Original Research

Outcome Of Neonates Discharged From Sncu In Tertiary Care Hospital, Western Up

[1]Dr. Shashank Singh, [2]Dr. Abhishek Singh, [3]Dr. Navratan Gupta, [4]Dr. Alpa Rathi

[1]Senior Resident, [2]Professor, [3]Associate Professor, [4]Assistant Professor, Department of Pediatrics, Lala Lajpat Rai Memorial Medical College (LLRMMC), Meerut, India

Corresponding Author
Dr. Shashank Singh
Senior Resident, Department of Pediatrics, Lala Lajpat Rai Memorial Medical College (LLRMMC), Meerut, India

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Abstract

Background and Aim: All over the world majority of neonatal deaths are concentrated in the first day and first week with about 1 million die on first day of life and close to 1 million die within next 6 days of life. There is poor availability of quality and quantity of infrastructure and utilization of neonatal care services in our country. The aim of the present study is to assess outcome of neonates discharged from SNCU in tertiary care hospital, Western UP.

Material And Methods: The present study was conducted in department of Pediatrics in SVBP Hospital attached to LLRM Medical College. The present study was conducted over a period of one year i.e., from January 2018 to January 2019. After discharged, follow-up was done to all patients. We looked for anthropometry measurement, neurological assessment, mortality and morbidity we made telephonic contacts and SMS regarding their follow-up visit. All morbidities were recorded at every immunization visit and finally at 12 months.

Result: Out of 201 patients, 4 patients died during follow up: 2 at 6 weeks of age, 1 at 14 weeks of age and 1 at six months of age. Out of 201 patients 54.2% and 58.7% developed P.E.M. at 6 month and 12 months respectively. Out of 201 patients 19.7% and 13.6% developed Stunting at 6 month and 12 months respectively. Out of 201 patients 18.2% and 16% developed Microcephaly at 6-month and12 month respectively. Out of 201 patients 10.8% of patient of perinatal asphyxia developed Microcephaly, 35.1% patients were neurologically abnormal, and 32.4 % had developmental delay during follow-up. In 15 no patient (7.5% develop visual abnormality).

Conclusion: Our study concludes that regular follow up of patient up to 1year age helped us in early diagnosis of sequelae and early intervention to rescue and prevent further comorbities and mortality.

Keywords: SNCU, NMR, Morbidity, Mortality, Follow Up

Introduction: Newborn care is a major problem in developing countries. Neonatal morbidity and mortality rates reflect the nation's socioeconomic status as well as the efficiency and effectiveness of health care services. Since neonatal morbidity and mortality possess a serious challenge in developing countries, important indicators like NMR (Neonatal Mortalitiy Rate) are useful in planning for improved health care services and basic neonatal care.[1] All over the world majority of neonatal deaths are concentrated in the first day and first week with about 1 million die on first day of life and close to 1 million die within next 6 days of life.[2] The current NMR of INDIA is 24 per 1000 live birth. [3]Reducing neonatal mortality is important not only because the proportion of the under 5 mortality that occurs during neonatal period is increasing as the under 5 mortality is decreasing but also because the health interventions needed to address the major cause of neonatal deaths generally differ from those which one needed to address under 5 mortality.[4] Under 5 mortality at 39 per 1000 live births in 2016, in India is unacceptably high compare to our stature as an economic, scientific and strategic power. The eight important causes of under 5 mortalities in children in India (i) complications of prematurity (24%) (ii) pneumonia (13%) (iii) neonatal infections (12%) (iv) diarrhea (11%) (v) birth asphyxia (11%), (vi) congenital malformations (4%), (vii) measles (3%), and (viii) injuries (3%). The above causes are the proximate conditions that lead to death. Poverty, illiteracy, low caste, rural habitat, harmful cultural practices, and poor access to safe water and sanitation are important determinants of child health. Undernutrition is a critical underlying intermediate risk factor of child mortality, associated with about 45% of under 5 child deaths. Undernutrition causes stunting and wasting, predisposes to infections and is associated with adult disorders and low economic productivity.[5,6,7]The care of a child in SNCU is a very important aspect but more importantly the care of neonates post discharge is tremendously important in-patient management

which is commonly neglected. Post discharge deaths go unnoticed and might be several times higher than deaths during hospitalization. Neglect in post discharge care occurs due to overburden on health system with limited manpower and resources and ignorant attendants of the babies.[8] Therefore our aim is to follow up babies after discharge from SNCU and counselling of the attendants regarding the danger signs for rehospitalization and routine care at home with the following objectives:

