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Original Research Article

A study of neonatal morbidity and mortality in government general hospital, Srikakulam Andhra Pradesh, India

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ABSTRACT

Background: Four million newborn babies die in the neonatal period, India 1.2 million neonatal deaths every year. India contributes for a quarter of global neonatal deaths and thus faces the biggest newborn health challenge of any country in the world. The aims of the study were done with the objective to conclude the morbidity and mortality pattern of neonates admitted to a neonatal intensive care unit (NICU).
Methods: Hospital based prospective study was conducted at NICU Government Medical Collage, Srikakulam, Andhra Pradesh, India. Neonates from admission to discharge flowed, LAMA or death collecting the data by using a predesigned standardized preform.
Results: Neonates were admitted in the NICU during period April 2014 to March 2019. The data analysis for the morbidity showed that the neonatal jaundice (NNJ) were 765(10.57%) , septicemia were 1110 (15.34%), prematurity were 593 (8.19%), birth asphyxia were 963 (13.30%), respiratory distress syndrome (RDS) were 184 (2.54%),hypoxic ischemic encephalopathy (HIE) were 984 (8.46%), meconium aspiration syndrome (MAS)were 612 (8.46%),transient tachypnea of neonate (TTN) were 634 (8.76%), low birth weight (LBW) were 418 (5.77%), intra uterine growth retardation (IUGR) were 179 (2.47%), congenital anomalies were 131 (1.81%), meningitis were 83 (1.15%), seizure disorder were 49 (0.68%) and others. The disease wise mortality among the neonates admitted to NICU was studied and were found that prematurity 212 (35.75%), septicemia were 74 (6.67%), birth asphyxia were 91 (21.70%), meconium aspiration syndrome were 70 (11.44%) and respiratory distress syndrome were 66 (35.87%), low birth weight were 102 (24.40%) congenital anomalies were 31 (23.66%) the top major contributors to the neonatal mortality.
Conclusions: The commonest causes of admission were neonatal jaundice (NNJ), sepsis, prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight, congenital anomalies. The most common cause of case fatality was prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight, congenital anomalies in NICU in a tertiary care teaching hospital, government medical college, Srikakulam, Andhra Pradesh, India.

Keywords: Care, Causes, Morbidity, Mortality, Neonatal

INTRODUCTION

The neonatal period is a highly vulnerable time for an infant completing many of the physiologic adjustments required for life outside the uterus. As a result, there are high rates of morbidity and mortality.

World over, four million newborn babies die in the first month of life-99% in low and middle-income countries every year.[1] In India, 26 million babies are born every year, and 1.2 million die in the first four weeks of life, which accounts for a quarter of global neonatal deaths. India thus faces the biggest newborn health challenge of

any country in the world.[2] Neonatal deaths constitute two-thirds of infant deaths in India; 45% of the deaths occur within the first two days of life.[3] The common cause of neonatal mortality in India are asphyxia, prematurity and low birth weight, sepsis, congenital abnormalities, variety of surgical problems. Improved level of newborn care can bring down the mortality rates.[4] Globally, prematurity (29%), infections (29%), asphyxia (23%), congenital malformations (8%), and other (11%) are important causes of neonatal death in low-income country while prematurity and malformation contribute in developed countries.[5] About 44 percent of these childhood deaths occur within the first 28 days of life, thus increasingly accounting for a larger proportion of the under five deaths.[2,6] Moreover, 79 percent of neonatal deaths occur during early neonatal period (0-6days) of which 41 percent is in the first 24 hours of birth where as 21 percent happen in late neonatal period (7-28days).[7]

High neonatal mortality rate in a country reflects the poor availability of quality and quantity of infrastructure and utilization of neonatal care of that country. To determine the burden of neonatal disease, understand patient needs, planning and organization the present study was undertaken at GMC, Srikakulam, Andhra Pradesh, India, to determine the morbidity and mortality pattern of among the neonates admitted to a NICU. The present study will help us to find out gaps if any in the required infrastructure for NICU of GMC Srikakulam, Andhra Pradesh, India. The study was undertaken with the objective to determine the morbidity and mortality pattern of neonates admitted in NICU.

METHODS

This study was done at a neonatal intensive care unit teaching hospital, government medical college, Srikakulam, Andhra Pradesh, India. The study was conducted from April 2014 to 2018 March 2019.

