

Assessment of Special Newborn Care Unit in District
Hospital of Madhubani District, Bihar

By

Piyush Bansal

*Dissertation submitted in partial fulfillment of the requirements of the degree
MBA Hospital and Health Management*

Academic year, 2017-2019



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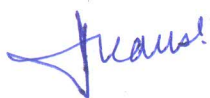
TO WHOMSOEVER MAY CONCERN

This is to certify that **Piyush Bansal**, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **CARE INDIA, BIHAR** from **04th Feb'19 to 03rd May'19**.

The Candidate has successfully carried out the study on **ASSESSMENT OF SNCU IN DISTRICT HOSPITAL OF MADHUBANI DISTRICT, BIHAR** him during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.

A handwritten signature in blue ink, appearing to read 'Kaushik'.

Col. (Dr.) Ashok Kaushik
Dean, Academics and Student Affairs
The IIHMR University, Jaipur

16 May 2019.

A handwritten signature in blue ink, appearing to read 'Phadnis'.

Dr. Sameer Phadnis
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CERTIFICATE

The certificate is awarded to
Piyush Bansal

In recognition of having successfully completed his
Internship in the department of

Bihar Technical Support Programme
and has successfully completed his Project on

**ASSESSMENT OF SPECIAL NEWBORN CARE UNIT IN DISTRICT
HOSPITAL OF MADHUBANI, BIHAR**

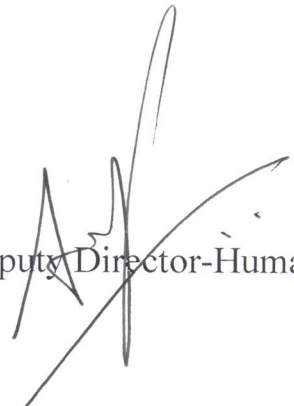
04th FEB'19- 03rd MAY'19

CARE INDIA, BIHAR

He comes across as a committed, sincere & diligent person who has a strong drive
and

zeal for learning

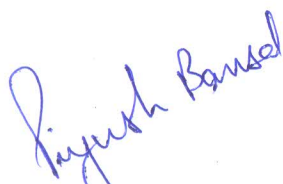
We wish him all the best for the future endeavors


Deputy Director-Human Resources

THE IIMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **ASSESSMENT OF SPECIAL NEWBORN CARE UNIT IN DISTRICT HOSPITAL OF MADHUBANI, BIHAR** and submitted by **Piyush Bansal** Enrollment No 0622 under the supervision of Dr. Sameer Phadnis for award of MBA in Hospital and Health Management in Health and Hospitals of the University carried out during the period from 04th Feb'19 to 03rd May'19 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.



Signature

Piyush Bansal

Acknowledgement

At this juncture of the completion of my dissertation, first I would like to thank the almighty for showering his blessings on me. I would like to sincerely thank The IIHMR University for giving me this platform of learning and making me a part of this memorable journey.

I would also, like to express heartfelt gratitude to Dr. Ashok Kaushik, Dean Academics, The IIHMR University, whose valuable support and constant inspiration taught me a strong groundwork to be a public health professional now and thereafter.

Further I would like to thank my guide Dr. Sameer Phadnis for his constant support and guidance throughout, this process and her constant endeavour to make me better and better every passing day.

My heartfelt appreciation goes to Mr. Mahendra Singh, District Team Leader; Care India, Madhubani, Bihar, for supporting me to complete my dissertation with his valuable guidance. I would also like to thank all my respected faculty members and other academic and administrative staff for their constant cooperation throughout.

This acknowledgement is incomplete without thanking the most important people in my life. First and foremost, I would like to thank my parents, who are my constant source of inspiration.

Thank you all.....

Piyush Bansal

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ABBREVIATIONS

CHC	Community Health Centre
CFR	Case Fatality Rate
ENMR	Early Neonatal Mortality Rate
FBNC	Facility Based Newborn Care
IMR	Infant Mortality Rate
JSY	Janani Suraksha Yojana
KMC	Kangaroo Mother Care
LBW	Low Birth Weight
VLBW	Very Low Birth Weight
LNMR	Late Neonatal Mortality Rate
MCH	Mother and Child Health
MOHFW	Ministry of Health and Family Welfare
NBCC	Newborn Care Corner
NBSU	New Born Stabilisation Unit
NFHS	National Family Health Survey
NHM	National Health Mission
NMR	Neonatal Mortality Rate
PHC	Primary Health Care
SNCU	Special Newborn Care Unit
SRS	Sample Registration System
U5MR	Under Five Mortality Rate
WHO	World Health Organisation

Operational definitions

CFR: Proportion of deaths among babies admitted to the SNCUs

Early Neonatal Mortality Rate = (Number of infant deaths of < than 7 days during the year/ Number of live births during theyear) *1000

High Priority District (HPD): It is defined as the bottom 25% of the districts in every State according to the ranking of districts based on composite health index. All Left Wing Effected districts and districts with majority tribal population, whose composite health index is below 50% are also categorized as HPDs (MOHFW 2015).

Infant mortality rate comprises of two parts viz. Neo-natal mortality rate and Post neo-natal mortality rate. The neo-natal mortality rate also comprises of two parts viz. Early neo-natal mortality rate and late neo-natal mortality rate.

Infant Mortality Rate (IMR) = (Number of Infant deaths during the year/ Number of live births during the year) * 1000

Low Birth Weight: Birth Weight less than 1500 grams

Neonatal Mortality Rate (NMR) = (Number of infant deaths of < than 29 days during the year/ Number of live births during the year) * 1000

Neonatal Period: It refers to the period of less than 28 days of life

Pre-term: Gestational age of less than 37 completed weeks (i.e. less than 259 days)

Still Birth Rate (SBR) = (Number of still births during the year/ Number of live births and still births during the year) * 1000

Under Five Mortality Rate- The under-five mortality is the probability that a child born in a specific year or time period will die before reaching the age of five, subject to current age specific mortality rates. It is expressed as a rate per 1,000 live births.

Functional status: Functional status is defined as the working condition of the equipment available in SNCUs

Resource availability: Resources are measured in terms of availability of human resources (such as doctors, nurses and staff) and infrastructure (such as availability of equipment and supplies in SNCUs)

Service utilization: It is measured in terms of average length of duration of stay in SNCUs

Input: It is measured in terms of infrastructure and human resource.

Output: It is measured in terms of the average duration of stay and aseptic measures followed.

Outcome: It is measured as performance of each unit assessed using Case- Fatality Rate (CFR)

Performance indicators: It is measured in terms of morbidity profile and mortality rate among the admitted newborn. (Inborn/Outborn, and cause of mortality such as Respiratory distress, Sepsis, Low birthweight/ prematurity, Birth asphyxia, Congenital malformation, Jaundice, Others)

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

To strengthen continuum of care and reduce neonatal mortality India is operationalizing Facility Based new born care (FBNC) approach. The FBNC model is comprehensive and has been developed with a mindset of delivering quality care at all childbirth points. The components of FBNC are New Born Care Corners (NBCCs) at delivery points, New-born Stabilizing Units (NBSUs) at FRU and SNCUs at district hospitals.

District hospitals is an important component of community health. It establishes the continuum across different stages of the public health system. Inadequate pediatric care quality puts a negative impact on care seeking by parents, thus putting the effectiveness of health intervention packages to bad shape.

Globally, 30% of the neonatal deaths are from India as stated by WHO. The neonatal mortality rate in India is 24/1000 live births. About 2/3 of infant deaths and nearly 50% of total under-5 deaths are contributed by NMR alone. Deaths occurring within the first four weeks of life constitutes almost 75% of total infant deaths. Neonatal deaths occurring within first week of life constitutes almost 75% of deaths within NMR (in 4 weeks). This accounts for half the IMR and are called Early Neonatal Mortality Rate (ENMR). As a result, global NMR (about 15 per 1000 livebirths) similar to that in developed countries in the era before the widespread institution of intensive neonatal care can be produced by 50% decrease in neonatal mortality (Darmstadt et al, 2005). Evidences from trend studies show that neonatal mortality decline has slowed down and neonatal deaths account for a larger share of U5MR (Jabbari et al, 2015).

Bihar neonatal mortality rate is 27/1000 live births which means 60% of under-five deaths occurs within 28 days of life every year (SRS 2016).

