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Morbidity and Mortality Profile of Neonates in a Tertiary Care Center in Andhra Pradesh

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Abstract **Original Research Article**

Every year an estimated 4 million babies die in the first 4 weeks of life (the neonatal period). Three-quarters of neonatal deaths happen in the first week—the highest risk of death is on the first day of life. Almost all (99%) neonatal deaths arise in low-income and middle-income countries, yet most epidemiological and other research focuses on the 1% of deaths in rich countries. The highest numbers of neonatal deaths are in south-central Asian countries and the highest rates are generally in sub-Saharan Africa [5]. ***Aims and Objectives:*** To study the morbidity and mortality patterns in NICU of tertiary care hospital. ***Methods:*** This is a hospital based retrospective study from data of past four years from 1st April 2014 to 31st March 2018. Factors affecting the neonatal mortality and morbidity were analyzed. ***Results:*** Total 13725 babies were admitted in our NICU, 113 babies were referred to higher institute, 524 babies left the hospital against medical advice. 60.4% were inborn and 39.6% outborn babies. Ratio of male to female was 1.35:1. 55.5% babies had birth weight >2500 grams. 62.6% babies were of gestational age >37 weeks. The major causes of morbidity were Perinatal asphyxia in 21.7%, Neonatal jaundice 18.8%, Sepsis/pneumonia/meningitis 11.8%, Hyaline Membrane Disease 7.7%, Meconium Aspiration Syndrome 7.9%. Mortality rate was 18.6% (2548). The major causes contributing to mortality were Perinatal asphyxia in 822 (32.3%), Hyaline Membrane Disease in 566(22.2%). Case Fatality Rate was highest with Hyaline Membrane Disease. ***Conclusions:*** This study identified Perinatal Asphyxia as major cause of morbidity. Perinatal Asphyxia, Hyaline Membrane Disease were the major contributors to the neonatal mortality and highest case fatality rate was seen in cases of HMD.

Keywords: Morbidity, Mortality, HMD.

INTRODUCTION

The development of a country is defined by its healthcare status especially the maternal and child health. Neonatal Mortality Rate in India has always been an area of concern due to logistic issues in implementation of preventive and curative programmes but has shown a slow but steady fall in the last 2 decades. The current NMR of Andhra Pradesh is 26-30/ 1000 live births (2016) which is similar to the national NMR.

The neonatal mortality rate (NMR) declined from 52 per 1000 live births in 1990 to 28 per 1000 live births in 2013, but the rate of decline has been slow and lags behind that of infant and under-five child mortality rates. Among neonatal deaths, the rate of decline in early neonatal mortality rate (ENMR) is much lower than that of late NMR. The rate of decline in NMR and to an extent ENMR accelerated with the introduction of National Rural Health Mission in mid-2005. Almost all states have witnessed this phenomenon, but there is still a huge disparity in NMR between and even within the states.

The SNCU at Government General Hospital, Kakinada was established in 2012 as a 20 bedded unit as joint venture of Government of India and NHM (National Health Mission). SNCU at Government General Hospital, Kakinada is an important tool to decrease NMR of East Godavari and it's neighboring districts like West Godavari and Visakhapatnam. Being part of medical college, neonatal care unit at GGH, Kakinada provides level 3 care which includes services like advanced respiratory support like mechanical ventilation, surfactant administration, CPAP, as well as parenteral nutrition and management of sepsis, jaundice, low birth weight, prematurity and other

neonatal conditions. A review of the morbidity and mortality profile of sick newborns admitted to SNCU will help in analyzing problem areas and developing policies for further decrease in the neonatal mortality in the institute as well as the state. Therefore, a retrospective study was carried out to study the morbidity and mortality profile of newborns admitted in SNCU over a 4-year period (April 2014 to March 2018).

METHODS

This is a hospital based retrospective analytical and descriptive study done in SNCU, Government General Hospital for a period of four years from 1st April 2014 to 31st March 2018.The study has been approved by the Institutional ethics committee. Data was taken from SNCU records. All neonates less than 28 days admitted in SNCU during study period were enrolled in the study.

The diagnosis was mainly clinical and primary disease was considered as final diagnosis even if the baby developed complications of primary disease or having more than one disease. WHO definitions were used for prematurity, low birth weight (LBW), very low birth weight (VLBW) and extreme low birth weight (ELBW).

