Paediatrics

ADMISSION PATTERN AND OUTCOME OF NEONATES AT A TERTIARY CARE CHILDREN'S HOSPITAL IN INDIA.

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ABSTRACT   **Background:** Children face the greatest risk of death in their first 28 days of life. A vast majority of new born deaths take place in low- and middle-income countries. Neonatal mortality rate in India is 26 per 1000 live births.Major causes of neonatal mortality are infections, pre-maturity and birth asphyxia. This study was under taken to find out the outcomes of neonatal admission in the tertiary care hospital in north India. **Method:** The study is a retrospective analysis of case records of the neonates admitted between February 1st, 2016 to June 30, 2016. Pro-forma was developed and validated for data collection. **Results:** Out of 1431 neonates (male: female ratio 1.56:1), admitted in the hospital during the study period, 1309(91.47%) were discharged after treatment, 112(7.83%) died during the treatment, 01(.07%) neonate was referred to another tertiary care centre for treatment and 09(0.63%) neonates were taken away by their attendants against medical advice. **Conclusion:** Although the outcomes in present study are encouraging but this may not be true representative figures of the all the sick neonates of the Kashmir division as many do not reach this hospital, implies that peripheral health care delivery services in general and perinatal services in particular may need to be strengthened.

KEYWORDS : Mortality, Neonates, NICU, Outcomes

INTRODUCTION

The first 28 days of life, the neonatal period is the most vulnerable time for a child's survival. Evidence had revealed that at the country level, annual neonatal mortality rates (NMRs) ranged from 44·2 to 0·9 deaths per 1000 live births in 2017; in 17 countries the annual NMR was more than 30 deaths per 1000 live births whereas, in 17 countries, the annual rate was less than 2 deaths per 1000 live births.[1] Children who die within first 28 days of birth suffer from conditions and diseases associated with lack of quality care at birth or skilled care and treatment immediately after birth. A vast majority of new born deaths take place in low and middle income countries.[2]

With the birth of 25 million children each year, India accounts for nearly one fifth of world's annual child births.Every minute one of those babies die. Neonatal mortality rate in India is 26 per 1000 live births, with lowest in Kerala-6/1000 live births and highest in Madhya Pradesh as 35/1000 live births, where as in Jammu and Kashmir NMR is 26/1000 live births.[3] Major causes of neonatal deaths are infections(33%) such as pneumonia, septicaemia and umbilical cord infection, Pre-maturity(35%) and Asphyxia(20%).[3] The sustainable Development Goals(SDGs) specify thatall countries should aim to reduce the neonatal mortality rate(NMR) to 12 deaths per 1000 live births or fewer by 2030. Accelerated improvements are most needed in the regions and countries with high NMR. Government of India is committed to eliminate preventable deaths of neonates, so as to reduce neonatal mortality to 12/1000 live births by 2030. National Health Mission (NHM) is providing assistance to hospitals to ensure zero out of pocket expenditure on the treatment of sick babies up to one year of life. The hospital under study is a beneficiary of the NHM scheme and the hospital administration of the hospital implement all the components of the scheme. Present study was under taken to publish admission pattern and outcome of neonates admitted in the hospital as a ready reference to policy makers, researchers and administrators.

METHODOLOGY

The current study was conducted in a tertiary care hospital, which isassociated to the Government Medical College, Srinagar, Kashmir. The hospital runswell-equippedthree level step down Neonatal intensive care unit (NICU) managed by qualified faculty, senior resident doctors, post graduates and trained nursing staff. Referrals from all the districts of Kashmir divisionand some districts of Jammu division are admitted in the NICU of the hospital. The study is a retrospective data evaluation of patient records. All the neonates admitted in NICU of hospital from 1st February 2016 to 30th June 2016 till their discharge/death from the hospital were included in the study. However, neonates, who left against medical advice (LAMA) / referred to other hospital were excluded for final data analysis. After the approval from the medical records department, the records of the neonates were retrieved and proforma was developed and validated for collection of the data. The data was recorded on the pre-tested Pro-forma and analysed for the desired outcome indicators. Simple statistical tool like percentages, ratio and rates were used to infer the results.