1. To assess outcome of neonates discharged from SNCU in tertiary care Hospital, Western UP.
2. To study the growth profile of neonates successfully discharged from SNCUin tertiary care hospital at 1 year of age.
3. To study impact of socioeconomic status on mortality and morbidity after discharge from SNC
4. To compare outcome of baby discharged at weight <1800 gms and >1800 gms

Material And Methods: This prospective observational cohort study was conducted in the Neonatal Intensive Care Unit, Department of Pediatrics, LLRM Medical College, Meerut from January 2018 to January 2019. The study was approved by Institutional Ethical Committee of LLRM Medical College, Meerut. Informed written consent from parents/guardian was taken before enrolment of babies.

Inclusion Criterion: Neonates admitted in the NICU of the hospital and living within 20 km radius of institution premises constituted the case group. Only those newborns who were successfully discharged from NICU were included

Exclusion Criteria: Baby admitted to NICU but taken LAMA, referred to higher centre and babies born with any major congenital anomalies

Methodology: We conducted a prospective cohort study of all newborn infants (<28 days) hospitalized in a neonatal unit over a 1-year period and followed after discharge till 1 year of age. Mother was asked regarding number of episodes of diarrhea, pneumonia, Hyperbilirubinemia, phototherapy, number of re-hospitalizations, and feeding difficulties.

Weight: For infants weighing up to 10 kg, basket or pan type scale is used. The infant was placed on a tray, which is supported in a reading frame calibrated for measuring a minimum of 10 g increment. Digital portal weighing scales for infants can measure up to 5g difference in weight.

Measuring the length: Harpendon's infantometer measures the length of newborn and infants. The infant meter is designed to measure lengths between 0 and 100 cm, with a precision of 1mm.

Head circumference: The head circumference is recorded between birth to 2 years of age which is the period of brain growth. It is the maximum circumference of the head with measuring tape overlying the occiput at back and supraorbital ridges in front.

Assessment Of Nutrition By Anthropometry: The terms malnutrition, undernutrition, protein calorie malnutrition (PCM) and protein energy malnutrition (PEM) have been widely used to describe abnormal anthropometric measurements similarly anthropometry has been used to signify the duration of undernutrition as being acute ,chronic, or acute on chronic however there is a need to replace these terms by a more objective terminology based on anthropometric indices with specified cut-offs for indicating abnormal nutritional status nowadays we primarily use three indicators viz, underweight , stunting and wasting to describe the severity and duration of undernutrition key box 5 enlists and describes the utility of few anthropometric indicators based on weight and height.

IAP (Indian academy of pediatrics)

Classification of PEM (Protein Energy Malnutrition): The classification is based on weight -for - age children weighing more than 80% of the 50th percentile of WHO/NCHS standards are considered normal. IAP categorizes under nutrition in **4 grades; GRADE 1:** (71-80%), **GRADE 2:** (61-70%), **GRADE 3:** (51- 60%), And **GRADE 4:** (≤50%) Of expected age for that age alphabet is postfixed in presence of edema for example a male child is weighing 8 kg at 2 years of age with pedal edema (50th percentile for 2 years is 12.3kg) is classified as PEM grade 2 (k) as per IAP classification.

Statistical analysis: Data analysis was performed using SPSS 23 software version (SPSS Statistics for Windows, version). Birth weight gestational age social economic status work compared with anthropometric measurement examination findings neurological and developmental and morbidity profile of the patient using chi-square test.

Results: Of the 201 neonates followed up till 6months of age 123 were male i.e., 61.2% and 78 were female i.e., 38.8% (male female ratio of 1:57:1). 67 patients were preterm i.e., 34.8% and 131 patients were term i.e., 65.2% 53 patients were <1800g and 148 were >1800g. Most common presenting complaints were respiratory distress perinatal asphyxia, seizures, low birth weight, prematurity (table 1).

