

**Summer Training at
CARE India Solutions for Sustainable Development, Bihar**

**Assessment of Special Newborn Care Unit in Bihar: Observational Cross-
Sectional Study**

**By
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**Under the guidance of
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**MBA Hospital & Health Management
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The IIHMR University, Jaipur
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CERTIFICATE

This is to certify that **Mr. Kirtee Anand** has undergone summer training at **Concurrent Measurement and Learning(CML) unit, CARE India Solutions for Sustainable Development(CISSD), Bihar Technical Support Programme(BTSP)** in **Patna** from **9th April to 2nd June 2018**.

The candidate himself completed the project assigned to him during summer training. His approach to the project was sincere and proactive. This summer training is in partial fulfillment of the course requirement recommended for the award of MBA in hospital and healthcare management.

I wish him success in all his future endeavors.



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TO WHOM IT MAY CONCERN

This is to certify that **Mr. Kirtee Anand** student of **MBA (hospital and health management), IIMR University, Jaipur** has successfully completed his Summer Training Project on the “**Assessment of Special Newborn Care Unit in the public healthcare facilities of Bihar**” at **Concurrent Measurement and Learning (CML) unit, CARE India Solutions for Sustainable Development (CISSD), Bihar Technical Support Program (BTSP), Patna** from **9th April, 2018 to 2nd June, 2018**. The Candidate has successfully carried out the study/tasks assigned to him during this training. We found him sincere, intelligent and hardworking. We wish him all the best in his future endeavors.

Sincerely,

Dr Tanmay Mahapatra
Team Lead, CML Unit
CISSD-BTSP

Dr Anup G Nair
Deputy Director – HR and OD
CISSD-BTSP

Acknowledgements

“leadership and learning are indispensable to each other”

by John F. Kennedy

The summer training opportunity I had with Care India was an enriching experience, it was a great chance for learning and professional development. It helped me develop an ability to understand healthcare issues from various perspectives.

Bearing in mind the previous, I would like to take this opportunity to express my deepest gratitude and special thanks to my mentor, Dr. D.K. Mangal, Dean(Research) IIHMR University, Jaipur for guiding and keeping me on the correct path throughout the two months of internship.

It is my radiant sentiment to place on record my best regards, deepest sense of gratitude and indebtedness to Dr. Tanmay Mahapatra, Team Lead CML, Care India, Patna for his immense support and faith and for allowing me to carry out the study with ease at his esteemed organisation during the internship.

I would like to gratefully acknowledge Dr. Sunil Sonthalia, MLE Manager(Facility) CML, Care India, Patna whose deep sharing, and cooperation has moved me many levels beyond our own thinking.

Furthermore, I would like to express my deepest thanks to Kunal Ranjan (Officer-Data analysis), And Ankit Asst. Manager(facility) CML, Care India, Patna for providing me with her experiences and all the required information that helped me with my study.

Special thanks to the CML Team, DTLs, CAF Team and Block managers for supporting me throughout the Field visit. Contribution of DMOs of all the districts was magnificent.

I perceive the opportunity as a big milestone in my professional development. I will strive to use the gained skills and acknowledgement on the best possible way, and will continue to work on their improvement, to attain the desired career objectives.

