

A Study on Clinical Profile and Outcome of Sick Neonates in a District Level SNCU

Subinay Mandal¹

¹Associate Professor, Department of Paediatrics, Bankura Sammilani Medical College and Mentor of SNCU Bishnupur District Hospital, West Bengal.

ABSTRACT

BACKGROUND

Though several primary care-based strategies and programmes were introduced at national level since nineties, the neonatal mortality was almost stagnant since recent past. Special Care Newborn Units (SNCUs) have now been established in several district and sub divisional hospitals to meet the challenges of reduction of neonatal mortality. Identifying the factors influencing neonatal mortality will help in planning measures for further reduction of neonatal mortality & morbidity. With this background, we conducted this study to evaluate the clinical profile and outcome of sick newborns in a district level SNCU.

METHODS

We retrospectively analysed the computerised data of our twenty bedded level II SNCU, for the period of ten months (from 01/01/2017 to 01/11/2017). Admission, treatment, and outcome profile was analysed thoroughly. Necessary ethical permission was taken from the institution.

RESULTS

Total number of newborns admitted in SNCU was 843 of which 55.8% was inborn 44.2% was out born. Out of the total newborns admitted, 75.8% were term, 0.6% were post term and rest 199 (23.6%) were preterm. Major indications for admission were perinatal asphyxia 22.4% & neonatal jaundice 22.5%. Average duration of stay of the sick newborns was 4.54 days. Most common diagnoses were birth asphyxia 21.5%, neonatal jaundice 21% & neonatal sepsis 19.9%. 41.6% patients needed oxygen for treatment. 33.8% neonates were treated with phototherapy. Sepsis was diagnosed in 16.6% patients. Antibiotics were used in 38.8% patients. Common antibiotic used were ampicillin, gentamicin, cefotaxime & amikacin. 82.9% patients were discharged, 7.7% were referred to higher centre and 8.3% neonates expired. Common causes of death were birth asphyxia (45.7%), prematurity (14.5%), respiratory distress syndrome (12.9%), sepsis (8.6%) etc. In very low birth neonates, common causes of death were prematurity (41.7%), respiratory distress syndrome (20.8%), birth asphyxia (16.7%) and sepsis (4.2%). Case fatality in sepsis was 3.6%, birth asphyxia 17.1% and in RDS 27.3%. In preterm babies (28 to <37 weeks), death rate was 16.7%.

CONCLUSIONS

In our SNCU, like rest of our country, common causes of neonatal deaths are birth asphyxia, prematurity & sepsis. In our SNCU survival of full-term neonates is better and survival of preterm neonates is also high. Prematurity is one of the important reasons for neonatal death in our SNCU. To improve survival of neonates, a better intrapartum care for the prevention of birth asphyxia & timely inutero referral of preterm babies to higher centre is required.

KEYWORDS

Term, Preterm, Asphyxia, Sepsis, Phototherapy, Antibiotics

Corresponding Author:

*Dr. Subinay Mandal,
#4, Sarani, Uttar Pratap Bagan,
Bankura P.O and Dist.- 722101,
West Bengal.*

E-mail: drsbped@gmail.com

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BACKGROUND

One fourth of global neonatal deaths occur in India. Though the under-five mortality has decreased, the reduction of neonatal mortality is very slow since early nineties in our country.^{1,2} Though several primary care-based strategies and programmes were introduced at national level since nineties, the neonatal mortality was almost stagnant since recent past. Special care newborn units (SNCUs) have now been established in several district and sub divisional hospital to meet the challenges of reduction of neonatal mortality.³ Identifying the factors influencing neonatal mortality will help in planning measures for further reduction of neonatal mortality & morbidity. With this background, we conducted this study to know the clinical profile and outcome of sick new-borns in a district level SNCU.

METHODS

We retrospectively analysed the computerised data of a SNCU, for the period of ten months (from 01/01/2017 to 01/11/2017). It is a 20-bed level II sick newborn care unit (SNCU), at a district hospital. The unit provides level II care, including oxygen by hood, resuscitation with bag and mask ventilation, phototherapy, intravenous therapy, and naso-/oro-gastric feeding etc. Services, such as ventilation, insertion of central vascular catheters, total parenteral nutrition, or blood culture are not available at this unit. Admission, treatment and outcome profile was analysed thoroughly. Necessary ethical permission was taken from the institution.