With the introduction of National Rural Health Mission (NRHM), there is decline in NMR and to an extent ENMR which has accelerated in mid- 2005. Due to the different baseline rates, there is still high disparity in NMR between inter and intra-state. The urban-rural, rich-poor, and gender differentials further compounds the disparity.

The newborn healthcare, in India, has started receiving a great amount of attention and resources with the launch of the National Rural Health Mission (NRHM) in 2005.

Under NRHM, new initiatives were introduced and taken to boost maternal-neonatal care in the country. Cash incentive for childbirth in health centers is provided by the Janani Suraksha Yojana (JSY). To build a three-tier system of neonatal care, the Primary Health Centres (PHCs), the Community Health Centres (CHCs) and the District Hospitals is being aimed and encompassed under the Facility – Based Newborn Care (FBNC). There is a drop by 33% from 52 per 1000 live births (SRS 2012) to 39 (SRS 2016) in Under-five mortality rate (U5MR). Also the NMR declined by 21% from 29 per 1000 live births to 24 in 2016 in the same period. To improve survival and decrease neonatal mortality, SNCU is hence designed to provide care to premature children, low weight, sick or with some medical condition in early neonatal period. The key frontier to improve the obstetric and neonatal care is District Hospital including specific newborn care strategies, in health systems of low- and middle-income settings with increasing facility births (Lawn et al, 2013).

Therefore, for evidence-based newborn care, health programmes and facilities need to be monitored and assessed for strengthening capacity building and scaling up.

1.2 Statement of Problem

Around 3.1 million newborns die per year globally in the 1st four weeks of life. Most of the neonatal deaths around 99% occurs in low and middle-income countries (Sen et al, 2009). India constitutes thirty percent of the global neonatal deaths (SRS 2016). Facility-based care is required by around roughly 15% of the newborns according to global reviews (NIPI SNCU brochure). FBNC can reduce NMR by as much as 23-50% in different settings (Lancet 2005; 365:977-88). In developing countries, there can be substantial decline in perinatal mortality in hospital settings which can be achieved by the advancements in premature infant care and prevention of spontaneous preterm labour. (Ngoc et al, 2006).

Even if the decline of NMR has been slow and lags behind that of infant and under-five child mortality rates, the NMR of the country did decline from 52 per 1000 live births in 1990 to 24 per 1000 live births in 2016 (SRS 2016). The increasing contribution of neonatal mortality to infant mortality is due to the slower decline. The first week of life alone accounts for about 45% of total under-five child deaths in the country, stated that the current ENMR is 18 per 1000 live births (SRS 2016).

Preterm birth complications, birth related complications and infections are the three major causes of neonatal deaths, contributing around 90% of total neonatal deaths. Due to the immaturity of the organ systems and concurrent disease states of preterm neonates, they experience a range of morbidity. The iatrogenic effects could be minimized by modifying the environment. (Symington and Pinelli, 2006).

The rate of decline among neonatal deaths in ENMR is much lower than that of late NMR. Early neonatal mortality has been the slowest to decline among all the components of the under-five mortality. The 1st week of life, ENMR (which is currently 18/ 1000 live births) accounts for about 46% of total Under-5 child deaths (SRS 2016). The major stumbling block is the slow decrease in neonatal mortality particularly that of early NMR. Huge burden of neonatal death among the outborn is due to preventable causes like asphyxia and infections (Rakholia et al, 2014)

Across the nation each year, the newly created SNCUs in the district hospitals provides care to more than 0.6 million newborn babies, mostly from poor families (MOHFW 2012). The key recommendation is to promote application of best practices of care at SNCUs all over the country, to create mentoring teams, and further building such more units to address the patient's unmet need. It aims to revamp monitoring of vital neonatal-perinatal data and coverage indicators i.e. developing system to estimate trends in the burden of stillbirths, low birth weight, preterm deliveries; and to measure key indicators of coverage of maternal-neonatal health more frequently than at present.

Bihar

According to SRS 2016, NMR in Bihar is 27 as compared to India which is at 24. On the other hand, ENMR is 21 as compared to national average of 18, whereas LNMR is 6 for both state and national average.

According to the Sample Registration Survey, 2016, IMR in Bihar is 38, which is higher than the national estimate of 34 (38 rural, 23 urban). However, Bihar is a high-focus state. Here, the neonatal mortality rate is 27/1000 live births which means about 60% of under-five deaths occurs within 28 days of life every year.

HEALTH INDICATORS			
		Bihar	India
Neonatal mortality rate		27	24
Post neonatal mortality		11	10
Infant mortality rate	Total	38	34
	Male	31	33
	Female	46	36
Under-5 mortality rate		43	39
Peri natal mortality rate		24	23

Table 1. Health Indicators (Source SRS 2016)

In Bihar, IMR is higher (38) as compared to the national average (34) (Table 1).

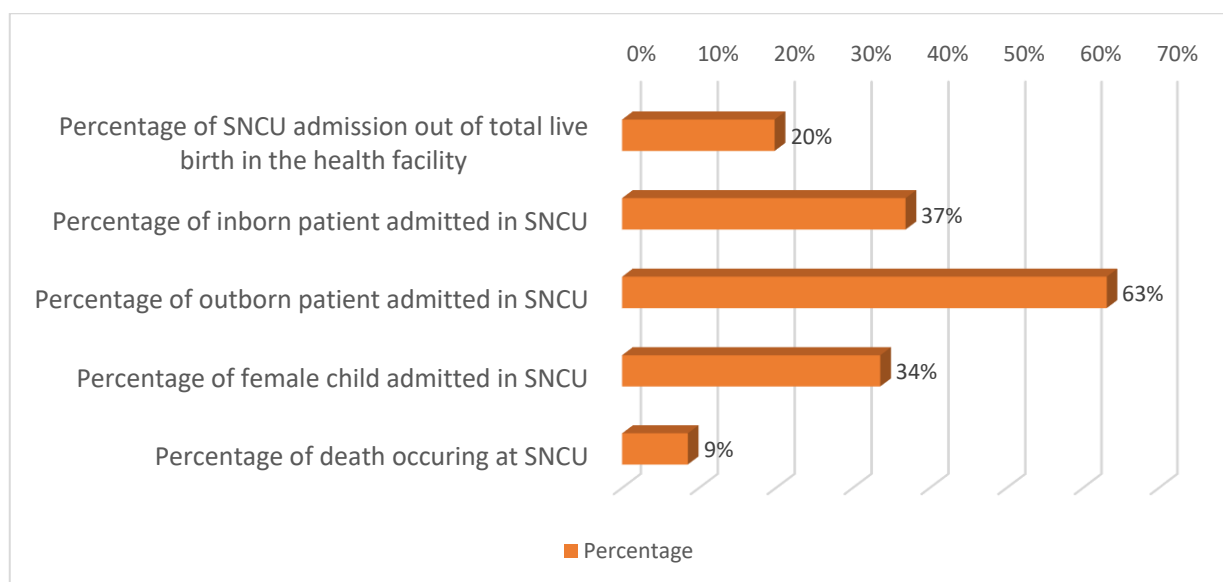


Figure 1- Indicators of Madhubani DH SNCU (2018-19)

According to HMIS 2018-19, among all live childbirths in the health center, 20 percent are admitted in SNCUs. Thus, SNCUs plays a vital role in improving neonatal healthcare services. The percentage of outborn being admitted is more than inborn patient. The percentage of female is 32% being admitted to SNCU.

1.3 Rationale of Study

Preterm birth complications, birth related complications and infections are the three major causes of neonatal deaths, contributing around 90% of total neonatal deaths. There is stagnancy and high level of perinatal mortality rate because of slow decline in early neonatal deaths in India.

To address these issues, the FBNC services at health centers need to be strengthened. SNCU is designed for premature children, low birth weight, sick, birth related complications or with some medical condition in early neonatal period to improve survival and decrease neonatal mortality

In 2015, there were 525 SNCUs in the country. Around 9159 beds were available in SNCUs of the country. Nearly 12,00,000 newborns were admitted in 2013-15, of whom 90% survived (MOHFW 2015). Inadequate transport facility, less number of doctors and beds, no mechanisms for repair of equipment on time and lack of follow-up after discharge are the usual challenges.