Sincerely,

Kirtee Anand

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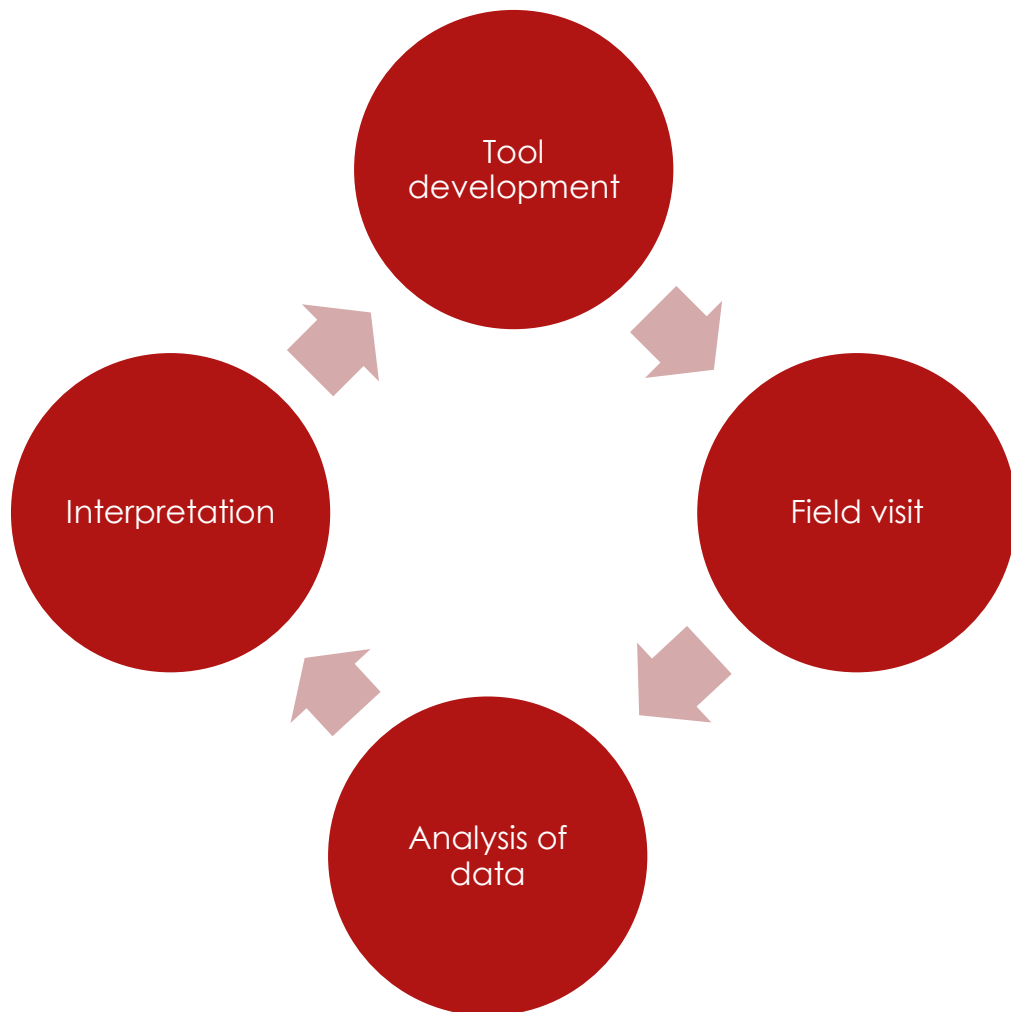
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Abbreviations

AMC -Annual Maintained Cost	LBW -Low Birth Weight
ANM - Auxiliary Nurse Midwife	MAS -Meconium Aspiration Syndrome
ANC - Antenatal Care	MCH -Maternal and Child Health
BA -Birth Asphyxia	MDG -Millennium Development Goals
BP -Blood Pressure	ML -Millilitre
CFL -Compact Fluorescent Light	MOHFW - Ministry of Health and Family Welfare
EBM -Expressed Breast Feeding	MVA -Manual Vacuum Aspiration
ELBW - Extremely Low Birth Weight	NBCC - Newborn Care Corner
FBNC -Facility Based Newborn Care	NBSU -Newborn Stabilization Unit
F-IMNCI -Facility Based Integrated Management of Neonatal Childhood Illness	NIBP -Non-Invasive Blood Pressure
GIR -Glucose Infusion Rate	NMR -Neonatal Mortality Rate
GOI -Government of India	NNF -National Neonatology Forum
HEP-B -Hepatis B	NRHM -National Rural Health Mission
HIE -Hypoxic Ischemic Encephalopathy	NS -Normal Saline
HR -Heart Rate	NSSK -Navjat Shishu Suraksha Karyakram
IAP - Indian Academy of Paediatrics	OPV -Oral Polio Vaccine
IMNCI - Integrated Management of Neonatal and Childhood Illness	OT - Operation Theatre
IMR -Infant Mortality Rate	PHC -Primary Health Center
IANN -Indian Association of Neonatal Nursing	RCH II -Reproductive Child Health Programme II
IV -Intravenous	RDS -Respiratory distress Syndrome
IVF -Intravenous Feeding	SNCU - Special Newborn Care Unit
JSY -Janani Surakhsha Yojana	SRS – Sample Registration System
KCL -Potassium Chloride	U5MR – Under-5 Mortality Rate
KG -Kilogram	VLBW – Very Low Birth Weight
	WHO - World Health Organisation