RESULTS

Total no. of newborn admitted in SNCU was 843 of which 430 (55.8%) was inborn, 373(44.2%) was out born. Out of the total newborn admitted 639(75.8%) were term,

05(0.6%) were post term and rest 199(23.6%) were preterm. Admission profile by gestational age is shown in figure 1. 427(50.6%) newborn admitted in SNCU during the study period were of birth weight below 2500 gms. 22(2.6%) were extremely low birth weight (ELBW), 61(7.2%) were very low birth weight (VLBW) and rest 344(40.8%) were low birth weight (LBW). (Figure 1)

Major indications for admission were perinatal asphyxia (22.4%), neonatal jaundice (22.5%), refusal to take feed/poor feeding (17.7%), respiratory difficulty (8.2%) and prematurity (8.2%).

Average duration of stay of the sick newborns was 4.54 days. Duration of stay of 113 (13.4%) was more than seven days and in 57 (6.8%) stay was less than one day.

Most common diagnoses were birth asphyxia (21.5%), neonatal jaundice (21%), neonatal sepsis (19.9%), hyaline membrane disease (3.9%), transient tachypnoea of newborn (0.8%), congenital malformation (1.8%) etc. Figure 2 is showing the profile of diagnoses. (Figure 2)

350 (41.6%) patients needed oxygen for treatment. 284 (33.8%) neonates were treated with phototherapy. Though final diagnoses of sepsis were made in 186 (16.6%) patients but antibiotics were used in 326 (38.8%) patients. Use of antibiotics was less than three days in 90 (27.5%) patients. Three to five days antibiotics were used in 148 (45.7%) patients and more than five days in 88 (27%) patients. Common antibiotic used were ampicillin, gentamicin, cefotaxime & amikacin. In few cases piperacillin with tazobactam (3.4%) and meropenem (1.5%) were used. Out of the total 843 admission 697 (82.9%) were discharged, 65 (7.7%) were referred to higher centre and 70 (8.3%) neonates expired. Out of 470 inborn babies 55 died (11.7%). Death rate of out born babies was 4.2% (10/239). Death of babies referred from other govt facility was 3.7% (5/134). Figure 3: showing the mortality rates in different birth weight groups. (Figure 3)

Common causes of death were birth asphyxia (45.7%), prematurity (14.5%), respiratory distress syndrome (12.9%), sepsis (8.6%) etc., (Figure 4).