For the better functioning and operationalization of SNCU, there is urgent need of streamlining the activities of SNCU establishment like supervision, monitoring and evaluation and training of human resources. This study aims to assess SNCU of District Hospital, Madhubani in the state of Bihar.

CHAPTER -2

REVIEW OF LITERATURE

As per GOI guidelines, a hospital having 3000 deliveries will have 12 bed SNCU. SNCUs cater to sick new-borns delivered at health institutions and also to those delivered at home and referred by the community health workers. The sick new-borns are kept at the SNCUs for a variable period of time and discharged and followed up for care and compliance with discharge instructions by ANMs. This intervention by first increasing the knowledge and skills of ANMs, also promotes Kangaroo mother care and early child development practices.

India is presently saving additional 440 000 neonatal lives annually compared to the year 2000 (Gathwala, 2015). The JSY has ensured that an additional 12 to 13 million women are now delivering in government facilities each year with institutional delivery rate touching 80%.

Across the nation each year, the newly created SNCUs in the district hospitals provides care to more than 0.6 million newborn babies, mostly from poor families (Paul et al, 2016).

To avert each preventable neonatal death, will require not only promotion of current strategies and initiatives, but also formation and implementation of new innovations and programmatic approaches.

Facility-based newborn care is a key strategy to improve neonatal health. “The quality level II newborn care can be provided at the district level within the public-health system. Investment in neonatal care units is a resource-intensive exercise” (Negi et al, 2011). “In India, the establishment cost of a 12-bedded level II unit (Special Newborn Care unit - SNCU) in a district hospital is around 41,00,000 INR. This does not include the cost of training. The running cost (excluding salaries of staff) comes to 10, 00,000 INR (20,000 USD) per year. This is much less compared to what is incurred in developed nations making it highly cost effective” (Neogi, 2013). “With the introduction of SNCU, rate of admission has been increased along with a significant decrease in case-fatality rate and mortality due to asphyxia and prematurity” (Negi et al, 2011).

The SNCUs are a critical investment to curb the NMR in India. However, high load of admission, quality care gets compromised. The performance of SNCU can also be influenced by the admission policy of a unit. In many places, there was high dependence on the SCNUs, and 10 in many instances, due to societal pressure newborns were kept in SNCU just for observation. This often leads to sharing of beds (admission overload) which can cause increase in infection and decrease in quality of care. Arad et al, 2008, found that that even tiny premature outborn infant may share an outcome comparable with that of inborn babies, if adequate obstetric, perinatal and immediate neonatal care is provided.

The districts with weak SNCUs can imbibe best practices from the better counterparts through cross learning and improve further with help from mentors (experienced pediatricians, nurses) drawn from medical colleges and the private sector, even as their number is raised to meet the unmet need.

It aims to reduce inequities in maternal-neonatal care, strengthening techno-managerial capacity of programme teams and nurturing neonatal equipment industry. It also aims at revamping monitoring of vital neonatal-perinatal data and coverage indicators i.e. developing system to estimate trends in the burden of stillbirths, low birth weight, preterm deliveries; and to measure key indicators of coverage of maternal-neonatal health more frequently than at present and developing a roadmap to end all preventable neonatal deaths and stillbirths.

Facility based newborn care:

In 1994, a District Newborn Care Programme was introduced as a part of the Child Survival and Safe Motherhood Programme (CSSM) in 26 districts. Facility based newborn care (FBNC) in the public health system got a boost under NRHM with a nationwide creation of Newborn Care Corners (NBCC) at every point of child birth, Newborn Stabilization Units (NBSUs) at Community Health Centres and Special Newborn Care Units (SNCUs) at district hospitals.

According to MOHFW FBNC guidelines 2011 states that, “SNCU is a 12 bedded unit in the vicinity of a labour room, require at least one pediatrician or a trained doctor round the clock i.e. 3-4 trained doctors. Such a unit require 3 nurses in each shift, round the clock and a dedicated support staff. The staff posted must undergo FBNC training”. The criteria for admission, facilities and care must be followed for efficiency. (FBNC Guidelines 2011, NRHM)

In 2015, “there were 525 SNCU, 1,761 NBSU and 14,099 NBCC in the country. Around 9125 beds, were available in SNCU all over the country. Nearly 12,00,000 babies accessed SNCU care in 2013-15, from which 90% survived” (MOHFW 2015).

Less number of doctors and beds, and no mechanisms for repair of equipment on time are the common challenges. KMC has not been mainstreamed into the facility-based care. Socioeconomic inequity is one of the challenges.

With the initiative of state governments in developing “Special Care Newborn Units (SCNU) at District Hospitals, many of the sick neonates can be provided better newborn care if they are timely transported in a stable condition. Also transport from these SCNU to higher center should be made possible by a skilled transport team when necessary” (NNF Clinical Practice Guidelines, Pg. 322). Additionally, newborn discharged from the SNCU are untraceable after the discharge, due to absence of follow up and feedback system. There is no reliable follow up system for these newborn leading to nearly 10% newborn deaths after discharge within first year of life, many of them having growth failure and developmental delays.

Thus, assessment of these facilities is necessary to evaluate the availability and utilization of services and improve quality.

CHAPTER -3

METHODOLOGY

3.1 Research Objectives

1. To find out the resource availability status in SNCU.
2. To find out the percentages of inborn/outborn babies according to their place of birth, age, sex, birth weight and morbidity profile being admitted in SNCU?
3. To ascertain the patient outcome and performance of SNCU in terms of Case Fatality Rate, discharge rate and morbidity profile indicators of neonates and its differentials

3.2 Research Questions

1. What are gaps of the resources (infrastructure, human resources and essential equipment) available at SNCU as compared to the prescribed standard FBNC guidelines?
2. What is the pattern of service utilization of SNCU at DH, Madhubani?
3. What is the status of selected patient outcome and performance of SNCU in terms of Case Fatality Rate (CFR), average length of stay, discharge rate and mortality profile of neonates?

3.3 Conceptual Map

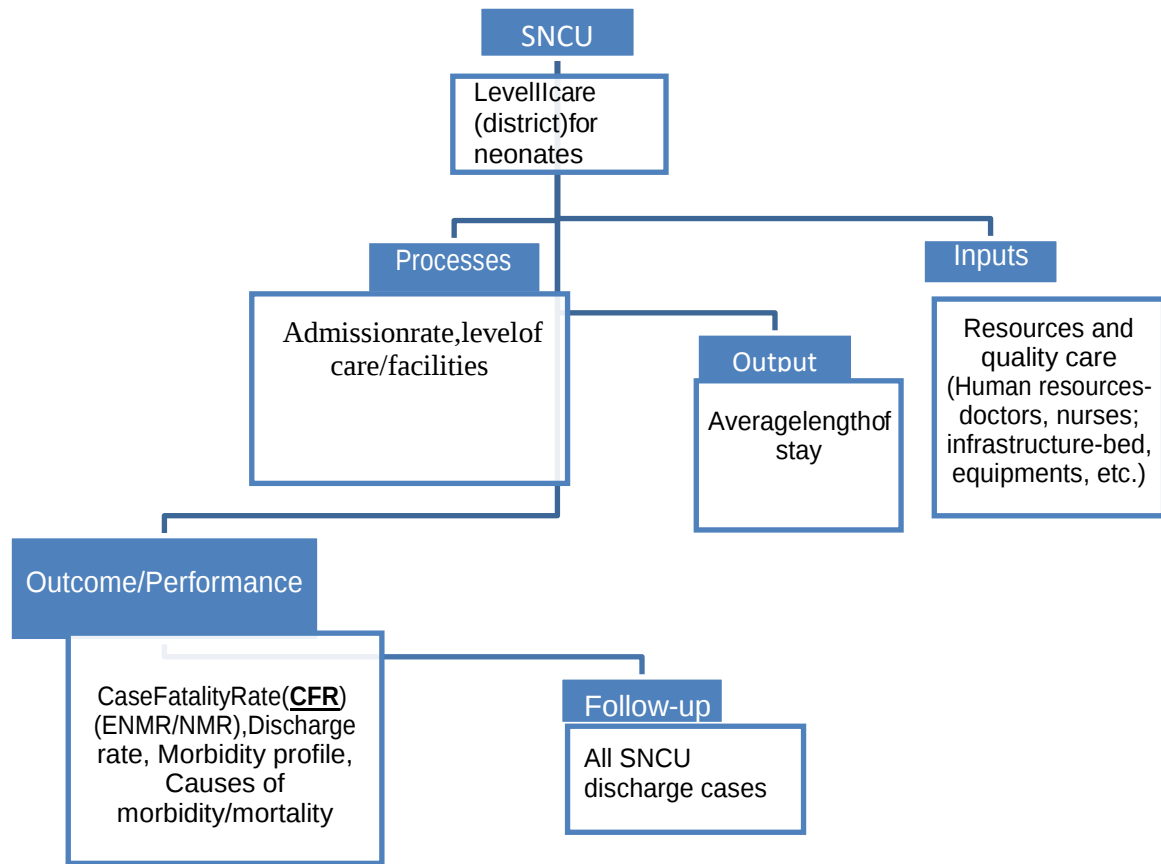


Fig No 2- Conceptual Map

The conceptual map provided the basic framework for this assessment study and includes three major components i.e. input, output and outcome.