Observations

In summer training programme I was placed in CML department of CARE India solutions for sustainable development. In CML as I observed there were kind of tasks related to health programme as Tool development, field visit, analysis of data and interpretation in CML, this is cyclic process CML department work for each assigned programme and do the same process for each programme which is funded by government or foreign agency. For receiving the health programme, CML department sends research proposal to the funding agency. there was running an observational study related to the assessment of SNCU, NBSU, Paediatric Ward, Blood Bank, Blood Storage Unit in all districts of Bihar. Fortunately, I was part of this same study some of the tasks were given to me and field visit also provided.



Tool Development:

In this process, CML team develop the tools related to health programme or various type of study. Firstly they read programme guideline thoroughly related to the assigned project, find the things on which they can make the tool to find the gap of study or purpose of study after that they do tool testing, review on problems those are occurring in the field and lastly makes changes in the tool.

Field visit:

This is another part of cyclic process in this task CAF (Clinical Assessment Facilitator) teams go to the field for data collection. I went to field visit with CAF and 6 districts were assigned to us for data collection. I observed the SNCUs of some districts they admit newborn (0-30 days) and provide special newborn care to newborns, triage area, human resource, machinery and types of equipment, records of admission, intramural and Extramural ward. SNCU was close to labour ward.

Analysis of Data:

After collecting data from CAF teams, data is transferred in CML server and they analysed it within 25 days. First, they are inspecting, cleansing data in SPSS and Microsoft Excel and transform data in meaningful information.

Interpretation of result:

In this process, CML team work on finding of the study and interpret the result in a way that Funding agency and government can understand of their achievement. CML team make a report of every health programme on which they work and share it with the concerned agency as well as in their achievement.

Findings:

- For 2 months training I didn't find any major critical factor that affects functioning of CML department.

Conclusive Learning:

In initial days of training I learned how does make tools for related study and operations of CAPI, and tools testing. In field visits I learned lots of things about SNCU, NBSU, Paediatric Ward, Blood Bank and Blood Storage Unit, how information is collected from health personnel of public health facility, learned making situational report of the unit that finds gap between data and observation, drawing layout of units. During last days of training I learned inspecting, filtering and analysing of data and how does interpret the result of study or programme. At the end how does summarize review of literatures on single topic.

Limitation:

- **Not much involvement while tool was being prepared.**
- **Not much involvement in analysis of running study.**
- **Not much aware other functions of CML.**

Suggestions:

- **Interns should be fully involved in tool preparation.**
- **Interns should also be involved in data analysis and result interpretation.**
- **Interns also a part of organization and should know much about organization and all functions of organization.**

CARE India

CARE has been working in India for over 65 years, helping alleviating poverty and social exclusion by facilitating empowerment of women and girls from poor and marginalized communities. In India, CARE focuses on the empowerment of women and girls because they are disproportionately affected by poverty and discriminations; and suffer abuse and violations in the realization of their rights, entitlements and access and control over resources. They do this through well planned and comprehensive programmes in health, education, livelihoods and disaster preparedness and response.

To be able to bring about lasting change, CARE India addresses underlying causes of poverty and social injustice. For example, they implement a gender transformative framework within their programmes to address unequal power relations at the grassroots level.

CARE in India works across 14 States and 38 projects, touching the lives of 37 million people. Some of the notable initiatives of CARE India are:

- CARE India response on Cyclone Phailin hit on the Eastern Coast of India.
- CARE India Tsunami relief programme.
- CARE India response to floods in Uttarakhand.

