

## A STUDY OF MORBIDITY AND MORTALITY PATTERNS OF NEWBORNS ADMITTED IN EXTRAMURAL NICU IN A TERTIARY CARE HOSPITAL

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### Abstract

**Background:** Newborn health is vital to the survival of all children on the planet. Three quarters of a million newborn deaths take place each year, making about thirty-six percent of all pediatric deaths globally. Two-thirds of infant fatalities and nearly half of all deaths in children under five happen during the neonatal era. **Objective:** to study of morbidity and mortality patterns of newborns admitted in extramural NICU in a tertiary care hospital. **Methods:** We conducted our prospective hospital-based study for the one-year hospital admission in tertiary care hospital. 1301 neonates were admitted during this period are enrolled in the study. **Results:** During this period, total 5945 patients visited the emergency room (neonate & non-neonate). 4887 patients were admitted while 1058 were treated as outpatient. Out of 4887, 1301 were neonates (27% of the total paediatric admission). Most of the time when a newborn was referred to emergency room it was for admission. 65% of newborns were admitted on the first day of life. **Conclusion:** Most of the time when a newborn was referred to emergency room it referred for admission. 65% of newborns were admitted on the first day of life. Out patients, referrals in c/o newborn were negligible during the study period. While data for non-neonate shows 1054 (23%) patients visited for OPD and 3586 (77%) patients required admission. Neonatal admission proportion has ranged from 25-30% thru out the year.

**Keywords:** Trends, Neonatal Mortality, Morbidity, Infants Born, Womb Factors

**Introduction:**

The health of newborns is crucial to the survival of children worldwide. Three point nine million neonatal fatalities occur annually, accounting for 36 percent of all deaths in children under the age of five worldwide. Nearly half of all deaths among children under the age of five and two-thirds of newborn deaths occur in the neonatal period. [1-2]

Therefore, rescuing infants is the only solution to the problem of child survival in India. The current national IMR is 50 per 1,000 live births, whereas the NMR is 34 per 1000. Gujarat, a state with the second-highest industrial growth, a well-developed physical infrastructure, a >10% growth rate, a population of 60.3 million, and a population concentration in urban areas of 42%, has virtually identical IMR (48) and NMR (34) values. Gujarat's IMR and NMR are lower than several other states. [3-5]

The causes of newborn mortality are complex. Things include the type of birth, where it takes place, whether or not a neonatal care unit is available, how far away the institution is, how the baby is transported, how quickly they are resuscitated, how well they are cared for during transport, etc.[6-8]

The fate of a newborn in the NICU depends on a wide variety of criteria, including but not limited to birth weight, age at presentation, mode of transport, maturity, condition on receipt, site of delivery, manner of delivery, person conducting delivery, etc. Exclusive breast-feeding in the first few months of life has beneficial effects. [9-10]

Birth asphyxia, meconium aspiration syndrome, hyaline membrane illness, respiratory distress, significant congenital deformity, hypothermia, hypoglycemia, sepsis, preterm, and low birth weight are all comorbidities that might affect a baby's fate. [11-13]

**Aim & objectives:**

- Study causes of referral, morbidity and mortality in these extra mural newborns.
- Factors affecting the outcome of extra mural newborns.

**Method:**

Our research is a prospective hospital-based study that took place in the extramural NICU at SSG Hospital in Vadodara for one-year period. A total of 1301 neonates were admitted during this period are enrolled in the study.

Inclusion Criteria: During the research period, all newborns (28 days) admitted to the EMNICU were included. All newborns (28 days) are seen in the emergency room and are given outpatient care.