3.4 Study area

Madhubani District, Bihar was selected for the purpose of assessment study

3.5 Study Period

Study was done from period April'18 to March'19

3.8 Study Population

All SNCU of DH, Madhubani, Bihar

3.9 Study Design

It is a descriptive study based on documents review.

3.10 Sampling Design

Sample size: Records of all children admitted to SNCU from period April'18 to March'19 were studied.

Sources of Data: Hospital/SNCU Records (Monthly SNCU reports/Admission registers/Stock registers) including past records

3.11 Methods of data collection

Review of relevant documents were done. Secondary Data from hospital records was used for analysis.

Quantitative information was collected on the resources inputs provided and available with SNCU unit and performance of unit was measured in terms neonatal mortality and morbidity indicators.

3.12 Tool of data collection

Checklist and structured questionnaire were developed from FBNC guideline for study.

3.13 Data Analysis Plan

Indicators related to following aspects were estimated in this study are-

- Service Utilization Indicators includes- percentage of inborn/outborn babies according to their place of birth, age, sex, birth weight and morbidity profile being admitted in SNCU.
- Outcome variable is the average length of stay, discharge rate and mortality profile of neonates.
- Data analysis was done in Microsoft Excel.
- Analysed data was presented in percentage, bar graph and pie charts.

3.14 Ethical consideration

Permission from the respective Head of Department at the facility was duly received. The informed consent from staff and patient were obtained after explaining the purpose of research in detail.

Extreme care was exercised to follow asepsis guidelines at SNCUs, hospital decorum and not to disturb the hospital environment. All the information provided by the facility has been kept in strict confidence and has been used for academic purposes only. Nowhere in the study or elsewhere, has the name of the respondents has been mentioned to maintain anonymity and confidentiality.

3.15 Limitation of the study

The sample size of the study is limited to one SNCU, hence generalization of the study is not possible. Also, the study is quantitative in nature and the underlying understanding of cause of infrastructure deficit and mortality is beyond the scope of this study.

However, personal observations and interaction with staff and patients is done for missing data.

CHAPTER - 4

ANALYSIS, DISCUSSION AND RECOMMENDATIONS

4.1 Analysis

The data was collected manually from facility and then entered into Microsoft Excel sheet for reproduction of graphs and charts.

Descriptive analysis was used to describe the characteristic of the findings and the individual level data was aggregated to perform analyses. Final data was analysed using Microsoft Excel. Graphical pie chart and bar charts were used for analysis and were observed for obtaining findings.

The research findings were correlated with the available data and inferences were made based upon them. Finally, the overall conclusion was made based on inferences and discussion.

4.2 Findings

1. Distribution of neonates based on place of birth and gender

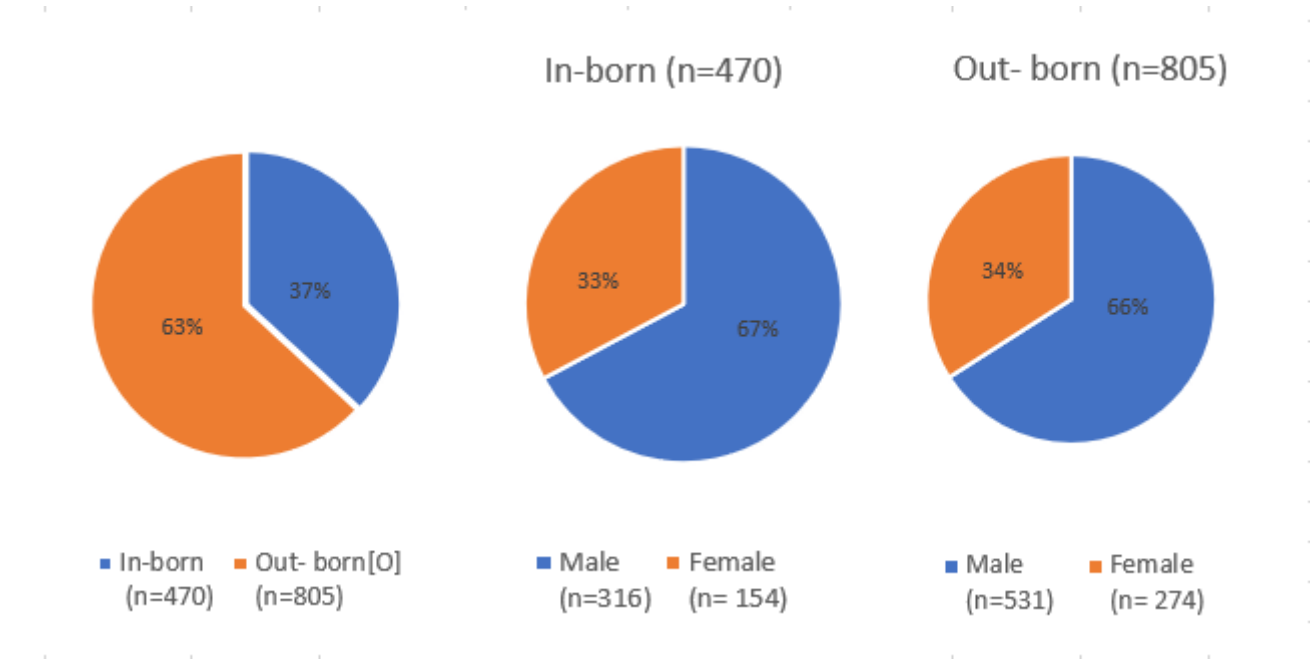


Fig No 3- Distribution of neonates based on place of birth and gender

Among the total admitted children, 63 percent are outborn and 37 percent are inborn. Among inborn, 67 percent are male while 33 percent are females. Similarly, among outborn children, 58 percent are males and 42 percent are females.

Inference: The proportion of male children is higher as compared to female children.

2. Distribution of neonates based on birth weight

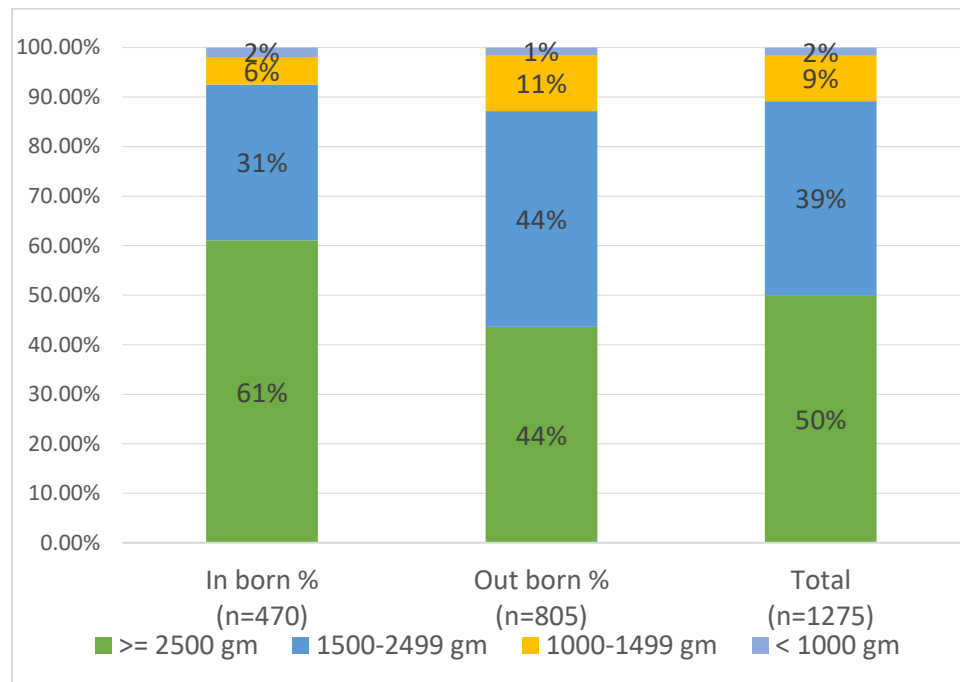


Fig No 4.- Distribution of neonates based on birth weight (%)

Among total inborn admissions, 61 percent neonates are more than 2500 g, 31 percent weigh between 1500-2499 g and 8 percent weighs less than 1500g.