CARE India has been working extensively in different parts of India. They work with grassroots initiatives, state and district governments, and communities and individual from all over the country. As of now, CARE India is present in 14 states of India, with the head office being in Delhi

Vision and Mission

Their vision is to seek a world of hope, tolerance and social justice, where poverty has been overcome and people live in dignity and security. CARE will be a global force and partner of choice within a worldwide movement dedicated to ending poverty and will be known everywhere for its unshakeable commitment to the dignity of people.

Program Goals

Women and girls from the most marginalised communities are empowered, live in dignity and their households have secure and resilient lives. CARE India aims to accomplish this goal by working with 50 million people to help them have quality health, education, livelihoods and overcome the effects of disasters.

Four Main Functional Areas

- 1. Disaster preparedness**
- 2. Education**
- 3. Health**
- 4. Livelihood**

CARE India Initiative in Healthcare

Delivering healthcare to over a billion people is a very complex challenge. CARE India works in close collaboration with State and Central Government and other partner organizations to secure accessible and quality maternal and child healthcare among marginalized communities. It works towards identifying the root causes of healthcare challenges, provides innovative solutions, and helps implement secure and quality healthcare services in India. CARE India believes that a healthy mother and a healthy baby is the route to a productive and a developed nation. Hence, CARE has specially focused upon providing comprehensive solutions to address public health problems. CARE India promotes essential new born care and immunization, reducing malnutrition, preventing infant and maternal deaths and protecting those affected by or susceptible to HIV/ AIDS and TB. CARE works closely with its partners to achieve good health care for everyone.

Bihar Technical Support Programme

The Bihar Technical Support Programme, supported by Bill & Melinda Gates Foundation, provides catalytic support to Health and Social Welfare Department of the Government of Bihar in achieving their goals of reducing maternal, newborn and infant mortality, total fertility, anaemia and malnutrition, improving family planning services, and increasing immunization coverage in the state

Bihar Technical Support Programme find roots in CARE India's integrated Family Health Initiative (IFHI) projects that was first launched in 2011, as part of the Ananya Program, with support from the Bill and Melinda Gates Foundation (BMGF). The goal was to increase the coverage and Quality of life saving interventions and improve the health, survival and nutrition of women, newborns and children during the first 1000 days- from conception to the child's second birthday. CARE India interventions focused on better counselling and emergency preparedness for mother and new born, building Basic Emergency Obstetrics and Newborn care (BEmOC) capabilities, improved management of neonatal infections, early initiation and exclusive breast feeding, complimentary feeding, increased immunization and expanded access to quality family planning services and birth spacing methods.

Concurrent Monitoring and Learning Unit

Data plays key role in evaluating the success and gaps of health programmes. For better health programs and outcomes continuous monitoring and evaluation is required. therefore, for effective and efficient use of the resources, the need of good quality of data is mandatory.

CML team of Bihar Technical Support Program is the known for its quality of data. Report are generated within 25 days of post collection of data and Data is gone through with significant back-checks-spot-checks and validation.

Rationale

Infant mortality is higher in low and middle-income countries. 99% account of deaths occurred in developing countries, around (25-30%) deaths occurred in India. 0.94 million out of 26 million babies die before reaching one month of life in India. Neonatal death constitutes about two-thirds of all infant deaths with NMR 34/1000 live births (Source: SRS2009). Preventable diseases such as hypothermia, asphyxia, infections, and respiratory distress are the main cause of neonatal death. NMR of India in 2004 was 58/1000 live birth and declined steadily in 2009(50/1000 live births) However, there is slow progress recorded in NMR which declined from 37 in 2004 to 34 in 2009. Reduction of deaths of newborns in India has shown least progress in first week of life. It has been estimated that about 70% of neonatal deaths could be prevented if proven interventions are implemented on a large scale. It was further estimated that health facility-based interventions can reduce neonatal mortality by 23-50% in different settings(1). Facility-based newborn care, thus has a significant potential for improving the survival of newborns in India. Infant mortality is high in Bihar, infant mortality rate 38/1000 live births (Source SRS2016) is on the decline and is almost at par with MDG 2000-15 but is below the national achievement (25/1000 live births). IMNCI is a programme in which contact with newborns at their house, detection and referral of

sick newborn to the hospital facility and giving newborn care and care for sick newborn at district and subdistrict level. but been found there is lacking above services. Due to failure of this programme another new program was introduced called FBNC this programme have potential to reduce infant mortality in India as well as in high burdened infant mortality states of India.