Performa for patient enrollment began in October 2011, during the preparation phase. Neonate mortality and morbidity were defined using NNF standards. All newborns admitted to NICU between November 2011 and October 2012 were enrolled, and a form was filled out for each neonate. The patient's vitals are taken using a variety of instruments upon arrival, including a digital thermometer, an optimum glucometer, a pulse oximeter, a capillary filling time, an NIBP, an electronic scale, a respiratory rate monitor, a colorimeter, and a sensorium. Initial diagnosis established and documented in accordance with accepted criteria. The infant was cared for in accordance with the NICU's established protocols. The length of time spent in the neonatal intensive care unit, the recovery room, and the ward is noted. Patients' outcomes are documented, including whether they were discharged, discharged on request (DOR), discharged against medical advice (DAMA), absconded, sent to a higher center for further therapy, or passed away. Standard diagnostic criteria are applied to determine the final diagnosis and the cause of death (if any).

Microsoft Excel-2007 is used to plot and analyze the data obtained. Data is collected, analyzed, and compared to NNPD2002-03 in a number of tables and graphs.

### Results:

During the 12 months from November 2011 to October 2012, newborns admitted to the extramural NICU at SSG Hospital in Vadodara were the subjects of a prospective research. There were a total of 5945 patients (including neonates and adults) that went to the ER during this period. There were 4887 inpatients and 1058 outpatients. There were a total of 4887 pediatric admissions, with 1301 of those being newborns (about 27 percent).

**Table 1: Sex distribution and gestation group details (NNPD 2003)**

Category	Number of infants (n=11026)	Proportion (%)
Sex distribution		
Males	7406	67.2
Females	3610	32.7
Ambiguous	10	0.1
Preterm (<37weeks)	3471	31.5
Term	7466	67.7
Post-term (>41weeks)	89	0.8

Table 1 shows had a greater percentage of women than the NNPD from 2003. A total of 39% of the children in our sample were girls, up from 33% in the NNPD 2003. There were 62% males in our sample, compared to 67% in the NNPD 2003. Our study found a similar rate of

preterm birth (34%) compared to the NNPD 2003 (31.5%). The percentage of preterm babies in our NICU is 10%.

The birth weight categories are represented in Table 2 for an overview of the newborn population. The majority (46.9%) of admitted newborns have a birth weight of less than 2500 grams. There is a 19.6 percentage point birth weight range, with 4 percent being exceedingly low. Only 29.5 percent of newborns are considered healthy.

**Table 2: Birth weight category in admitted neonates**

Birth Weight (Grams)	Number of neonates (n=1301)	Proportion (%)
<1000	52	4.0
1000-1500	255	19.6
1500-2500	610	46.9
>2500	384	29.5

Our findings confirm the increased prevalence of low birth weight infants since the NNPD 2003. Our findings show that 70% of newborns are LBW, up from 52% in the NNPD 2003. There are 29.5% NBW infants compared to 40% in the NNPD 2003. Once again, this is a sign that LBW infants have a higher risk of morbidity and are thus referred for specialized treatment. We have a 39% LBW and a 5.6% VLBW rate in our NICU. Both low birth weight and very low birth weight are more common in our NICU's extra-mural ward. [Table 3]

**Table 3: Birth weight category of admitted neonates (NNPD 2003)**

Category	Number of infants (n=11026)	Proportion (%)
Low birth weight (<2500 gm)	5748	52.1
Normal birth weight (>2500 gm)	4402	39.9
Not known	876	7.9

Age at admission is listed in Table 4 for the newborn. About 65 percent of newborns are hospitalised during the first day. After the 21st day of life, just 3% had admitted. Not only have that, but 87% of all hospitalizations occurred during the first week of life. That the highest rates of morbidity and NICU admission occur so soon after birth.