Among total outborn admissions, 44 percent neonates are more than 2500 g, 44 percent weigh between 1500-2499 g and 12 percent weighs less than 1500g.

Inference: About 50 percent of total admitted children are LBW, including 11 percent which are VLBW children.

3. Distribution of neonates based on gestational age

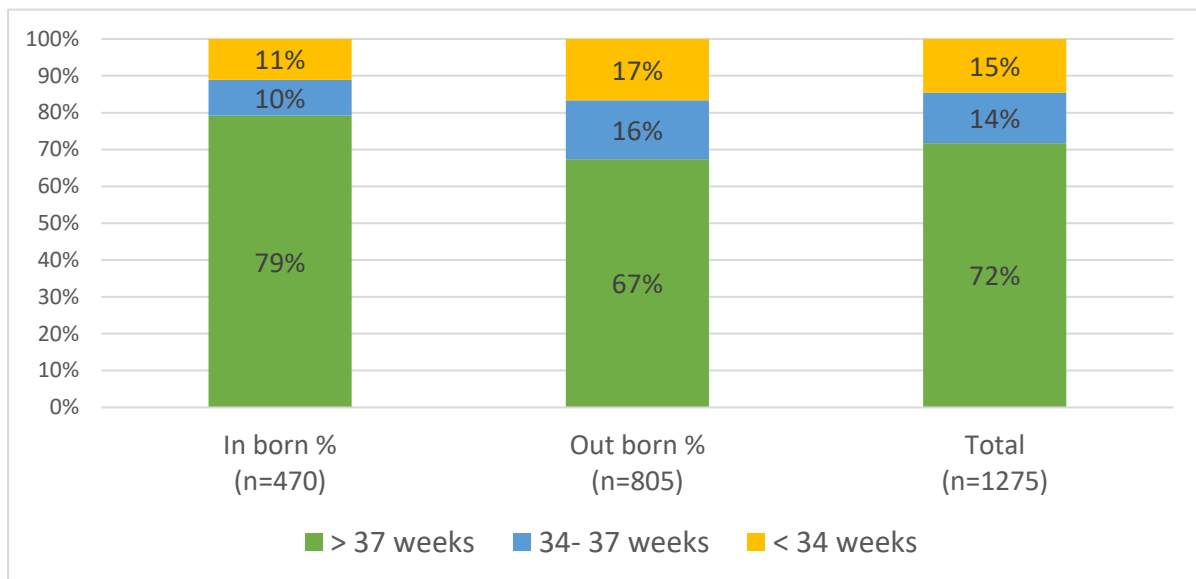


Fig No 5. Distribution of neonates based on gestational age

Out of total admitted neonates, 72 percent are of more than 37 weeks gestational age, 14 percent are between 34-37 weeks and 15 percent are below 34 weeks of gestational age.

Inference: About 29 percent of total admitted neonates are below normal gestational age, including 15 percent premature babies who most likely require intensivecare.

4. Distribution of neonates based on morbidity profile

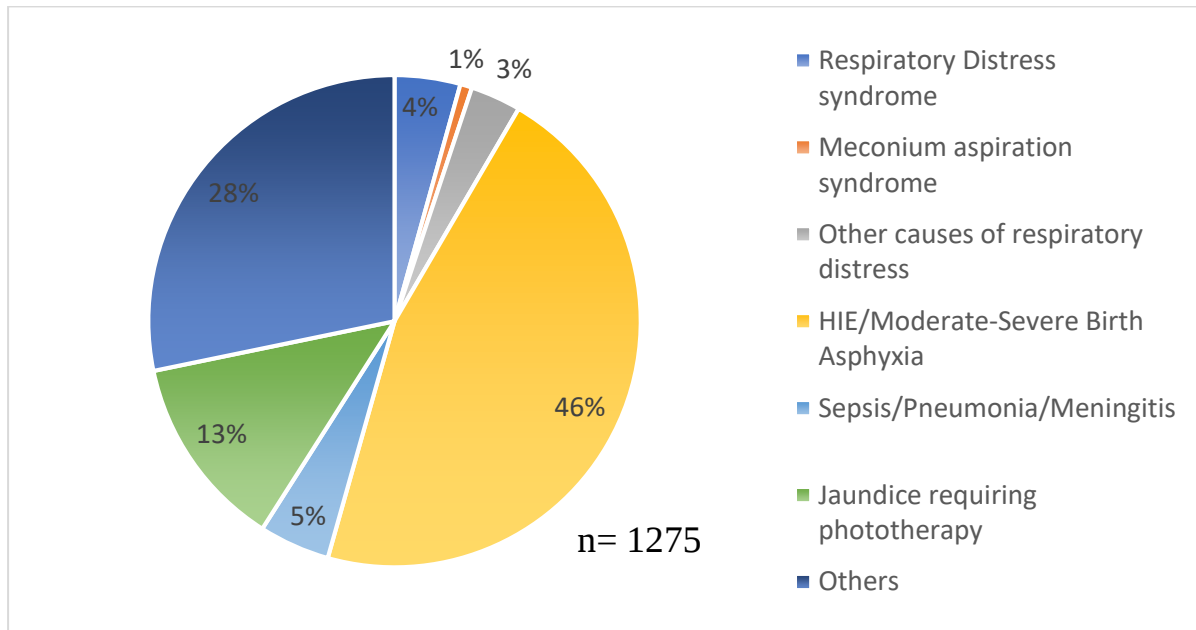


Fig No 6- Distribution of neonates based on morbidity profile

The most common cause of admission in SNCU is birth asphyxia (46 percent), followed by other causes (28 percent), jaundice (13 percent) and sepsis (5 percent)

Inference: Asphyxia, sepsis and jaundice are among the major cause of admission in SNCUs

5. Distribution of neonates based on duration of stay

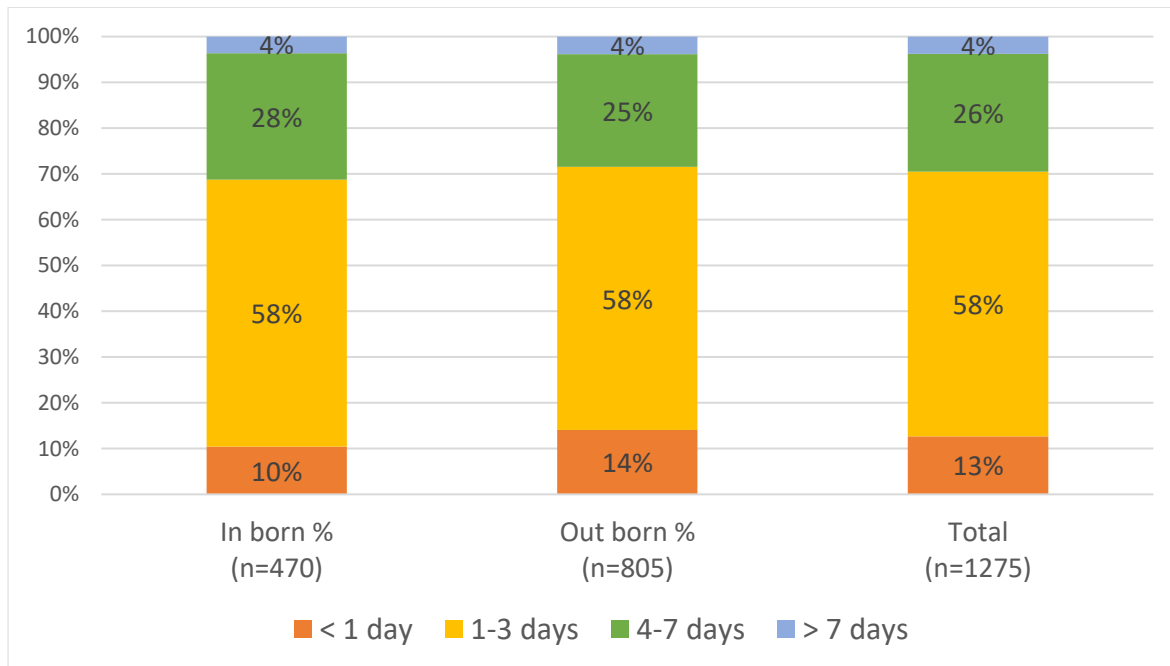


Fig No 7- Distribution of neonates based on duration of stay

Majority of the neonates admitted have duration of stay between 1-3 days (58 percent), followed by 4- 7 days and more than 7 days (30 percent each) and less than one day for 12 percent of neonates.

