

Original Research Article

A study on the length of stay of neonates in neonatal intensive care unit in a referral hospital in India

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Received: 28 December 2018

Accepted: 31 January 2019

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ABSTRACT

Background: Estimate of length of stay is important while counseling the parents of preterm infants and also make them prepared psychologically.

Methods: A retrospective study done in the Neonatal Intensive Care Unit (NICU) of Government Mohan Kumaramangalam medical college hospital, Salem, Tamil Nadu, India between December 2017 and November 2018. All the neonates admitted during the study period formed the study group.

Results: There were 3902 neonates admitted in the NICU during the study period. The mean duration of stay of neonates in the NICU during the study period was 7 days. Out of 3902 neonates in the study group, 37 (0.94%) neonates stayed less than 24 hours, 2208 (56.58%) neonates stayed for 1 to 5 days, 929 (23.8%) neonates stayed for 6 to 10 days, 668 (17.11%) neonates stayed between 11 to 30 days, 41(1.05%) neonates stayed for 31 to 60 days and 7 (0.18%) neonates stayed for more than 61 days. About 45% of neonates in the birth weight category of 1001 to 1500g stayed for 11 to 30 days. A similar trend was also observed in the analysis of length of stay of 29 to 32 weeks preterm neonates.

Conclusions: Every hospital should have their own data to predict the length of stay of neonates in NICU. Future directions should include strategies in reducing the length of stay in NICU thereby optimising resources for the parents and the country.

Keywords: Length of stay, Low birth weight, Neonate, NICU

INTRODUCTION

Recent advancements in the neonatal care and a massive thrust to neonatal care under the auspices of National Rural Health Mission in India have led to improvement in the survival of premature infants.¹ The improved survival of premature and very low birth weight infants has led to an increase in hospital days and ultimately cost of treatment of these infants.^{2,3}

Estimate of length of stay is important while counseling the parents of preterm infants and also make them

prepared psychologically for longer stay in the hospital. Previous researchers have focused on investigating the duration of stay for neonates who graduate to discharge. Inclusion of neonates who die while in the hospital can make length of stay estimation complicated.⁴⁻⁷

Clinical care of preterm and very low birth weight infants in developing countries like India is difficult and labour intensive as the resources are limited for intensive care.

In a study from the same centre last year about one third of the neonates stayed for more than 7 days.⁸ The

increased length of stay poses a severe strain in the already overloaded intensive care area.

There are many studies which experimented various strategies like Creating Opportunities for Parent Empowerment (COPE) program to limit the length of stay of neonates in hospital.⁹

The aim of this study was to analyze the length of stay of neonates in neonatal intensive care unit of our hospital and to correlate it with variables like birth weight, gestational age and morbidity pattern.

METHODS

A retrospective descriptive study done in the neonatal intensive care unit (NICU) of government Mohan Kumaramangalam Medical College Hospital, Salem, Tamilnadu, India between December 2017 and November 2018.

In the analysis of length of stay, the duration in which maximum numbers of neonates were present will give a better picture than the mean duration of stay.

The mean duration of stay is influenced by longest staying neonate in each variable.

Hence the presence of even a single neonate in any of the variable adversely increases the mean duration of stay. Institutional ethical clearance was obtained.

Inclusion criteria

- The data collected included gender, birth weight, diagnosis, place of delivery, gestational age and duration of stay in NICU.

Exclusion criteria

- All the neonates admitted during the study period formed the study group. The readmitted neonates were excluded.

Statistical analysis

The collected data were statistically analyzed using Microsoft Excel software.

RESULTS

The profile of neonates in the study group and their morbidity and outcome are tabulated in Tables 1 and 2. There were 3902 neonates admitted in the NICU during the study period. The mean duration of stay of neonates in the NICU during the study period was 7 days.

Out of 3902 neonates in the study group, 37 (0.94%) neonates stayed less than 24 hours, 2208 (56.58%) neonates stayed for 1 to 5 days, 929 (23.8%) neonates stayed for 6 to 10 days, 668 (17.11%) neonates stayed between 11 to 30 days, 41(1.05%) neonates stayed for 31 to 60 days and 7 (0.18%) neonates stayed for more than 61 days.

Table 1: Profile of the neonates admitted and their length of stay analysis.

Parameter	< 24 hours		1-5 days		6-10 days		11-30 days		31-60 days		> 61 days		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Male	26	1.21	1220	57	496	23.17	370	17.29	25	1.16	3	0.14	2140
Female	21	1.19	988	56.13	433	24.6	298	16.93	16	0.9	4	0.23	1760
Ambiguous	0	0	1	50	0	0	1	50	0	0	0	0	2
Intramural	18	0.65	1220	58.51	651	23.64	438	15.9	29	1.05	6	0.22	2753
Extramural	29	2.523	598	52.04	278	24.19	231	20.1	12	1.04	1	0.08	1149
Birth weight <1000g	4	5.97	41	61.19	7	10.44	11	16.41	4	5.97	0	0	67
1001-1500g	7	2.11	78	23.56	80	24.17	149	45.01	16	4.83	1	0.30	331
1501-2500g	24	1.51	725	45.74	486	30.66	333	21.01	14	0.88	3	0.19	1585
>2500g	15	0.78	1330	69.31	356	18.55	209	10.89	6	0.31	3	0.16	1919
Gestational age <28 weeks	9	6.87	69	52.67	22	16.79	25	19.08	6	4.58	0	0	131
29 -32weeks	5	1.68	60	20.20	75	25.25	141	47.47	15	5.05	1	0.33	297
33-36 weeks	7	0.76	335	38.96	316	34.68	243	26.67	9	0.98	1	0.10	911
>37 weeks	26	1.01	1745	68.08	516	20.13	260	10.14	11	0.42	5	0.19	2563
Term	26	1.01	1745	68.08	516	20.13	260	10.14	11	0.42	5	0.19	2563
Preterm	21	1.57	464	34.65	413	30.84	409	30.55	30	2.24	2	0.15	1339

Table 2: Morbidity and outcome in the study group.