RESULTS

During the study period, 1431 neonates from twelve districts were admitted for treatment to the NICU of the hospital. Out of whom 872(60.94%) were male neonates and 559(39.06%) were female neonates (male: female 1.56:1). The district wise profile of the admitted neo-nates is depicted in table-1 and the neonatal death rate of the admitted neonates is depicted in the table-2. Maximum number 358(25.02%), of referrals were district Srinagar, whereas least 02(0.14) were from district Doda of Jammu division of UT. Highest mortality (23.81) was found among the neonates referred from district Ramban of Jammu district, whereas least death rate (2.48) was observed among neonates referred from district Budgam.

Majority 1309(91.47%) of the neonates were discharged after successful treatment, whereas 112(7.83%) neonates died during the period hospital stay. One neonate (.07%) was referred to other hospital for treatment,09(0.63%) neonates were taken away by their attendants against medical advice.

Table-1: Referring Location And Outcomes Of The Admitted Neonates

Referral District	Admissions			Discharged n(%)	Deaths (n)	LAMA n(%)	Referred n(%)
	Total	Males n(%)	Females n(%)				
Srinagar	358	210 (58.66)	148 (41.34)	339 (94.69)	16	03 (0.84)	00
Anantnag	168	93 (55.36)	75 (44.64)	144 (85.71)	21	02 (1.19)	01 (0.60)
Bandipora	77	45 (58.44)	32 (41.56)	71 (92.21)	06	00	00
Baramulla	179	120 (67.04)	59 (32.96)	158 (88.27)	20	01 (0.56)	00
Budgam	158	101 (63.92)	57 (36.08)	153 (96.84)	04	01 (0.63)	00
Kulgam	58	35 (60.34)	23 (39.66)	50 (86.21)	08	00	00
Kupwara	161	109 (67.70)	52 (32.30)	143 (88.82)	18	00	00
Pulwama	158	94 (59.50)	64 (40.50)	151 (95.57)	06	01 (0.63)	00

Shopian	74	39 (52.70)	35 (47.30)	69 (93.24)	05	00	00
Ganderbal	21	13 (61.90)	08 (38.10)	18 (85.71)	03	00	00
Doda	02	02 (100)	00	02 (100)	00	00	00
Ramban	17	11 (64.70)	06 (35.30)	11 (64.71)	05	01 (5.88)	00
Total	1431	872 (60.94)	559 (39.06)	1309 (91.47)	112	09 (0.63)	01 (0.07)

We found the overall death rate of 7.88% of the neonates admitted in the NICU. High death rate was found among the neonates referred from the districts of Ramban (23.81), Kulgam (12.12), Anatnag (11.29), which are far away from the hospital location. Table-II, details the case mortality rate(CMR) of the neonates during the study period.

Table II. Case Mortality Rate

Disease	Total		Case mortality rate		
	N	Deaths	Overall	M	F
Acquired pneumonia	36	05	13.89	8.70	23.08
Acute renal failure	02	01	50.00	100.00	00
Birth Asphyxia	98	26	26.53	32.20	17.95
Congenital malformation	07	03	42.86	60.00	00
Convulsions of new born	28	00	00	00	00
Congenital pneumonia	01	01	100.00	100.00	00
Extreme immaturity	01	01	100.00	100.00	00
Hypothermia Of New Born	10	00	00	00	00
HIE Of New Born	05	05	100.00	100.00	100.00
Neonatal Aspiration of Meconium	20	06	30.00	26.67	40.00
Neonatal Hypoglycaemia	19	01	5.26	7.69	00
Neonatal Jaundice	244	00	00	00	00
Neonatal Sepsis	268	17	6.34	5.81	7.08
pre-maturity	52	09	17.31	7.14	29.17
RDS	260	16	6.15	6.83	5.05
Transient tachypnoea of new born	10	00	00	00	00
Low Birth Weight	27	04	14.81	20.00	00
Meningitis	04	02	50.00	50.00	50.00
Shock	10	06	60.00	50.00	100.0
Primary sleep apnoea	02	00	00	00	00
IUGR	02	00	00	00	00
Haemolytic disease of new born	02	00	00	00	00
Other diagnosis	313	09	2.88	3.17	2.42

The age at which the babies died in the hospital during the study period is shown in table-III.