A hospital based retrospective study of was 7238 neonates admitted in the neonatal intensive care unit teaching hospital, government medical college, Srikakulam, Andhra Pradesh, India. For five years period April 2014 to March 2019.Neonates below the age of 28 days who were admitted in the neonatal intensive care unit teaching hospital, government medical college, Srikakulam, Andhra Pradesh, India. For five years period April 2014 to March 2019.

Exclusion criteria

- Individual recordings in the register which were improperly filled were excluded.

Data collection technique

The source of data for this study was the NICU registers at government general hospital (GMC) Srikakulam, Andhra Pradesh, India which consisted of new-born information recorded at admission such as date of admission, age, weight of the child, status at birth, diagnosis, treatments given, outcome status and records of maternal information like parity, antenatal follow up, gestational age and mode of delivery. All these data were collected using a uniform extraction format developed by taking in to account all the relevant variables in the standard NICU registers.

Statistical analysis

A retrospective cross-sectional study was conducted among all admitted neonates in the NICU of government medical college, Srikakulam, from April 2014 to March 2019. Information was extracted retrospectively during admission from patient records and death certificates, using a pretested questionnaire. The data were entered and analyzed using SPSS version 20, and p-values <0.05 were considered statistically significant.

RESULTS

The data analysis showed that there were 7238 neonates admitted to NICU during five-year period of study from April 2014 to March 2019. The age wise distribution of admitted neonates less than 24 hours were 4131 (57.07%) and 1-3 days were 2137 (29.52%) and 4-7 were 573 (7.91%) and 8-28 days were 397 (5.48%). Majority of neonates were male 4088 (56.46%) and female 3150(43.52%). The minimum and maximum gestational age of the neonates was 25 and 43 weeks respectively. Majority 4214 (58.22%) of the neonates were born at full term of gestation, preterm 34-37 weeks were1704(23.54%), less than 34 weeks were 1320(18.23%). The minimum and maximum weight of the admitted neonate was 820 and 4350 grams respectively. Majority (56.38%) of the neonates were of normal weight (more than 2500g). Most 7088(97.92%) of the admitted neonates were born in health institution (Table 1).

The data analysis for the morbidity showed that the neonatal jaundice (NNJ) were 765(10.57%) , septicemia were 1110 (15.34%), prematurity were 593 (8.19%), birth asphyxia were 963 (13.30%), respiratory distress syndrome (RDS) were 184 (2.54%), hypoxic ischemic encephalopathy (HIE) were 984 (8.46%),meconium aspiration syndrome (MAS)were 612 (8.46%), transient tachypnea of neonate (TTN) were 634 (8.76%), low birth weight (LBW) were 418 (5.77%),Intra uterine growth retardation (IUGR) were179 (2.47%),congenital anomalies were 131 (1.81%), meningitis were 83 (1.15%), seizure disorder were49(0.68%) and others (Table 2).

The data was analyzed for outcome of the total admitted neonates during the study period. It was observed that out of 7238 neonates admitted most were discharged5672 (76.36%) whereas 968(13.37%) expired and were

688(9.51%) left against medical advice (LAMA), Referral were 509 (7.03) (Table 3).

Table 1: Distribution of neonates admitted to NICU.

Characteristic	Variable	Frequency (N=7238)	Percentage (%)
Age of the neonate on admission	< 24hours	4131	57.07
	1-3 days	2137	29.52
	4-7 days	573	7.91
	8-28 days	397	5.48
Neonatal period	Early (0-7 days)	6841	94.52
	Late (8-28 days)	397	5.48
Gender	Male	4088	56.48
	Female	3150	43.52
Gestational age at birth	>37 (weeks)	4214	58.22
	34-37 (weeks)	1704	23.54
	<34(weeks)	1320	18.23
Weight on admission	>2500 g	4081	56.38
	1500-2499g	2528	34.93
	1000-1499g	512	7.07
	<1000g	117	1.62
Place of delivery	Health institution	7088	97.92
	Home	150	2.07

Table 2: Patterns of disease among neonates admitted to NICU.