STATISTICAL ANALYSIS

Data collected from SNCU records was entered and analysed using Microsoft Excel worksheet. Key analytic outputs included morbidity profile, mortality profile and case fatality rate. Data is presented in the form of frequencies and percentages.

RESULTS

Table-1: Admission profile based on gender and gestational age.

	INBORN	OUTBORN	TOTAL
Gender			
Male	4789	3106	7895(57.5%)
Female	3498	2332	5830(42.8%)
Gestation			
Term	5673	2912	8585(62.6%)
Preterm	2614	2526	5140(37.5%)

Table-2: Diagnosis at admission.

MORBIDITY	INBORN	%	OUTBORN	%	TOTAL	% n=13725
Hyaline Membrane Disease	515	6.2	540	9.9	1055	7.7
Meconium Aspiration Syndrome	709	8.6	383	7.0	1092	7.9
Other causes of respiratory distress	411	4.9	147	2.7	558	4.1
Perinatal asphyxia	1761	21.3	1224	22.5	2985	21.7
Sepsis/pneumonia/meningitis	802	9.7	816	15	1618	11.8
Major congenital malformations	216	2.6	267	4.9	483	3.5
Neonatal jaundice requiring Phototherapy	2082	25.1	494	9.1	2576	18.8
Others	1226	14.8	1088	20	2314	16.9

Table-3: Mortality rate based on gestational age.

	INBORN (n= 8287)	OUTBORN (n=5438)	TOTAL
Term (n = 8585)	640	688	1328 (15.46%)
Preterm (n = 5140)	551	669	1220 (23.73%)
Total	1191 (14.4 %)	1357 (24.95 %)	2548

Table-4: Mortality Profile based on diagnosis

Mortality Profile	INBORN	OUTBORN	TOTAL	%
Hyaline Membrane Disease	213	353	566	22.2
Meconium Aspiration Syndrome	129	85	214	8.4
Perinatal asphyxia	440	382	822	32.3
Sepsis/pneumonia/meningitis	126	229	355	13.9
Major congenital malformations	88	70	158	6.2
Total	1191	1357	2548	

Table-5: Year wise admissions and mortality

YEAR	ADMISSIONS			MORTALITY		
	IM	EM	TOTAL	IM (%)	EM (%)	TOTAL (%)
2014-2015	1930	734	2664	287(14.9)	161(21.9)	448(16.8)
2015-2016	1841	1486	3327	249(13.5)	339(22.8)	588(17.7)
2016-2017	1970	1627	3597	295(14.9)	418(25.7)	713(19.8)
2017-2018	2546	1591	4137	358(14.4)	441(27.7)	799(19.3)

Table-6: Year wise distribution of mortality among term and preterm neonates

Year	Term neonates		Preterm neonates	
	Intramural	Extramural	Intramural	Extramural
2013 - 2014	8.3%	46.3%	32.8%	12.8 %
2014 - 2015	12.3%	21.5%	16.1%	24.7%
2015 - 2016	12.9%	20.6%	19.5%	32.9%
2016 - 2017	11.7%	23.9%	18.7%	32.4%

Table-7: Case fatality rate

YEAR	RDS		MAS	Moderate-Severe Perinatal Asphyxia		Sepsis/Pneumonia/ Meningitis		
	IM %	EM %	IM %	EM %	IM %	EM %	IM %	EM %
2014-2015	68.4	100	30.8	30.9	19.3	25.3	17.1	23.7
2015-2016	51.7	75.6	14.6	26.4	26.7	30.4	14.5	30.7
2016-2017	40.6	55.4	20.9	24.5	22.1	32.8	16.2	29.9
2017-2018	37.7	67.8	9.5	11.6	30.6	32.9	10.3	23.9

Table 1 shows the admission profile. A total of 13,725 babies were admitted in SNCU, Government General Hospital, Kakinada during the study period of 4 years. Of them, 8287 (60.4%) were inborn and 5438 (39.6%) were outborn. 113 babies were referred to higher institute and 524 babies left the hospital against medical advice. Males were 7895 (57.5%), females were 5830 (42.8%) and the ratio of male to female was 1.35:1. 55.5% babies were of normal birth weight and the rest were low birth weight of whom 9.5% were VLBW and 2.2% were ELBW babies.62.6% babies were term babies and the rest were preterm.