Table III, Age At Death Of Male And Female Neonates Due To Various Diseases

Age (in days) ➡ Diagnosis ⬇	0-7(early neonatal)	7-28(late neonatal)	>28(post neonatal)
Acquired Pneumonia	01	02	02
Acute renal failure	00	01	00
Birth Asphyxia	17	05	03
Congenital Malformation	03	00	00
Congenital pneumonia	00	00	01
Extreme immaturity	01	00	00
HIE of newborn	02	02	01
Aspiration of meconium	04	02	00
Neonatal hypoglycaemia	01	00	00
Neonatal sepsis	07	10	00
Pre-maturity	09	00	00
RDS	09	07	00
Low birth weight	04	00	00
Meningitis	02	00	00
Shock	02	04	00
Other diagnosis	07	03	00
Total	69	36	07

DISCUSSION

The neonatology division of present centre of study is managed by highly professional faculty, senior residents, academic junior residents, technicians and trained nursing staff. NICU of the hospital at the time of study is equipped with ventilators CPAPs, high flow airways, vital sign monitors, infusion pumps, baby warmers, LED phototherapy and other lifesaving equipment. The treatment of the neonates in the hospital is free and there is zero out of pocket expenditure by the attendants. All the expenditures on the treatment of the admitted neonates were borne from the Government budget with assistance under JSSK scheme of NHM.

Present study show an admission male to female ratio of 1.56:1, which is consistent with other studies and has been linked to better care seeking for male children and greater vulnerability of male to illness.[4-8] The 7.83% (112/1431) NMR from our observation is similar to earlier studies.[9,10]

However it is lower than the study conducted by Vaid et al, which could possibly be that very sick neonates might have been either not reached alive or not reported at all from the far-flung areas of our province.

The death rate of male neonates was found higher in this study as compared to the death rate of female neonates. It is well in conformity with the earlier study.[11] However it is in contrast to previous reports from other parts of the Sub-continent.[12,13] Higher death rates of male neonates as compared to female neonates is also reportedby other investigators intheir studies.[10,14]

Neonatal Death Rate was observed higher mostly among the neonates referred from far away districts of the state. Neonates referred from district Ramban (more than 100 Kms away from the hospital) had the highest neonatal death rate (31.25) when compared with the neonatal death rate (4.51) of neonates referred from district Srinagar. This is consistent with the research that neonates referred from the distant locations has a direct relation with bad outcome.[15]

Congenital malformation was seen in 0.49% of admitted neonates which lower than the average occurrence rate of birth defects.[16] However, higher occurrence was observed among male gender as reported reported in other studies.[17-19]

Highest case mortality was observed among shock (60%), followed by meningitis (50%), and acute kidney injury patients, which is contrary to the study by Vaid et al[11] who found perinatal asphyxia and pematurity as the commonest causes of death among the admitted snenates.[11] Whereas both neonates admitted with the diagnosis of Congenital pneumonia, extreme immaturity died during hospital stay an observation similar to earlier studies.

Sixty nine (61.61%) neonates died during the first week of life, followed by 36(32.14%) in the late neonatal period and 7(6.25%) in the post neonatal period, an observation consistent with other studies across the world.[20,21]

This study being a single centre study, although having representation of neonatal admissions from all the districts of Kashmir division but,the conclusion about the generalizability of the findings cannot be made upfront. Secondly the information documented in the study is generated from the retrospective review of data of patient records.

CONCLUSION

Neonatal outcome of studied population is quite reassuring, however, efforts for further improvement need to be taken to fill up the gaps. Strengthening of peripheral mother and child health services along with proper neonatal transport might be right way to improve the neonatal outcome.

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