Disease	Frequency (N=7238)	Percentage
Septicemia	1110	15.34
HIE	984	13.59
Birth asphyxia	963	13.30
Neonatal jaundice (NNJ)	765	10.57
Transient tchypnea of neonates (TTN)	634	8.76
Meconium aspiration syndrome (MAS)	612	8.46
Prematurity	593	8.19
LBW	418	5.77
others	373	5.15
Respiratory distress syndrome (RDS)	184	2.54
IUGR	179	2.47
Congenital anomalies	131	1.81
Meningitis	83	1.15
Seizure disorder	49	0.68
ELBW	41	0.57
Pneumonia	31	0.28
Hypoglycemia	12	0.17
shock	5	0.06
ARF	4	0.055
Extreme preterm	2	0.03
Diarrhea	2	0.03
DIC	2	0.03
hyperthermia	1	0.015

The disease wise mortality among the neonates admitted to NICU was studied and were found that prematurity212 (35.75%), septicemia were 74 (6.67%), birth asphyxia were 91(21.70%), meconium aspiration syndrome were 70 (11.44%) and respiratory distress syndrome were 66 (35.87%), low birth weight were 102 (24.40%) congenital anomalies were 31 (23.66%) the top major contributors to the neonatal mortality (Table 4).

Table 3: Outcome of the neonates who were admitted to NICU.

Outcome	Frequency(N=7238)	Percentage
Discharged	5672	76.36
Expired	968	13.37
LAMA	688	9.51
Referral	509	7.03
Grand total	7238	100

The data was analyzed for the case fatality rate and it was observed that out of discharged and expired neonates (6640) it was observed that case fatality rate was more in MAS (15.64%), congenital anomalies (50.62%), prematurity (43.44%), birth asphyxia (25.12%), RDS (42.04%), septicemia (8.04%), LBW (24.83%) HIE (10.89%), TTN (0.17%) and pneumonia (9.52%), meningitis (11.9%). The chi-squared test (χ^2) was 89.49585 (df=15) and the two-tailed p-value was less than 0.0001 indicating that disease type is very strongly associated ($p<0.0001$) with the outcome i.e. discharge or death of a neonate (Table 5).

Table 4: Disease wise mortality pattern among neonates admitted to NICU.

Disease	Frequency (N=disease)	Death	Mortality rate
Septicemia	1110	74	6.67
HIE	984	91	9.24
Birth asphyxia	963	209	21.70
Neonatal jaundice (NNJ)	765	5	0.65
Transient tachypnea of neonates (TTN)	634	1	0.15
Meconium aspiration syndrome (MAS)	612	70	11.44
Prematurity	593	212	35.75
LBW	418	102	24.40
others	373	34	9.12
Respiratory distress syndrome (RDS)	184	66	35.87
IUGR	179	14	7.82
Congenital anomalies	131	41	31.29
Meningitis	83	7	8.43
Seizure disorder	49	6	12.24
ELBW	41	31	75.60
Pneumonia	31	3	9.68
Hypoglycemia	12	0	0
shock	5	3	60
ARF	4	1	25
Extreme preterm	2	1	50
Diarrhea	2	0	0
DIC	2	0	0
hyperthermia	1	0	0

Table 5: Disease wise case fatality rate of the neonates admitted to NICU.

Disease	Out come				Total 6640	
	Discharged		Expired		N	%
	N	%	N	%		
Septicemia	846	91.96	74	8.04	920	100
HIE	745	89.11	91	10.89	836	100
Birth asphyxia	623	74.88	209	25.12	832	100
Neonatal jaundice (NNJ)	695	99.8	5	0.02	700	100
Transient tachypnea of neonates (TTN)	605	99.83	1	0.17	606	100
Meconium aspiration syndrome (MAS)	378	84.36	70	15.64	448	100
Prematurity	276	56.56	212	43.44	488	100
LBW	309	75.18	102	24.82	411	100
Others	207	85.89	34	14.11	241	100
Respiratory distress syndrome (RDS)	91	57.96	66	42.04	157	100
IUGR	154	91.67	14	8.33	168	100
Congenital anomalies	40	49.38	41	50.62	81	100
Meningitis	55	88.71	7	11.29	62	100
Seizure disorder	27	81.81	6	18.29	33	100
Elbw	41	56.94	31	43.06	72	100
Pneumonia	19	90.48	3	9.52	21	100
Hypoglycemia	8	100	0	0	8	100
Shock	0	0	3	0	3	100
ARF	3	75	1	25	4	100
Extreme preterm	2	66.66	1	33.34	3	100
Diarrhea	2		0		2	100
DIC	0		0		0	100
Hyperthermia	1		0		1	100

DISCUSSION

Accurate data on the neonatal disease volume and pattern are useful for many reasons. It is important for the providers of care, investigators, local and national health administrators, and for decision makers to design interventions for prevention and treatment and to implement and evaluate health care programs.