Inference: Most of the children require short duration of care from 1-3 days, while children requiring more than seven days of care constitute only 24 percent of total admission.

6. Distribution of neonates based on outcome of Inborn and Out born Admissions

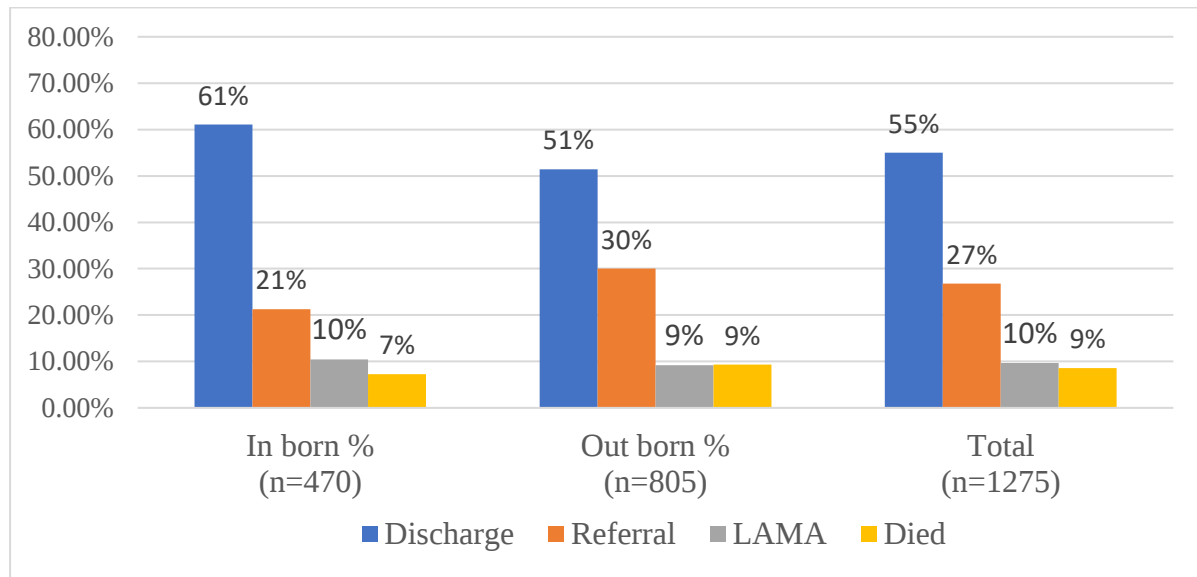


Fig No 8- Distribution of neonates based on outcome of inborn and out born admissions

Among inborn admissions, 61 percent patients were discharged safely, whereas referral and LAMA (Leave against Medical Advice) cases are 21 and 10 percent each. Only 7 percent of admitted neonates could not be saved due to several reasons and complications.

Among outborn admissions, 51 percent patients were discharged, 8 percent LAMA and 5 percent were referred to higher facilities. Eleven percent patients did not survive.

Inference: Mortality rate among admitted neonates is 7 percent for inborn patients and 9 percent among outborn admitted neonates, which is higher than inborn admissions.

7. Distribution of neonates based on mortality according to admission weight

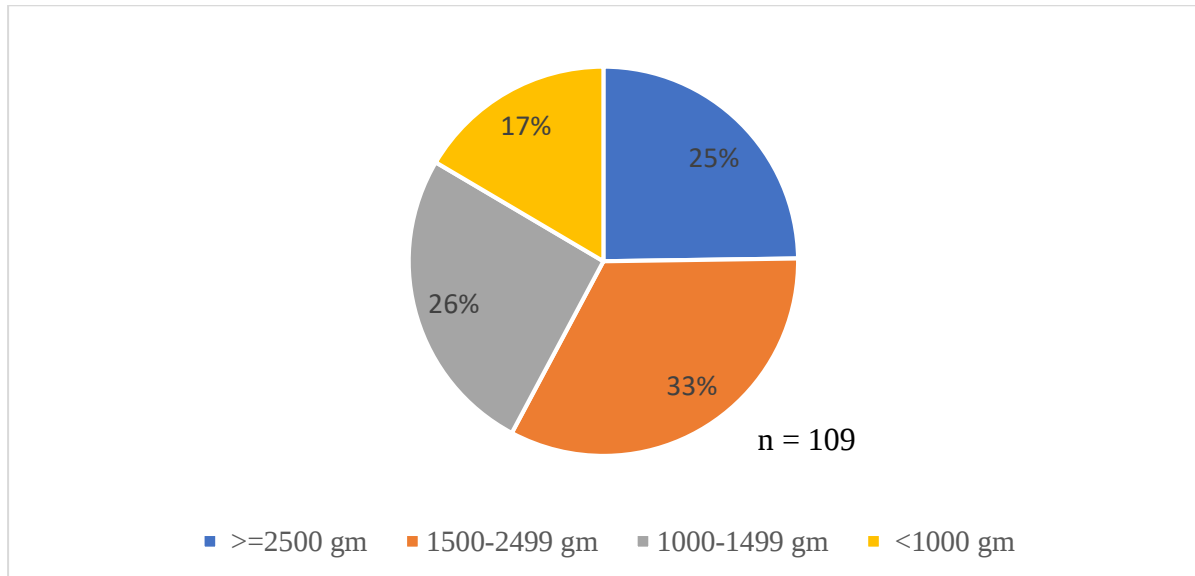


Fig No 9- Distribution of neonates based on mortality according to admission weight

Among total deaths, less than 43 percent were VLBW (below 1500 gm), 33 percent LBW and 25 percent were normal weight children with more than 2500 g weight.

Inference: LBW and VLBW children are at higher risk of mortality as compared to normal birthweight children

8. Distribution of neonates based on mortality causes of inborn and outborn admissions

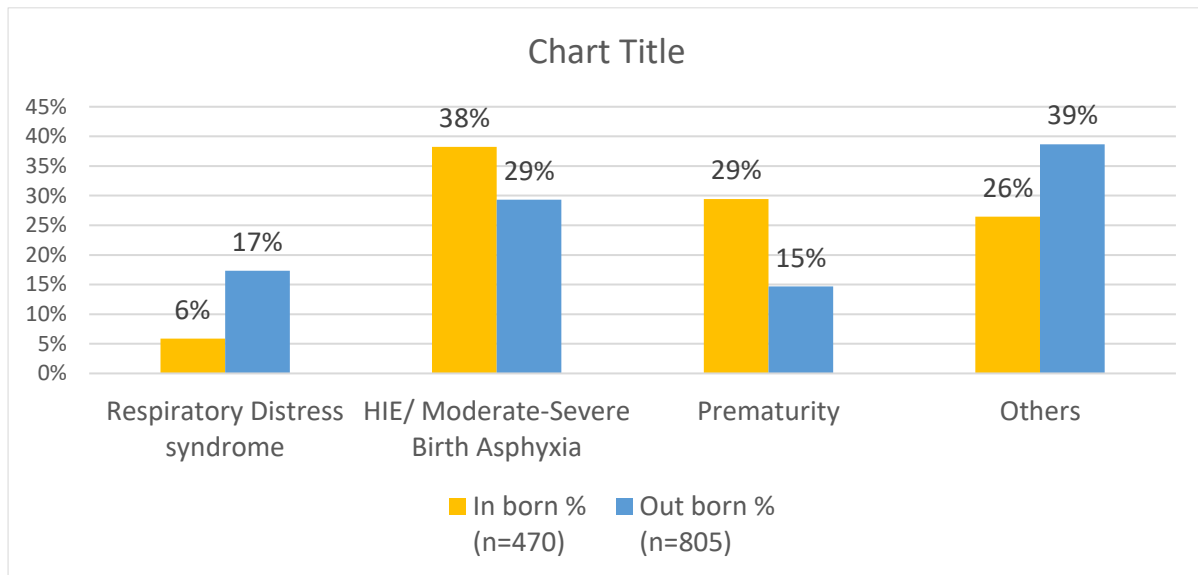


Fig No 10- Distribution of neonates based on mortality causes of inborn and outborn patient (%)

The cause of mortality among inborn was mainly asphyxia (38 percent), followed by prematurity related complications (29 percent), other reasons (26 percent), and respiratory distress syndrome (6 percent).