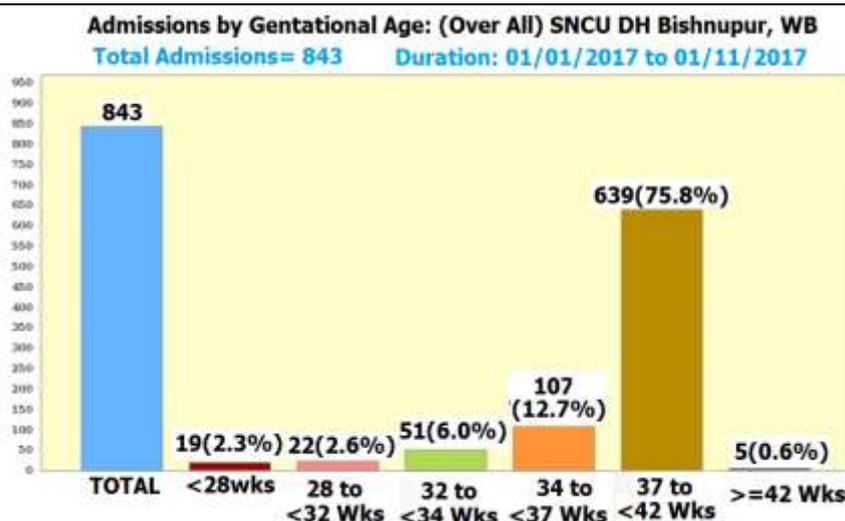
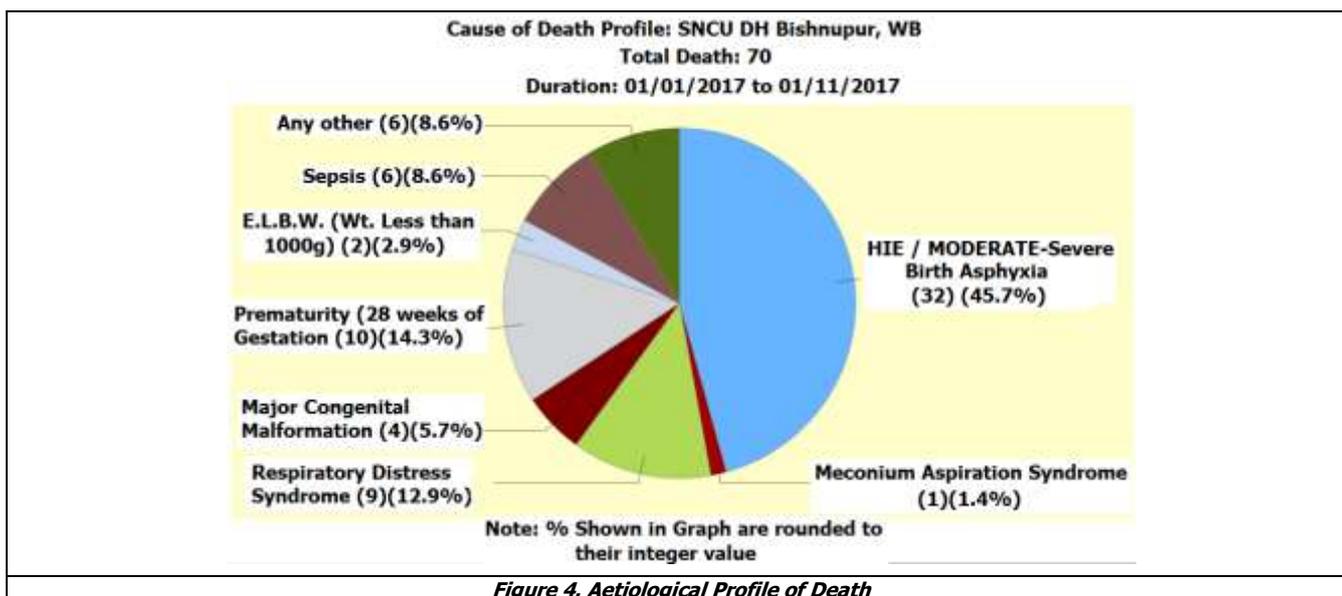