The data from NICUs of hospitals in India is very limited and there are very few published reports from these hospitals. Perhaps this is the published data concerning neonatal intensive care unit of government general hospital, Srikakulam, Andhra Pradesh, India. This is a hospital-based study and may not present what is going on in the community. So, the results of this study should be compared cautiously with other similar studies, because NICU of GGH Srikakulam inborn and out born neonates were admitted here.

This five-year prospective study was done in order to document the most common type of diseases with which the neonates are admitted, treatment and interventions the neonates received, and outcome of those neonates admitted in the neonatal intensive care unit GGH Srikakulam, Andhra Pradesh, India.

It was found that a total of 7238 neonates were admitted in the NICU during the period of study from April 2014 to March 2019. In born and out born neonates are admitted in GGH Srikakulam, Andhra Pradesh, India.

The age wise distribution of admitted neonates in present study revealed that most the neonates were in the age group of 0-7 days (94.52%) group followed by (5.48%) in 8-28 days age group. Thus, the findings of present study were early neonates are high to the study by Anjum ZM et al.[8] Present study also showed that males (58.48%) female (42.52%). It is consistent with local literature reported by Kumar MK et al.[9] The findings of present study are comparable the findings of whereas Seyal T et al, (60% male versus 40% female) and international studies from Pakistan by Seyal T et al, (59.55% male versus 40.5% female) and by Ugwu GI of Nigeria (54.3% male versus 45.7% female).[10,11] Present study also revealed that most of the admitted neonates were delivered in health institutions (97.92%) and only small number was delivered at home (2.07%). at Sir Ganga Ram hospital Lahore, Pakistan, found that only 3.9% were delivered at home. Nahar J et al, found that most of the babies were born in hospital (83%).[12] The findings of a greater number of health institution deliveries in present study are probably due to Janani Suraksha Yojana and Janani Shishu Sawasthaya Karyakram scheme of national rural health mission.

The weight parameter analysis revealed that the number of neonates having weight extremely low weight (<1000 grams), very low weight (1000-1499grams) and low weight(1500-2499grams), more than 2500grams was 1.62%, 7.2% and 34.93% and 56.38% respectively. The results of present study are comparable to a similar study done by Hussain S et al, which revealed that 2.25% were <1000 grams, 12.2% were between 1000-1499gram, 39.35% were between 1500-2499grams, 42.25% between 2500-4000 grams, and 3.95% were more than 4000 g.[13]

In present study it was also revealed that neonatal jaundice (NNJ) were 765 (10.57%),septicemia were 1110 (15.34%), prematurity were 593 (8.19%), birth asphyxia were 963 (13.30%), respiratory distress syndrome (RDS) were 184 (2.54%), hypoxic ischemic encephalopathy (HIE) were 984 (8.46%), meconium aspiration syndrome (MAS) were 612 (8.46%),transient tachypnea of neonate (TTN) were 634(8.76%), low birth weight (LBW) were 418 (5.77%), Intra uterine growth retardation (IUGR) were 179 (2.47%), congenital anomalies were 131 (1.81%), meningitis were 83 (1.15%), seizure disorder were 49 (0.68%) common indications for admission to NICU. In Ali SR et al, study prematurity, infections, birth asphyxia and NNJ were the main causes of admission to the neonatal unit, at 27.9%, 20.33%, 13%, and 11.3% respectively.[14] Present study showed that case fatality rate was more in RDS (42.04%), prematurity (43.44%), birth asphyxia (25.12%), LBW (24.83%), MAS (15.64%), HIE (10.89%),congenital anomalies (50.62%), septicemia (8.04%),TTN (0.17%) and pneumonia (9.52%), meningitis (11.9%). The most common cause of neonatal mortality was prematurity in present study which is similar to studies conducted by Seyal T et al, Nahar J et al, Narayan R et al, Prasad V et al, and Ali SR et al.[10,12,14-16]

CONCLUSION

The commonest causes of admission were neonatal jaundice (NNJ), sepsis, prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight, congenital anomalies. The most common cause of case fatality was prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight.

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