Morbidity pattern													
Parameter	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Total
Neonatal jaundice	1	0.09	930	86.75	120	11.19	21	1.96	0	0	0	0	1072
Neonatal sepsis	0	0	36	8.72	127	30.75	233	56.42	16	3.87	1	0.24	413
Transient tachypnoea of new-born	3	1.07	180	64.06	90	32.03	8	2.85	0	0	0	0	281
Birth asphyxia	10	2.91	73	25.08	104	35.73	98	33.67	6	2.06	0	0	291
Prematurity (28-<37 weeks)	0	0	53	21.29	106	42.57	83	33.33	7	2.81	0	0	249
RDS of new-born (HMD)	4	2.01	74	37.19	40	20.10	72	36.18	9	4.52	0	0	199
Other low birth weight (1000g-2499g)	1	0.52	67	34.54	81	41.75	42	21.65	3	1.55	0	0	194
Congenital malformation	12	6.22	103	53.37	47	24.35	30	15.54	1	0.52	0	0	193
Neonatal aspiration of meconium	1	1.04	59	61.46	23	23.96	11	11.46	2	2.08	0	0	96
Convulsions of new-born	0	0	8	20	12	30	18	45	1	2.5	1	2.5	40
Extreme immaturity (<28 weeks)	6	10.17	36	61.02	6	10.17	10	16.95	1	1.69	0	0	59
Small for gestational age (IUGR)	0	0	41	48.78	30	36.59	11	13.41	0	0	1	1.22	82
Any other diagnosis	8	1.09	532	72.68	136	18.57	52	7.10	0	0	4	0.54	732
Outcome													
Discharged	12	0.35	1962	57.55	831	24.38	561	16.46	36	1.06	7	0.21	3409
Expired	26	6.68	200	51.41	78	20.05	82	21.08	3	0.77	0	0	389
LAMA	9	9.47	46	48.42	18	18.95	20	21.05	2	2.11	0	0	95
Referred	0	0	2	22.22	2	22.22	5	5.56	0	0	0	0	9

On analysis of gender and length of stay, about 57% of male and 56.13% of female neonates stayed in the NICU for 1 to 5 days respectively. About 58.51% of intramural neonates and 52.04% of extramural neonates stayed for 1 to 5 days in NICU. About 6 intramural neonates stayed in the NICU for more than 61 days. On analyzing the birth weight categories and length of stay, it was noted that nearly half of all neonates except those in the 1001 to 1500g category stayed for 1 to 5 days. About 45% of neonates in the birth weight category of 1001 to 1500g stayed for 11 to 30 days. A similar trend was also observed in the analysis of length of stay and gestational age where all gestational age groups except that of 29 to 32 weeks stayed for 1 to 5 days. About 47% of neonates in this age group stayed for 11 to 31 days. About 68% of term neonates stayed for 1 to 5 days. But the preterm neonates had almost equal distribution in the 1 to 5 days, 6 to 10 days and 11 to 30 days categories. On correlation between the diagnosis and length of stay, large number of neonates with neonatal jaundice and transient tachypnea of newborn had a stay between 1 to 5 days.

More than 50% of neonates with sepsis stayed for 6 to 10 days. More than three fourth of the neonates in the 28 weeks to 36 weeks of gestational age in the study group stayed for 6 to 30 days. More than 50% of neonates who were discharged or died had a stay of 1 to 5 days in the

NICU. Also, about 43 neonates had a stay of more than 11 days, of which 7 neonates had a stay of more than a month.

DISCUSSION

The ability to predict duration of stay in NICU has become increasingly important as the improvements in the survival have led to very preterm babies requiring longer NICU care. Estimates of length of stay are very much necessary to counsel the parents about a neonate's anticipated stay and the cost involved.¹⁰ The mean length of stay in NICU in this study is 7 days. In another study it was 13 days.¹⁰ In this study the premature neonates in the 29 to 32 weeks gestational age had a stay between 11 to 30 days in NICU. This is comparable to other studies.¹¹ In this study 4 Low birth weight babies had a stay of more than 61 days. This longer stay causes enormous stress on the workforce and also increases the parental anxiety. As more and more preterm babies are graduating successfully after NICU care, this trend is expected to increase further. Hence alternative strategies should be planned. Bhutta ZA et al, demonstrated a successful implementation of a transitional care unit to cater to these neonates.¹¹ Many studies have provided data on using mothers to look after their preterm infants in their home.¹² The potential advantages of home care and

community follow-up for these infants were also documented.^{13,14} Parents are often anxious about when they will be taking their babies home and information with supportive data is often necessary to counsel them.¹⁵ There has been no evidence to suggest the optimal length of stay in NICU before discharge. Also, there is no evidence to demonstrate that a shorter length of stay in NICU has better outcome. Following an early discharge from NICU, babies may need readmission to a paediatric intensive care within a few days, whereas keeping them in the NICU a little longer may reduce the mortality.¹⁶ Larger studies are needed to compare the outcomes between earlier discharged-home cared neonates and those neonates with a longer duration of stay.

CONCLUSION

Every hospital should have their own data to predict the length of stay of neonates in NICU. This will help in counselling the parents and reduce their anxiety. Future directions should include strategies in reducing the length of stay in NICU thereby optimising resources for the parents and the country.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kanimozhi P, Kumaravel KS, Velmurugan K. A study on the length of stay of neonates in neonatal intensive care unit in a referral hospital in India. *Int J Contemp Pediatr* 2019;6:746-9.