Causes of mortality among outborn patients was mainly other reasons (39 percent), followed by asphyxia (29 percent), by respiratory distress syndrome (17 percent) and by prematurity related complications (15 percent).

Inference: Asphyxia and prematurity constitutes more than 67 percent of total inborn mortality and majority of outborn patient mortality is due to asphyxia and other reasons.

9. Distribution of neonates based on age of neonates at death

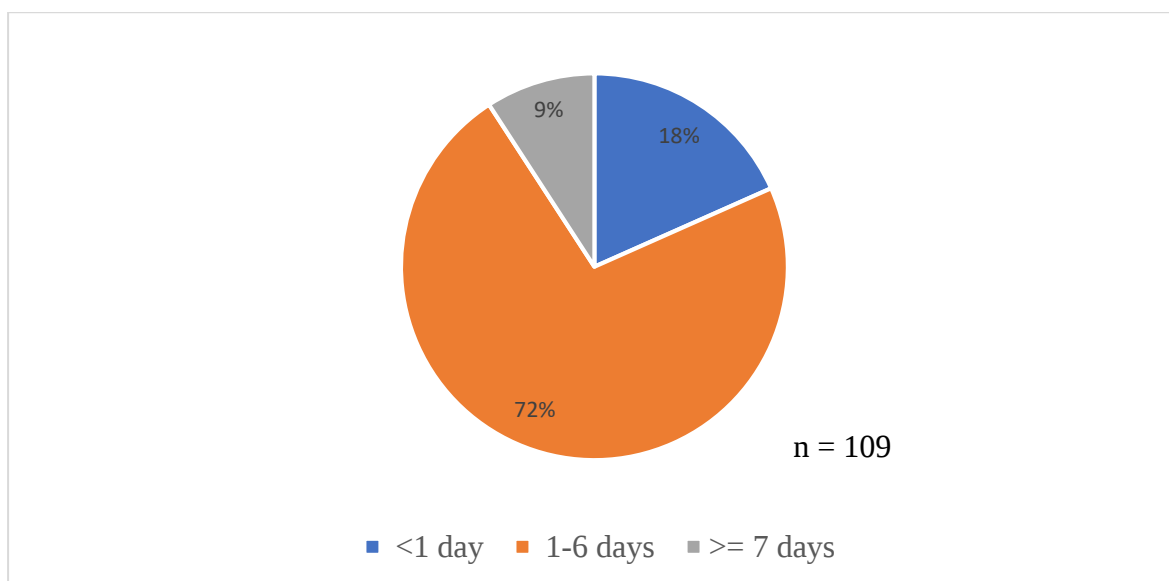


Fig No 11- Distribution of neonates according to age at death

Most of the neonatal mortality was observed within 1-6 days (72 percent), followed by less than one day (18 percent), and more than one day (9 percent).

Findings

1. Outborn admissions were more than inborn admissions (~60:40). Both groups were predominated by newborns that were male, normal birthweight, and full term.
2. Outborn and inborn admissions were majorly because of asphyxia followed by other causes. and jaundice. Both groups outcome was similar to each other. Around 12% of newborns left the SNCU on 1st day followed by another 58% in 1-3days.
3. Higher proportions of deaths were observed in inborn admissions having birth related complications and prematurity causes accounting for about 67% of thecases.
4. Intra-state variations were predominant for proportion of outborn admitted to the SNCUs and duration ofstay.
5. Nearly 18 percent of children died within one day. This is lesser than national average (24%), but it is still significant.

Table 2- Service Availability

S. No.	Question	Facility
1	24-hour delivery and newborn care coverage	es
2	24-hour duty roster observed and staff present onsite	o
3	Availability of essential newborn care services	es
4	Resuscitation services	es
5	Thermal care services	es
6	Breast feeding support services	es
7	Provision of referrals	es
8	Provision of 24-hour coverage for new-born care services	es
9	24-hour skilled person availability, on call	es
10	Availability of immunization services	es
11	Availability of essential laboratory services	es(Partial)

Observation: SNCU provided all facilities for essential and special newborn care services. According to NNF guidelines, the doctor must be available 24 hour round the clock for quick intervention in case of emergency. However, the doctors were available only on-call in case of emergency and night in facility.

Laboratory services were only available from 8 am to 4 pm till the OPD timing. After that, patient has to rely on private labs for test.

Table3- Human Resources

S. No.	HR	Facility	Standard
1	Paediatrician	3	3
2	Nurses	12	14
3	Support Staff	2	4
4	Data Manager	1	1
5	Lab technician	0	1
6	Guard	0	1

Observation: The human resource availability at SNCU was found to be adequate. However, as opposed to recommended dedicated faculty, the doctors were also serving paediatric department along with SNCUs, thus sharing time. The nurses, however, were deployed exclusively for SNCU.

Support staff were less in number as compared to sanctioned post

There was no lab technician available for the SNCU

Table4- Infrastructure, Equipment andSupply

S. No.	Infrastructure	Facility
1	Number of inpatient beds	12
2	Beds dedicated to newborn care	12
3	Availability of functional ambulance or other vehicle on-site for referrals	Yes
4	Availability of a mechanism or a system to make phone calls that is available all the time that client services are being offered. E.g. landline, mobile, etc.	No
5	Availability of 24-hour electrical supply (Check to see if electricity can be turned on)	Yes
6	Availability of a backup or a stand-by generator for electricity	Yes
7	Availability of Safe water source with sufficient amount for hand washing	Yes
8	Water outlet within 500 meters of the facility	No
9	Presence of on-site running water	Yes

Observation: Facility was reported to have adequate infrastructure, equipment and supplies. However, was not having proper drainage system due to which there is issue of water logging in the near-by areas.

Table6- Equipment andSupplies

S. No.	Item	Facility	Standard
Monitoring Equipment			
1	Stethoscope with neonatal chest piece	6	12
2	Non-invasive BP monitors	0	1
3	Heart Rate/Apnoea monitor	2	4
4	Pulse oximeter	4(NF)	6
5	Low reading clinical thermometer	3	4
6	Room thermometer	2	12
7	Electronic baby weighing scale	3	4
8	Mechanical baby weighing scale	0	0
Equipment for management			
1	Radiant warmer	13	12
2	Phototherapy unit	5	6
Resuscitation equipment			
1	Self-inflating bag	3	4
2	Foot operated suction pump/mucus trap	1	2
Oxygenation facility			
1	Centralised	Yes	Yes
2	Oxygen cylinders	12	0
3	Concentrator	5(NF)	4
Equipment for investigation			

1	Micro-haematocrit (Hemoglobinometer)	0	1
2	Dextrometer	5	3
General Equipment			
1	Generator	1	1
2	Invertor	0	1
3	Washing machine	1	1
4	Computer	1	1
5	Wall clock with 'seconds' hand	1	2
6	Spot lamps	0	2
7	Air conditioner	10	1
8	Autoclave equipment	1	1

Observation: Facility was found to have most of the equipment and supplies. Centralised oxygenation facility was available. Other missing instruments included Low reading clinical thermometer, room thermometer, stethoscope, spot lamps, computer, inverter, Hemoglobinometer and foot-operated mucus trap.