**Table 4: Age of neonate at admission**

Age (Days)	Number of neonates (n=1301)	Proportion (%)
<1	841	64.2
1-2	102	7.8
3-<7	183	14.1
7-21	136	10.5
>21	39	3.0

There was no significant difference between admission in the first two days of life in the NNPD 2003 and the current data. Nonetheless, our data shows that 64 percent of admissions occur during the first 24 hours of life. This may be attributable to a shift toward institutional care. Therefore, early diagnosis and referral are essential. One possible explanation for early admittance is the presence of additional transportation options. Both our research and the NNPD 2003 found nearly identical rates of admissions after the first 21 days of birth. According to the data shown above, late newborn morbidities are associated with a lower rate of hospitalization. [Table 4]

Privately sent neonates have a higher death rate than those sent to a public hospital. Most private hospitals focus on elderly care and neonatal intensive care units rather than obstetrics. The term "trust hospital" applies here as well. This is because our center is being sent patients who have a little chance of recovery, are in a terminal stage, or have significant financial restrictions. [Table 5]

**Table 5: Death by referring place**

Institute	Number of neonates (n=1301)	Number of deaths (n=340)	Number of Neonates survived	Intra group mortality (%)	Chi-Square (P Value)
Private Hospital	616	196	458	31.8	19.628 (0.0001)
Govt. Hospital	584	126	420	21.6	
Home	98	18	80	18.4	

**Discussion:**

Most newborns who were sent to the ER ended up being admitted. On the first day of life, admission rates for infants were 65 percent. Referrals of c/o newborn patients to outpatient care facilities were extremely low during the research period. Since our facility is classified as a

tertiary care center, we receive only the sickest babies that cannot be treated elsewhere. Whereas, among non-neonatal patients, records reveal that 3586 (77%) needed to be admitted and 1054 (23%) were seen in OPD. Patients who are not newborns who visit the ER may need to be hospitalized or seen on an outpatient basis, depending on their condition.

Males accounted for 799 (61%) and females for 502 (39%) of the total 1301 newborns. This demonstrates that men make up a sizable percentage of the population. There is a societal prejudice that suggests people are more likely to rush a sick boy to the doctor than a girl. Moreover, it is possible that male infants are more at risk for complications.

Our findings confirm the increased prevalence of low-birth-weight infants since the NNPD 2003. Our findings show that 70% of newborns are LBW, up from 52% in the NNPD 2003. There are 29.5% NBW infants compared to 40% in the NNPD 2003.

There was no significant difference between admission in the first two days of life in the NNPD 2003 and the current data. Nonetheless, our data shows that 64 percent of admissions occur during the first 24 hours of life. This may be attributable to a shift toward institutional care. Therefore, early diagnosis and referral are essential. Additional transportation options may also contribute to early entrance.

There was a rise in hospital births compared to the NNPD in 2003. In our research, 96% of births occurred in hospitals, compared to 81% in NNPD 2003. It only delivers 3.4% of their packages to their customers' homes. The NFHS-3 reports that 41% of births in India occur in hospitals. Further, in Gujarat, 54.6%

The newborn's prognosis is impacted by this factor. This points to a lack of knowledge among the general people or an absence of adequate ambulance facilities. Several aspects of newborn transport were not met by the EMS service. They were only able to provide respiratory assistance whenever needed by using manual IPPR with a bag/mask/tube, and they had no way to keep the infant warm or check its oxygen levels. The referring organization never gave advance notice or double-checked on the availability of beds. It was mandatory to accept and treat each infant who came feeling ill.

### **Conclusion:**

A total 4887 patients were admitted while 1058 were treated as outpatient. Out of 4887, 1301 were neonates (27% of the total pediatric admission). Most of the time when a newborn was referred to emergency room it referred for admission. 65% of newborns were admitted on the first day of life. Out patients, referrals in c/o newborn were negligible during the study period. Probably minor ailments of neonatal period are taken care of in the periphery and only sick newborn are referred to our hospital, as it is a tertiary care hospital. While data for non-neonate

shows 1054 (23%) patients visited for OPD and 3586 (77%) patients required admission. Neonatal admission proportion has ranged from 25-30% thru out the year. Mortality rate is high in our study (26%) against 17% of NNPD 2003. Reasons of this may be more sick neonates are transferred here as a tertiary level center.

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