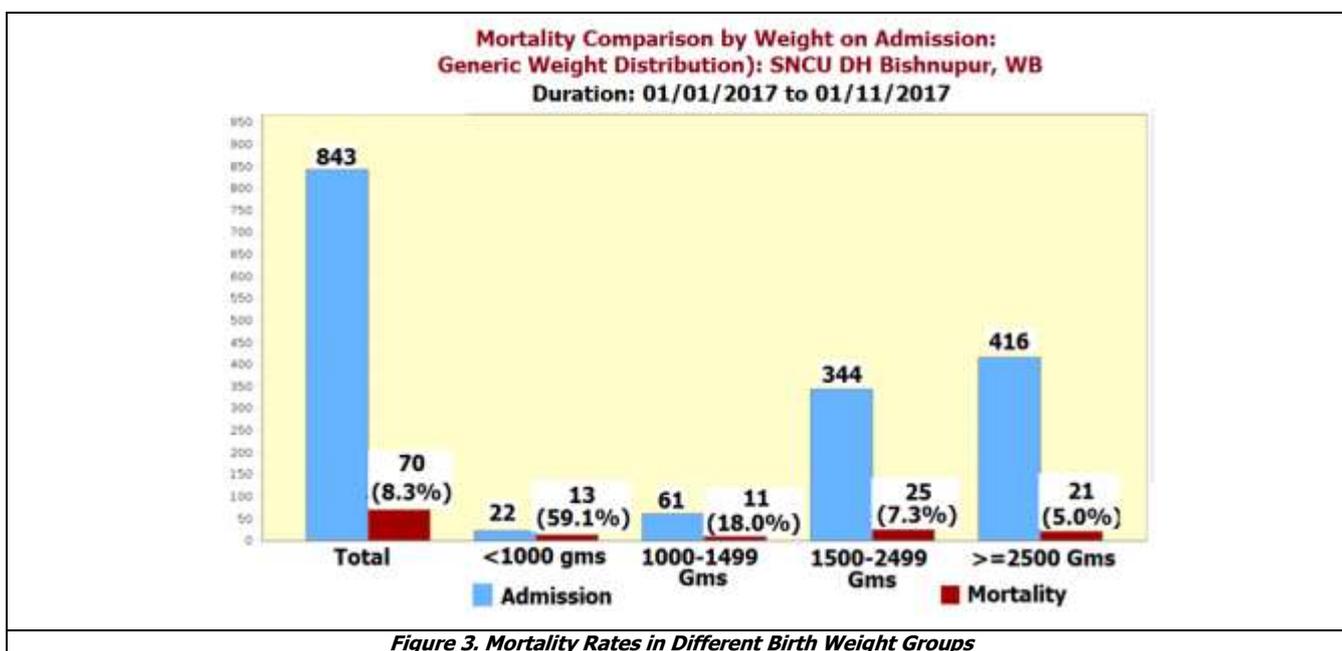
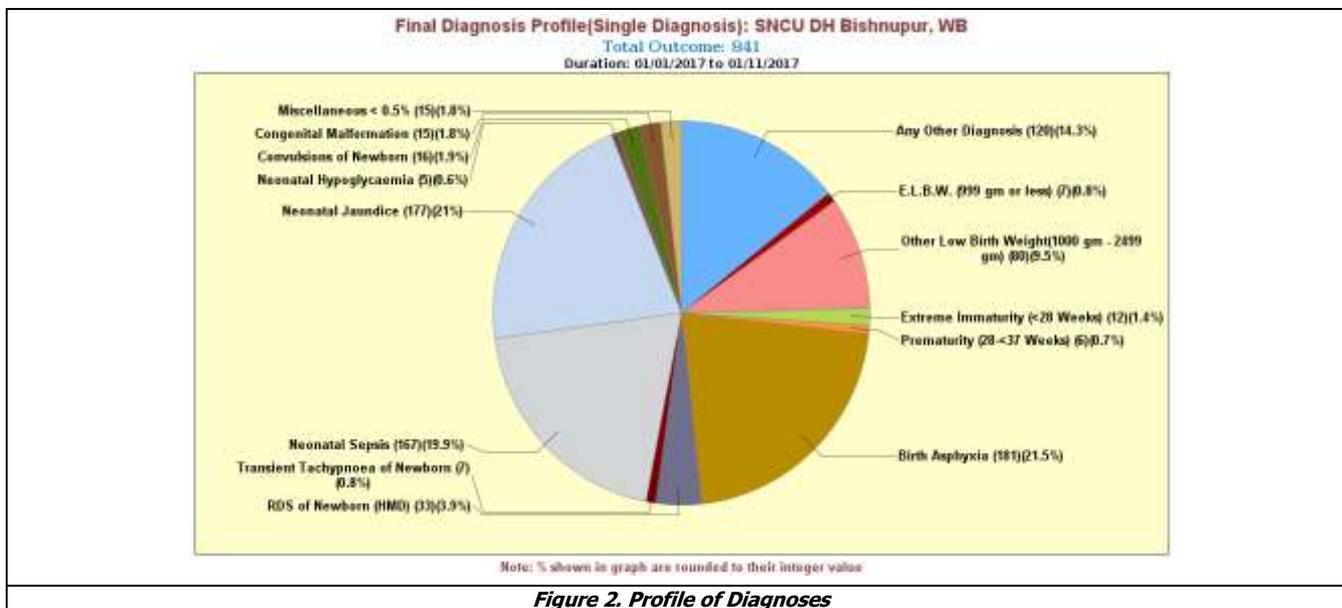


