.14
NICU admissions	Yes	36*	65.91	29**	31.82
Motherside	Yes	4	9.09	59***	61.36
	Total	100	Total	100	
NICU complications	RDS	16	44.45	11	37.93
	Sepsis	9	25	5	17.24
	UCHB	10	27.78	5	17.24
	Hypoglycemia	0	0	5	17.24
	TTN	0	0	4	13.79
	Anomalies	2	5.56	3	10.34
	Preterm care	9	25	3	10.34
	Expired	8	22.22	2	6.90
Discharge outcome	Alive and discharged healthy	25		80	
	Death	8		2	

DISCUSSION

Preterm births are at an all time high. Studies have shown that approximately, 15 million preterm births occur annually on a global scale. Unsurprisingly, the developing nations are the most significant contributors to this number. About 60% of the preterm births occur in Southern Asia and Africa.[2] This could be due to the sheer population numbers in these countries as well as insufficient antenatal, perinatal care apart from the obvious risk factors.

Preterm has broadly been divided as spontaneous preterm or indicated preterm. Indicated preterm could be due to maternal or fetal indications that demand termination of pregnancy before term is achieved. Spontaneous preterm however, encompasses PPROM and spontaneous preterm labor with intact membranes.[3]

Understanding the mechanisms of preterm labor is a good way to identify the reasons behind preterm births. It has been postulated that fetal release of cortisol may be playing a role. Increased cortisol acts to decrease progesterone levels, thereby reversing the estrogen/progesterone ratio and allowing labor to occur before term. It has also been suggested that a decidual activation via inflammatory pathways i.e. an intrauterine infection could result in preterm labor and eventually a preterm birth.[4]

Although, exact reasons and mechanisms of preterm labor aren't clear, there have been clear risk factors which predispose to preterm deliveries. If identified and dealt with, it can result in positive outcomes for both mother and child.

Among the risk factors, certain demographics has been shown to be associated with preterm births. Ethnicity, adolescent pregnancies, elderly pregnancies, inadequate spacing between children, mother's level of education and socioeconomic status, occupation play a role in preterm births. [1,4] Our study showed that most mothers were educated at least still secondary school level.

Mother's nutrition status, BMI in the extreme values too contribute to preterm births. [1,4] Antenatal history is a useful indicator to anticipate preterm deliveries. Mothers with a previous preterm are at a higher risk of recurrence of preterm deliveries.[5]

Comorbidities such as preeclampsia, thyroid disorders, diabetes mellitus and the associated medications for these diseases have a considerable influence on preterm births. Antenatal history is a useful indicator to anticipate preterm deliveries. Multiple gestations, antepartum hemorrhage by way of placental abruption, placenta previa; amniotic fluid volume derangements i.e. polyhydramnios, oligohydramnios too contribute to preterm births.

Social, psychological stress in the antenatal period, drugs, alcohol,

smoking are all contributors towards preterm births. Genetic, anatomic causes also have a role to play in preterm births. [3] These factors are evidence of the multifactorial etiology that drives preterm births. As JSSH is a tertiary care center, obstetricians are prone to see several high risk cases, which explains the high number of C-sections as it is known that cesarean sections hold better outcomes in a complicated or preterm delivery.Preconception counseling about reproductive planning, birth spacing, contraceptive usage, the importance of diet and micronutrient intake, physical activity is vital. Screening & management of chronic diseases, immunizations, management of infectious diseases are important steps to be taken to prevent preterm births. During pregnancy, identification and treatment of hypertensive disease in pregnancy, monitoring multiple gestations, administration of progesterone to prolong pregnancy, identification and treatment of structural abnormalities (e.g. cervical cerclage in cases of cervical insufficiency) are some ways to prolong the pregnancy to term. During labor, tocolytics to slow down labor, antenatal corticosteroids, antibiotics for PPROM, provision of magnesium sulphate are all methods to help reduce mortality and combat neonatal complications.Antenatal steroids help the fetus achieve lung maturity and decreases neonatal mortality.[6]In our study, of the 33 mothers that were eligible for receipt of antenatal steroids, 8 of them did not receive them.This was because the interval between arriving to the hospital and progression of labor was rapid in some cases.There were imminent reasons of danger to the mother and fetus due to antepartum hemorrhage in 4 cases. Due to paucity of time and imminent danger to mother and child, steroid prophylaxis was therefore given less priority.Magnesium sulphate too, if given timely aids in neuroprotection for the neonate. Of the 37 mothers who were eligible for magnesium sulphate prophylaxis, 10 did not receive any neuroprophylaxis due to paucity of time and/or imminent danger to the mother and child, which sidelined the administration of magnesium sulphate.

CONCLUSIONS

Identifying risky pregnancies early and therefore early referral to higher centers, will increase the chances of positive outcomes in both mother and neonate. An emphasis on preconception counseling and good antenatal care at antenatal clinics will take maternal and neonatal health a long way in preventing and managing preterm births.

Better record keeping and statistics from low income and developing countries will help assess the true seriousness of preterm births, mortality rates and help paint a true picture of the gravity of the disease. Preterm births are largely preventable and with the collective efforts of policy makers, health care providers and a consenting patient, one can definitely cut down preterm rates and risk factors considerably.

REFERENCES:

1. March of Dimes, pmNch, Save the children, Who. Born Too Soon: The Global action report on preterm Birth. eds cp howson, mV Kinney, Je lawn. World health organization. Geneva, 2012
2. Walani SR. Global burden of preterm birth. *Int J Gynaecol Obstet*. 2020;150(1):31-33. doi:10.1002/ijgo.13195
3. Goldenberg RL, Culhane JF, Iams JD, Romero R. Epidemiology and causes of preterm birth. *Lancet*. 2008;371(9606):75-84. doi:10.1016/S0140-6736(08)60074-4
4. Romero R, Espinoza J, Kusanovic JP, et al. The preterm parturition syndrome [published correction appears in BJOG. 2008 Apr;115(5):674-5]. *BJOG*. 2006;113 Suppl 3(Suppl 3):17-42. doi:10.1111/j.1471-0528.2006.01120.x
5. Mercer BM, Goldenberg RL, Moawad AH, Meis PJ, Iams JD, Das AF, Caritis SN, Miodovnik M, Menard MK, Thurnau GR, Dombrowski MP, Roberts JM, McNellis D. The preterm prediction study: effect of gestational age and cause of preterm birth on subsequent obstetric outcome. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Am J Obstet Gynecol. 1999 Nov;181(5 Pt 1):1216-21. doi: 10.1016/s0002-9378(99)70111-0. PMID: 10561648.
6. Website: https://www.nice.org.uk/guidance/ng25