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Pattern of admission and factors contributing to neonatal mortality: A small retrospective hospital based study

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Abstract

The neonatal period is a difficult time for a child's survival. In India, neonatal mortality is high, and the pattern of reduction is very less as compared to infant and child mortality. The magnitude and associated factors of neonatal mortality in a tertiary care centres are also not well documented. Therefore, the aim of this study is to see the pattern of admission, neonatal mortality and its causes. Among the neonates admitted in neonatal intensive care unit of SLBSGMC and hospital.

Keywords: Pattern, factors contributing, neonatal mortality, retrospective

Introduction

Neonatal period – most vulnerable period of a child's life. There is highest risk of mortality in the first twenty eight days of life. With an average rate of 18 deaths per 1,000 live births in 2018 [1, 2]. Globally, 2.5 million children died in the 28 days in 2018 alone that is 7,000 neonatal deaths every day – most of which occurred in the first week, with about 1 million dying on the very first day and about 1 million dying within the next six days [2, 6]. Neonatal mortality has declined globally in all the regions but comparatively slowly. Globally, the neonatal mortality rate fell by 51 per cent from 37 deaths per 1,000 live births in 1990 to 18 in 2018. Despite a declining neonatal mortality rate globally, marked disparities in neonatal mortality exist across regions and countries. Regionally, neonatal mortality was highest in South Asia, estimated as 27 deaths per 1,000 live births in 2017 [6]. About 0.75 million neonates die every year in India, the highest for any country in the world [1]. 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 rate. The progress in reducing deaths of neonates in a country with higher neonatal mortality like ours requires a better coverage of maternal and neonatal services. With special focus on the weakest segment of the society. At the time of greatest risk, that is the birth and the first few days of life [10]. Neonatal mortality is very important because of its share in under-five mortality. And the health interventions needed to address the major causes are closely linked to those of maternal health [10]. Recently new-borns have received attention from the health system. New-born health is now one of India's top priorities. Some of the common challenges for neonatal health include: poor health system, weak and uncoordinated referral system, widely prevailing and deeply-rooted cultural practices, and low skill among health workers in providing essential neonatal care services. Other challenges include ill-equipped health care facilities, shortage of skilled health workers, equipment, and drugs needed to provide emergency obstetric and neonatal care [8].

Materials and Methods

This study was performed at a Neonatal Intensive Care Unit in SLBS GMC Nerchowk mandi H.P. The NICU has two rooms with 15 beds in total: one room for Neonatal Intensive Care Unit, and the other is step down nursery. It is one of the hospital providing fully functioning NICU service in the region. The study was conducted from 15th of FEB to 15th of JULY, 2019. It was a hospital based retrospective study. Sample size was of 227 new-borns admitted in the NICU of SLBSGMC hospital from 15 February to 15 July, 2019. Individual recordings in the register which were improperly filled were excluded. The source of data for this study was the NICU register at SLBS GMC hospital 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 gestational age and mode of delivery. All this data was collected using a uniform extraction format developed by taking in to account all the relevant variables in the standard NICU registration book. The raw data were entered in to excel and checked for incomplete and inconsistent data, then missing values were excluded before exporting to SPSS version 20. Cross tabulation of admission and death events and graphs were used to summarize and present the data. Neonatal mortality rate was calculated using the total neonatal deaths recorded at the NICU divided by the total number of new-borns admitted at the NICU in the six months reviewed. The level of significance was set at $P < 0.05$. Binary logistic regression was used to produce a summary statistics of proportions including crude and adjusted odds ratio and 95% confidence intervals. A bivariate analysis using the Chi-square test or Fisher exact test, where appropriate, was performed to determine predictors of neonatal hospital mortality pertaining to neonatal characteristics for each variable one at time. Statistically significant ($P < 0.05$) variables were then

entered in to multiple logistic.