CONCLUSION

Gaps, we found for strengthening of SNCU is crucial to address neonatal mortality and Infant mortality. This study emphasized an utmost need of high skill building training of health personal posted in SNCU with practice of skills in resuscitation is also critical. Availability of functional equipments, optimal skills to use equipments will be important to decrease NMR. Essential equipments and facility-based care are proven interventions for reducing NMR, IMR and still birth rate among sick newborns; it is mandatory public health facility be equipped and made proficient in skills those are employed in SNCU.

There is also a need to review the quality of care at functional SNCU . Periodic inspection and audit are required to assess the availability and functioning of these units. This will help in channelizing resources more efficiently.

RECOMMENDATIONS

- Promoting partnership with private sector in providing human resource.
- Training of all staff (Doctors and nurses) should be in a regular interval with evaluation of training
- Hiring of human resources of lab assistants, guard and support staff should be done as soon as possible.
- Lab services should be provided at the SNCUs.
- Equipment is major part for functioning of SNCU and delay in repair should be minimized as soon as possible, There should be right policy to facilitate maintenance of equipment.
- The government must work on patient trust, most of the parents don't rely on public health facility services.
- Ensure the quality of care and follow up of the babies after discharge from the SNCU.

Appendices

Annexure 1.1: Reporting format for newborn facility

All new born care facility should submit a Monthly/ quarterly report to the Distt. NBCCs will only fill in section A, while section A, Band C will be filled in from all SNCUs. Compiled report from all new-born care facility in the Distt. Should be forwarded to the State.

State

District:

Reporting period

Name and address of the Health Facility

Contact person

No. Of Beds

Date of Operationalization

Type of Unit :

Section A

Section to be filled from labour room & OT records (as applicable)			
Sl. No.	Total Number	[N]	
1	Total Deliveries		
2	Caesarean sections		
3	Live birth		
4	Still Births		
4a	Fresh		
4b	Macerated		
5	Term Babies		
6	Birth weight of babies		
	>2500gm		
	<2500gm		
	1500-2499g		
	1000-1499g		
	<1000g		
7	Preterm births (Gestation)		
	>37weeks		
	<37 weeks		
8	No. Of newborn who required resuscitation at birth		
9	Total No. Of newborn deaths		
10	No. Of referrals made (to higher facilities)		

Section B

Section B to be filled from the special newborn care unit/Newborn Stabilization Unit records			
Sl. No.	Total Number	Inborn [I]	Outborn [O]
7	Admission in the unit		
7a	Male		
7b	Female		
8	Birthweight/weight at admission*Inborn-Record the birthweight Outborn-Record birthweight if available, if it is not available, record and report weight at admission		
8a	>2500g		
8b	1500-2499g		
8c	1000-1499		
8d	<1000g		
9	Gestation		
9a	>37 weeks		
9b	34-37 weeks		
9c	<34 week		
10	Morbidity profile		
10a	Respiratory distress syndrome		
10b	Meconium aspiration syndrome		
10c	Other causes of respiratory distress		
10d	HIE/Moderate-severe birth asphyxia		
10e	Sepsis / Pneumonia/Meningitis		
10f	Major congenital malformation		
10g	Jaundice requiring phototherapy		
10h	Hypothermia		
10i	Hypoglycemia		
10j	Others		
11	Management (no. Of babies who received)		
11a	Phototherapy		
11b	Antibiotics		
11c	Oxygen		

12	Step down care		
12a	No. Of babies managed in the unit from postnatal ward/step-down		
12b	No of babies managed in the step down from SNCU		
13	Outcome		
13a	Discharge		
13b	Referral		
13c	Left against medical advice (LAMA)		
13d	Died		
14	Duration of stay		
14a	<1 day		
14b	1-3 days		
14c	4-7 days		
14d	>7 days		
Sl. No.	Total Number	Inborn [I]	Outborn [O]
14e	Average duration of stay		
15	No. Of non-functional equipment (Non-functional equipment=not working>7 days/month		
15a	Phototherapy unit		
15b	Radiant warmer		
15c	Oxygen concentrator		
15d	Suction machine		
15e	Generator/Invertor		

Section C

Section C to be filled from the special newborn care unit/Stabilization Unit death records			
Sl. No.	Total Number	Inborn [I]	Outborn [O]
16	Mortality profile (Cause of death)		
16a	Respiratory distress syndrome		
16b	Meconium aspiration syndrome		
16c	HIE/Moderate- Severe birth asphyxia		
16d	Sepsis/Pneumonia/Meningitis		
16e	Major congenital malformation		
16f	Prematurity		
16g	Others		
16h	Cause not established		
17	Duration between the time of admission & death		

17a	<1 day		
17b	1-3 days		
17c	4-7 days		
17d	>7 days		
18	Age at death		
18a	<1day		
18b	1-6 days		
18c	> 7 days		
19	Birthweight/weightatthetimeof death		
19a	>2500 g		
19b	1500-2499 g		
19c	1000-1499g		
19d	<1000g		
20	Gestation		
20a	Term		
20b	Preterm		
20c	Post term		

Checklist Tool for SNCU

1. Total number of deliveries(Male/Female)
2. Gestation period (normal ≥ 37 weeks)
3. Proportion of newborn with birthweight of 1,500- 2,499 g/100 admissions (normal birth weight of child ≥ 2500 gm)
4. Proportion of newborn with birthweight of $< 1,500$ g
5. Total Low birth weightchildren
6. Number of children in need for assisted ventilation atbirth
7. Total Stillbirths
8. Number of admissions (Male/Female)
9. Rates of admission (n/total number of livebirths in the hospitals as the denominator)
10. Admissions(Inborn/Outborn)
11. Admissioncriteria
12. Profiles of newborn admitted toSCNUs
13. Inputs (Infrastructure, human resource,equipment)
14. Adequacy and availability of essential equipment (such as radiant warmers, phototherapy units, weighing machines, oxygen concentrators, generator, and air conditioners and their functionalstatus)
15. Availability and adequacy ofbeds

16. Availability of human resources (doctors and nurses)
17. Maintenance of asepsis
18. Bed: doctor ratio, bed: nurse ratio, average duration of stay, bed occupancy rate.
19. Triangulation by observation and beneficiary feedback (the mothers were encouraged to narrate the instructions given before entering the SCNU and their adherence to those instructions)
20. Secondary data of SNCU is compared regarding total admissions and mortality rate.

Sl No	Indicator	Numerator	Denominator
1	Inborn admission rate — Proportion of inborn babies admitted in the unit	Total number of inborn babies admitted	Total number of live births
2	Proportion of admissions which are in-born	Total number of inborn admissions	Total number of admissions
3	Proportion of admissions which are out-born	Total number of out-born admissions	Total number of admissions
4	Proportion of admissions by gender	Total number of males admitted	Total number of admissions
		Total number of females admitted	Total number of admissions
5	Proportion of low birth weight babies	Number with birth weight < 2500 g	Total number of admissions
6	Proportion of very low birth weight babies	Number with birth weight < 1500 g	Total number of admissions
7	Proportion of newborn deaths among inborn	Total number of inborn deaths	Total number of deaths
8	Proportion of newborn deaths among out-born	Total number of out-born deaths	Total number of deaths
9	Case fatality Rates • Respiratory distress syndrome (RDS) • Meconium aspiration syndrome (MAS) • Hypoxic-ischemic encephalopathy (HIE/ moderate/severe birth asphyxia(BA) • Sepsis/pneumonia/meningitis • Major congenital malformation • Prematurity	Number of newborn deaths due to RDS	Total number of deaths
		Number of newborn deaths due to MAS	Total number of deaths
		Number of newborn deaths due to HIE/BA	Total number of deaths
		Number of newborn deaths due to sepsis/pneumonia/meningitis	Total number of deaths
		Number of newborn deaths due to congenital malformation	Total number of deaths
		Number of newborn deaths due to prematurity	Total number of deaths
10	Antibiotic use rate in inborn	Number of inborn who received antibiotics	Total inborn admissions
11	Antibiotic use rate in out born	Number of outborn who received antibiotics	Total outborn admissions
12	Average length of stay	Sum of days/hours of stay	Total number of newborns
13	Equipment breakdown rate ^s (Radiant warmer, phototherapy units, oxygen concentrator)	No. of days or hours of breakdown each month	Total days or hours in use

(Source: FBNC Guidelines 2011, NRHM)

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