Figure 1. Admission Profile by Gestational Age



In very low birth neonates, common causes of death were prematurity (41.7%), respiratory distress syndrome (20.8%), birth asphyxia (16.7%) and sepsis (4.2%). Table 1: Showing aetiological profile in different weight groups.

Causes	Overall	<2.5 Kg	<1.5 Kg	<1 Kg
HIE	45.7% (32/70)	34.7% (17/49)	16.7% (4/24)	15.4% (2/13)
Sepsis	8.6% (6/70)	10.0% (5/49)	4.2% (01/24)	0
RDS	12.9% (9/70)	14.3% (7/49)	20.8% (5/24)	1.4% (2/13)
Prematurity	14.3% (10/70)	20.4% (10/49)	41.7% (10/24)	53.8% (7/13)

Table 1. Showing Aetiological Profile in Different Weight Groups

Cases fatality by diseases was in sepsis 3.6%, birth asphyxia 17.1% and in RDS 27.3%. In preterm babies (gestational age 28 to <37 weeks) death rate was 16.7%. In neonates with gestational age less than 28 weeks death rate was 75% (9 out of 12 neonates admitted expired).

DISCUSSION

The status of child survival is one of the key determinants of a country's development. Survival of a newborn during the first week of life is determined by the stresses of intrauterine life and birth process as well as by the adjustment to a new environment, nutrition and infection. Therefore, the early neonatal period (birth to 7 days of life) is the most critical period of life.^{4,5}

Between 1990 and 2015, the number of deaths in children under five worldwide declined from 12.7 million in 1990 to almost 6 million in 2015 as against the target of United Nations Millennium Development Goal-4 (MDG-4) of two third reduction.¹

The fall in neonatal mortality is considerably less than that in post-neonatal & childhood mortality particularly in middle & low income countries.^{5,6} Almost half of Under-5 deaths occur in infancy. Of the infant deaths, about two third occur in neonatal period. One third of all neonatal deaths occur on the first day of life, almost half within three days and nearly three quarters within the first week of life.^{4,5}

India has the largest number of births and newborn deaths in the world. The greater of it is concentrated in neonatal period. Two third of newborn deaths are due to infection, prematurity and asphyxia which are preventable. The causes of neonatal deaths in India according to a statistical report are preterm birth (35%), birth asphyxia (20%), pneumonia (16%), sepsis (15%), malformations (9%), diarrhoea (2%), others (3%).^{7,8}

In our study also common causes of death were birth asphyxia (45.7%), prematurity (14.5%), respiratory distress syndrome (12.9%), sepsis (8.6%) etc. In very low birth neonates, common causes of death were prematurity (41.7%), respiratory distress syndrome (20.8%), birth asphyxia (16.7%) and sepsis (4.2%). In comparison to national data in our study population percentage of sepsis as cause of death was less. Prematurity & birth asphyxia were the two most important causes in our study population. Birth asphyxia as one of the major causes of death reflects the poor intrapartum care that the mother receives.

In preterm babies (gestational age 28 to <37 weeks) death rate was 16.7%. In neonates with gestational age less than 28 weeks death rate was 75%. Timely referral in utero of these preterm babies could have prevented death of these neonates. Prematurity is found to be one of the strongest predictors of death in our study population. This relationship is consistent with global data identifying this as the number one cause of neonatal death.

Around two third of newborn deaths in our study are due to infection, prematurity and asphyxia which are preventable. It has been estimated that preventable neonatal deaths can be decreased by at least 50% through implementation and scale-up of educational interventions that include neonatal resuscitation and other essential elements of basic newborn care.² But aetiology of prematurity is complex & there is no single solution to prevent premature birth.

Birth asphyxia (21.5%) was most commonly observed reason for admission to SNCU (Figure 1). Neonatal jaundice (21%) was second most reason followed by sepsis (19.9%). Case fatality rate in sepsis was 3.6% & most common antibiotics used were ampicillin and gentamicin. As there was no blood culture facility in our SNCU, empirical antibiotic regimen as proposed by WHO, was followed. Most of the cases of sepsis could be treated with first line antibiotics. Use of carbapenem was insignificant in our SNCU.

The duration of stay in the intensive care units is well-dependent on birth weight.⁹ The average duration of stay in our SCNU was 4.54 days. This is in line as reported by Schmitt SK et al.¹⁰

CONCLUSIONS

Neonatal mortality in western countries has declined largely due to awareness, improvement in obstetric- and NICU-facilities as well as advances in the diagnosis and treatment. The newborn health challenge faced by India is bigger than in any other country. In our SNCU, like the rest of our country, common causes of neonatal deaths are birth asphyxia, prematurity & sepsis. In our SNCU survival of full-term neonates is better but survival of preterm neonates is high. Prematurity is one of the important reasons for neonatal death in our SNCU. To improve survival of neonates a better intrapartum care for prevention of birth asphyxia & timely in-utero referral of preterm babies to higher centre is required.

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