Result

This study reviewed a total of 227 new-borns below the age of 28 days who were admitted in the NICU at SLBS GMC Hospital over a span of six months (15 Feb to 15 July 2019) of them 126 (55.5%) were males and 101 (44.4%) were females. The mean birth weight was 2734 ± 760 gm and neonates with normal birth weight was at 64%. Two hundred twenty new-borns (96.6%) were discharged alive while seven (3.08%) died in the course of hospitalization making a Neonatal Mortality Rate (NMR) of 3.08% (31 per 1000 live births). Ninety-six per cent of these deaths were early neonatal that occurred in the first one week of life (<7 days) (Table 1). The trend of admission has risen since the neonatal intensive care unit was established. The leading causes of admission were: prematurity, sepsis, respiratory distress and meconium aspiration syndrome. Similarly, the causes of death were prematurity, suspected sepsis, meconium aspiration syndrome and respiratory distress/perinatal asphyxia and neonatal seizures which accounted for 21.1%, 22.4%, 11.7, 17% and 20% respectively (Table 2).

Table 1: Shows Newborn weight died survived total p-vaule

Newborn	Weight	Died	Survived	Total	p-value
BW	< 1.5kg	2(22.2%)	9(81.81%)	11	0.998
	1501-2499	11(18%)	50(81%)	61	0.994
	2500-3999	4(7.69%)	48(92%)	52	0.998
	>4kg	0	2(100%)	2	1
GA	<28weeks	2(33%)	4(66%)	6	0.840
	28-32 weeks	3(25%)	9(75%)	12	0.901
	32-37 weeks	6(95%)	57(90%)	63	0.990
	>37weeks	4(8.8%)	41(91.2%)	45	0.992

Table 2: Causes of Nicu Admission

Newborn variable	Died	Survived	Total	P-value
Prematurity	4(20%)	16(80%)	20	0.998
Sepsis	2(7.69%)	23(88.4%)	26	0.996
RDS	4(11.7%)	30(88.2%)	34	0.994
Pernatal	1(17%)	5(83%)	6	0.993
Hypoglycemia	0	5(100%)	5	1
NNS	1(20%)	4(80%)	5	0.998
Clinical Jaundice	0	30(100%)	30	1

Discussion

This study found a neonatal mortality rate of 3.08% 31 per 1000 live births in NICU of the hospital. This is comparable to other facility based studies done which reported a rate of 5.7% [12] and 5.3% [14]. The above variations in mortality rates could be explained by the differences in sample size, study settings, timing of the study and causes of death which vary between developed and developing nations. While new-borns typically die from unpreventable causes such as congenital abnormalities in developed countries, majority of infants in developing countries die from preventable conditions, including infections, birth asphyxia, and prematurity [7]. The leading causes of admissions and subsequent deaths in the NICU were found to be prematurity, sepsis, meconium aspiration syndrome and respiratory distress/perinatal asphyxia. Although this is consistent with studies [14, 18, 19], yet none of the above causes was statistically significant except prematurity ($P = 0.054$) which was very close to significance threshold. After

adjustment, prematurity was independently associated with less probability of death in the NICU. However, this finding needs to be carefully interpreted and can be partly explained by the fact that there is an improved survival of preterm neonates due to the availability of NICU-which is among the list of high impact child survival interventions implemented to reduce neonatal deaths immediately after birth—the most vulnerable period for neonates [4]. Another study argues that very preterm infants have a longer life span than all NICU patients [23]. A shorter duration of stay of below two days in the NICU also showed protection against neonatal mortality. This is in line with the established fact that most of the neonatal deaths occur in the first 24 hours following birth, and any intervention at this critical time has significant contribution to saving neonates [4, 9]. A merit of this study is that it reviewed all neonates admitted in the NICU of the hospital ever since its establishment without sampling, hence eliminating any possible sampling error. However, as this study used secondary data, the findings are

subjected to issues. Another limitation is the relatively small number of deaths reported which have affected some of the statistical tests.

Conclusion

The causes of neonatal death reported in this study are preventable. The neonatal mortality rate is high, a prematurity and shorter length of stay in the NICU of less than two days showed protective effect against neonatal death. This calls for more work along with improving the quality of care, early transfer of sick neonates to the NICU and scaling up establishment of NICUs.

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