Table 2 shows the diagnosis at admission of babies. Perinatal asphyxia (21.7%) was the most common morbidity noted both in intramural and extramural admissions followed by neonatal jaundice requiring phototherapy (18.8%), Sepsis/pneumonia/meningitis (11.8%), Hyaline Membrane Disease (HMD) (7.7%), Meconium Aspiration Syndrome (MAS) (7.9%) and Others (16.9%).

Table 3 shows the mortality profile. The overall mortality rate was 18.6%. The mortality among term and preterm babies was 15.46% and 23.73% respectively and the mortality among inborn and outborn babies was 14.4% and 24.8% respectively.

Table 4 shows the common causes of mortality. Perinatal asphyxia was the commonest cause of death (32.3%) followed by HMD (22.2%), Sepsis/pneumonia/meningitis (13.9%) and MAS (8.4%).

Table 5 shows the year wise admissions and mortality. Intramural admissions increased by 30% over 4-year period (from 1930 in 2014 to 2546 in 2018) whereas extramural admissions increased by 116% (from 734 in 2014 to 1591 in 2018).The overall admissions almost doubled. There is no significant change in mortality among intramural admissions. The mortality among extramural admissions increased from 22% in 2014 to 27.7% in 2018 resulting in a slight increase in overall mortality (from 16% in 2014 to 19.3% in 2018).

Tale 6 shows mortality among term and preterm babies. There is no significant change in mortality of term intramural babies. There is initial decrease in term extramural mortality which remained static after 1year.Preterm intramural mortality decreased significantly initially later it remained static whereas mortality among extramural preterm babies increased over 4-year period.

Table 7 shows the case fatality rate of 4 common morbidities. Case fatality rate of RDS decreased markedly among intramural (68% to 37.7%) babies and to a lesser extent in extramural babies (100% to 67.8%). Case fatality rate of MAS decreased significantly among both intramural and extramural admissions. Case fatality rate of moderate to severe perinatal asphyxia increased in both intramural and extramural admissions. Mortality due to sepsis remained static over 4-year period.

DISCUSSION

Neonatal mortality is a reliable index for evaluating the overall progress of neonatal and perinatal

care in a community, which is a valuable indicator of the standard of educational, social and health system of a community. Accurate data on morbidity and mortality profile of neonates is important for the health care providers and policy makers to decide and design any interventions for the prevention and treatment and also to implement and evaluate health care programmes.

In the present study, the admissions of male babies are more than female babies. Male to female ratio is 1.35:1. This difference may be due to the biological vulnerability of male gender and preference of male child in the society. This is similar to other studies [2-4,6]. In the present study, inborn admissions are 60.4% and outborn admissions are 39.6%. Higher inborn admissions are also seen in studies done by Ravikumar *et al.* and R Iyer *et al.*[2,3,6] In the present study 44.5% of neonates are low birth weight and 37.4% of neonates are born prematurely. Similar findings are seen in other studies [2-4].

According to INAP, the major causes of newborn deaths in India are pre-maturity/preterm (35%); neonatal infections (33%); intra-partum related complications/ birth asphyxia (20%); and congenital malformations (9%)[1]. Globally, the main direct causes of neonatal death are estimated to be preterm birth (28%), severe infections (26%), and asphyxia (23%), which is similar to the national data.

In present study, the chief morbidities are Perinatal asphyxia (21.7%), neonatal jaundice (18.8%) and sepsis (11.8%). The major causes of mortality in descending order are Perinatal asphyxia (32.3%), HMD (22.2%) and sepsis/pneumonia/meningitis (13.9%). Perinatal asphyxia is the predominant cause of morbidity and mortality. This is because of the late referral of high risk deliveries to this center which is a referral center to a population of around 10 million. Higher incidence of perinatal asphyxia is reported in studies done by R Iyer *et al*. and Ranjan A *et al.* In the present study, the mortality rate is higher among out born neonates (24.8%) when compared to inborn neonates. This finding is similar to studies done by Panda et al and Kannan R *et al.* [8,9]. Both disease specific and overall mortality trends remain higher in extramural babies. This may be due to delayed referral and poor general condition of the neonate by the time they reach referral hospital. There is a need to implement strict neonatal transport protocol to address this issue. Sepsis contributed to 11.8% morbidity and 13.9% of mortality in the present study. Higher incidence of sepsis is reported in studies done by R. Iyer *et al.* and Ranjan *et al.* In the status of newborn health in India report, nearly one fifth of neonates with sepsis are in the hospital. Over the years the proportion of neonatal deaths due to infections have shown a decline due to availability of better antimicrobials. But the sepsis rate is still high as most of the time the bed occupancy remains > 100 %, due to higher number of referrals from peripherals which leads to compromise in infection control practices and cross infections, hence appropriate steps should be taken to improve infrastructure and human resources to meet the recommended nurse to baby ratio.