Table 1: Percentage on the basis of number of patient and clinical picture

Variable	No. of patients	Percentage
Perinatal asphyxia	37	15.8%
Respiratory distress	167	83%
Hyperbilirubinemia	15	7.5%
Prematurity	67	33.4%
Low birth weight	63	31.5%
Sepsis	64	32%
Neonatal seizures	12	6%

20.9%, 34.7%, 32.7% 23.9 percent of patients developed diarrhea 6 weeks, 14 weeks, 6 months and 12 months respectively. 19.4%, 26.9%, 22.4% and 20.9% developed pneumonia 6 weeks, 14 weeks, 6 months and 12 months respectively. 24.4%, 28.4%, 29.4%, 32.3% developed fever at 6 weeks, 14 weeks, 6 months and 12 months respectively. 14.4%, 9.5%, 11.4% and 9% were hospitalized at 6 weeks, 14 weeks, 6 months and 12 months respectively. Out of which four patients died during follow up: 2 at 6 weeks of age, 1at 14 weeks of age and one at six months of age. 54.2% and 58.7% developed P.E.M. @ 6 month and 12 months respectively. 19.7% and 13.6% developed Stunting @ 6 month and 12 months respectively. 18.2% and 16% developed Microcephaly @ 6-month and12 month respectively. 10.8% of patient of perinatal asphyxia developed Microcephaly, 35.1% patients were neurologically abnormal, 32.4% had developmental delay during follow-up. 15 patients (7.5%) develop visual abnormality). The children with VLBE according PEM were follow-up, which shows 20% had severe stunting at 6 months, 66.7% stunted at 6 months and 26.7% were stunted at 12 months (table 2).

Table 2: Association of very low birth weight patients with stunting on follow up (N=15).

Follow-up time	Frequency	Percentage
6 months		
Severe stunting	3	20
Stunting	10	66.7
Normal	2	13.3
12 months		
Stunting	7	26.7
Normal	8	73.3

Table 3: Relationship between patient of hypoxic encephalopathy (HIE) and Microcephaly, Neurological abnormality and Developmental delay

	HIE	Microcephaly	Abnormal neurology	Developmental delay
Yes	37	10.8%	35.1%	32.43%
No	163	10.3%	1.2%	1.2%

Discussion: The different determinants of infant morbidity and mortality include age, sex, mode of delivery, gestational age, birth weight, parity of mother, vaccination, maternal education, age, birth spacing and socioeconomic conditions. Breast feeding is an important determinant which lowers the rate of infection related morbidities.[9] Improving perinatal neonatal care has led to increased survival of newborns[10] who are at high risk of post discharge morbidities including growth failure, ongoing medical illnesses, neurosensory impairment and developmental deficits. A recent systematic review in Lancet[11] has reported of long term neuro-developmental sequale after different intrauterine and neonatal insults, sepsis 40%, Meningitis 42%, HIE 31.0%, Jaundice 18.0%, Tetanus 26, 0% and CMV infections 41%. Most common sequale include:

Learning difficulties, cognition or developmental delay, cerebral palsy, hearing impairment and visual impairment. An appropriate and comprehensive follow up program for high risk infants will help in early detection and management of any morbidity associated with prenatal events, and shall ensure not only intact survival and optimum growth, but also an optimal quality of life for these infants.[12] On comparison of the anthropometric measurements with socioeconomic status we found that 61.1% of lower class developed PEM, 27.8% had stunting, and 13.5% had wasting while in upper lower class 63.2%, 13.6% and 26% had PEM, stunting and wasting respectively, in middle class 53.4%, 16.6%, 24% had PEM, stunting and wasting respectively when followed up for one year. In upper middle class only one case of PEM reported, no cases of stunting and wasting were there. From the above data we concluded that there is no significant association between the socioeconomic status and different morbidities like PEM, stunting, wasting, fever and rehospitalization. Incidences of diarrhea and pneumonia were slightly higher in lower classes as compared to upper classes possibly due to issues like overcrowding and poor hygiene. Further new studies are required to establish and verify the concrete relationship between socioecomic status and the associated morbidities in post discharge patients. In weight <1800 grams: 37.7% developed diarrhoea, 34% pneumonia, 35.8% fever and 32.1% were rehospitalised at 6 weeks.37.7% developed diarrhoea, 35.8% pneumonia, 30.2% fever and 13.2% were rehospitalised at 14 weeks.54.7% developed diarrhoea, 28.3% pneumonia, 45.3% fever and 24.5% were rehospitalised at 6 months, 88.7% had PEM, 50.9% were stunted and 22.6% had microcephaly at 6 months. 26.4% developed diarrhoea, 34% pneumonia, 41.5% fever and 20.8% were rehospitalised, 77.7% had PEM, 32.1% were stunted, 22.6% had microcephaly at 12 months. In weight >1800 grams:14.9% developed diarrhoea, 14.2% pneumonia, 20.8% fever and 8.10% were rehospitalised at 6 weeks.33.3% developed diarrhoea, 23.6% pneumonia, 27.7% fever and 8.10% were rehospitalised at 14 weeks. 24.3% developed diarrhoea, 20.3% pneumonia, 23.6% fever and 8% were rehospitalised at 6 months. 42.6% had PEM, 12.8% were stunted, 3.4% had microcephaly at 6 months.23% developed diarrhoea, 16.2% pneumonia, 29.1% fever and 4.7% were rehospitalised, 52%had PEM, 8.8% were stunted, and 2.7% had microcephaly at 12 months. On studying association between birth weight and further morbidities it shows that very low birth weight is directly associated with protein energy malnutrition, stunting, wasting and microcephaly. It is also associated with post discharge morbidities like fever, pneumonia, feeding difficulties, diarrhoea etc. Out of 201 patients we followed 167 had respiratory distress and 26.2% developed pneumonia at 6 weeks, 38.6 at 14 weeks, 30.3% at 6 months and 25.5% at 12 months. Therefore there is a high probability in the development of pneumonia on followup in patients having respiratory distress at the time of admission. Patients having Hypoxic Ischemic Encephalopathy were followed and 10.8% had microcephaly, 35.1% had neurological abnormality, 32.43% developed development delay. We concluded that outcomes (PEM, stunting, microcephaly, wasting, diarrhoea, pneumonia, fever, rehospitalization and mortality) were not influenced by socioeconomic status rather was related with clinical picture at the time of discharge (birth weight, diagnosis). On comparing with other studies and demographic profile of india we have approximately 9% cases of diarrhea and 11% of pneumonia under one year of age but in our study we had 28% incidence of diarrhea and 22% incidence of pneumonia in patients discharged from SNCU and followedup till one year. Therefore, incidence of diarrhea and pneumonia is definitely higher in discharged patients requiring thorough routine followup schedule post discharge for early diagnosis and management of these morbidities. In India IMR is 32 per 1000 live births. We had 2% mortality during followup till 12 months. Therefore we can also reduce the overall burden of mortality in patients discharged from SNCU by scheduled followup visits and early intervention thereby resulting in reduced IMR. After comparing the various anthropometric measurements we found that the incidence of the PEM (i.e. 61%) stunting (17.2%) and wasting (17.3%) at 6 months of age reduced significantly at 12 months of age (i.e. 47% PEM, 15% stunting and 11% wasting) by early intervention, timely introduction of complementary feeding, proper feeding counselling of the caretakers and micronutrient supplementation. This highlights the importance of scheduled followup visits and helps in all round healthy buildup of the post discharged patients. Regular follow up helped us in early diagnosis of sequelae and early intervention to rescue and prevent further morbidity and mortality. Frequent follow up and micronutrient supplementation, feed and diet monitoring, parental counselling helped them to gain weight and achieve the target height till one year of age in most of the participants. At 6 months of age 66% patients were stunted and out of them 20% were severely stunted, after thorough follow up these numbers reduced to 26.7% stunting and no severe stunting at 12 months of age.

Limitations: The limitation of our study is that our result is influence due to patient having lower rate of follow up (especially in upper middle socioeconomic status according to Kuppuswamy scale.) Follow up mostly compromised of patients having any morbidity which shows higher rate of mortality on follow up. Therefore, proper discharge planning is required prior to discharge care taker should be counselled regarding the relation between importance of regular follow up and healthy development of babies.

Conclusion: Our study concluded that during follow up of patients up to 1 year of age post discharge participants suffered from variety of morbidities (pneumonia, fever, diarrhea) and were hospitalized. Rehospitalization rate and morbidities were related to the birth weight, and clinical picture and diagnosis at the time of admission rather than socioeconomic status. However larger studies are required to establish the relationship between socioeconomic status and post discharge outcome. Our study highlights the importance of follow up of all patients after discharge from an SNCU and prevention, early diagnosis and management of different sequelae and morbidities.

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