Analysis of mortality rate over 4-year period (from 2014 to 2018) shows that there is no significant change in mortality among intramural admissions. The mortality among extramural admissions increased from 22% in 2014 to 27.7% in 2018 resulting in slight increase in overall mortality. As the study center is a level 3 NICU, moribund and terminally ill newborns are referred from periphery and private sector and expected mortality remains high in these setups.

The mortality of term intramural babies was static over 4 years (from 2014 to 2018). There is initial decline in mortality of term extramural babies but later remained static. Birth asphyxia accounted for most of the deaths in term babies. There is a broader agreement that in infants with >2500gm birth weight, mortality is influenced by the obstetric management and mortality of LBW babies is influenced by the quality of neonatal care. Strengthening the antenatal services at periphery, identification of high-risk pregnancies, vigilant fetal monitoring by obstetrician and providing effective resuscitative measures are the need of hour in reducing mortality and morbidity due to birth asphyxia.

In the present study, the mortality of preterm intramural babies initially decreased markedly due to improvement in neonatal services and later remained static which may be due to increased admission rate. The mortality of extramural preterm babies increased markedly over last 4 years due to marked increase in referrals from periphery and private sector as neonatal care is very expensive in corporate sector. Late referrals and poor transport facilities also contribute to higher mortality among extramural babies.

CONCLUSIONS

This study has shown perinatal asphyxia,respiratory distress and sepsis as the predominant causes of neonatal mortality.Improvements in antenatal care and appraising the community health personnel the importance of early identification and referral of high risk cases should be given a priority.Government should take initiation to improve the infrastructure and human resources in maternal and neonatat health sector in accordance with increasing admissions.

REFERENCES

1. Delhi N. Ministry of Health and Family Welfare. Government of India. 2001:7-30.
2. Chandrakala R Iyer, Gornale VK, Harsha P, Katwe N, Prasad S, Keerthivardhan Y. Morbidity and Mortality pattern of neonatal intensive care unit in

a Medical College Hospital from South India. Pediatr Rev: Int J Pediatr Res, 2015, 2(4): 105-110.
3. Ranjan A, Singh A. Pattern of morbidity and mortality of neonates admitted in tertiary level neonatal intensive care unit in Nalanda Medical College and Hospital, Patna, Bihar, India. Int J Contemp Pediatr. 2016;3(3):854-7.
4. Seoud I, Rasha M, El-Din G, Said RN, Hessin HA. Predictors of neonatal mortality in intensive care unit in children's hospital, cairo university. Alexandria J Paediatr. 2005 Jan;19(1):93-7.
5. Lawn JE, Cousens S, Zupan J, Lancet Neonatal Survival Steering Team. 4 million neonatal deaths: when? Where? Why?. The lancet. 2005 Mar 5;365(9462):891-900.
6. Pandya NK, Mehta KG. Clinical profile of patients with steroid sensitive nephrotic syndrome at tertiary care centre in Gujarat, India. International Journal of Contemporary Pediatrics. 2018 Jul;5(4):1172.
7. Malik S, Gohiya P, Khan IA. Morbidity profile and mortality of neonates admitted in Neonatal Intensive Care Unit of a Central India Teaching Institute: A prospective observational study. Journal of Clinical Neonatology. 2016 Jul 1;5(3):168.
8. Kannan R, Rao S, Mithra P, Rajesh SM, Unnikrishnan B, Rekha T. Neonatal Mortality and Morbidity in a Tertiary Care Hospital of Coastal South India. Journal of Nepal Paediatric Society. 2017;37(3):232-7.
9. Panda S. Mortality & morbidity profile in vlbw & elbw neonates admitted to NICU in HMCH. Yuva J Med Sci. 2016;1:51-.