Review of Literature

S.No	Author	Study Title	Study Area	Yaer	Study population	Result
1.	Jarina Begum	Evaluation of Antenatal to Neonatal Continuum Care Services Affecting Neonatal Health in a Tertiary Health-Care Setup	Odisha, India	2016	Registered patients at SNCU of MKCG Medical College and Hospital, Odisha	23% sick newborns were treated under integrated mangement of neonates and childhood illness, among them 56% were given given proper advice(2).
2.	Anuradha D.	A profile on the spectrum of neonatal mortality and morbidity pattern of extramural neonates in the Specialised	Chennai, India	2018	All neonates admitted to NICU in Institute of Social Paediatrics, Government Stanley	Among 2927 most were boys, most of babies without complication, there was high mortality in outborn due to extreme

		Neonatal Care Unit (SNCU) in a tertiary care hospital			Medical College, Chennai	preterm and neonatal sepsis(3).
3.	Sathya Jeganathan	Transport from the Community and Preterm Survival: Study from a Rural Based Sick Newborn Care Unit of South India	Kanchipuram, India	2016	SNCU online database of National Rural Health Mission in Chengalpattu Medical College Hospital	338 preterm were admitted during from may 2015 to september 2015. The mean duration of stay in SNCU for inborn was 12.2 days and for outborn was 9.46, more male babies were in admission. 245 survived among inborn and 47 survived outborn(4).
4.	Malhotra S.	Assessment of essential newborn care services in secondary-level facilities from two districts of India	Madhya pradesh and rajasthan	2014	For each district One DH & 2 CHC	Still birth rate of both the districts was 38/1000 live births, more births were recorded at chattarpur district. In condition of specialized care prefer paediatric ward. Register had incomplete information of inborn and outborn babies. Most of deaths due to sepsis in both the districts(5).
5.	S B Neogi	Assessment of Special Care Newborn Units in India	West Bengal, Orissa, Andaman and Nicobar Islands, Madhya Pradesh, Rajasthan Uttar Pradesh, Assam and Bihar	2011	8 SNCU of each state	Majority of patients were male, Most admission from the same hospital, around 40% of admitted babies weighed 1500-2499gm, prime morbidities in 8 districts were asphyxia, sepsis and LBW. Only 2 units complied with recommendations(6).

6.	A. sen	Impact of a district level sick newborn care unit on neonatal mortality rate: 2-year follow-up	Westbengal , India	2009	Every neonates admitted in purulia district hospital	Trained doctors were available round the clock, 413 babies were admitted from the establishment of SNCU(within 1 year). 55.3% were low birth weight and 30.7% were very low-birth weight and 2.3 % were ELBW(6).
7.	Harsh Dilipkumar Shah	A Step toward Healthy Newborn: An Assessment of 2 Years' Admission Pattern and Treatment Outcomes of Neonates Admitted in Special Newborn Care Units of Gujarat	Gujrat, India	2018	All SNCUs of gujrat	53% inborn and 47%outborn were recorded.Outcome of 69,662 admissions, 67% discharged, 16% died. The major reason for admission was RDS and death also(7).

Research Question

- What are the gaps to fulfilling the strengthening of existing SNCU in districts of Bihar?

Objectives

- To assess demarcated space in patient care are and demarcated space in ancillary service area.
- To assess availability of essential equipments and functionality of equipments.
- To assess housekeeping protocols.

- To assess BMW management.
- To assess availability of drugs.
- To assess availability of laboratories, equipments and functionality of equipments, laboratory services.
- To assess availability of records and registers

Research methodology

Study Design

Observational cross-sectional Study.

Study Area

24 Districts of Bihar

Duration of the study

2 months (from 9th April 2018 to 2nd June 2018)

Type of Data collection

Secondary data provided by Care India Solutions for Sustainable Development (CISSD), Patna.

Study Population

Total number of SNCUs in 24 districts

Method of data collection

Data collected through Excel sheet.

Tool for data analysis

MS excel used for data analysis

Analysis of Study

Location of SNCUs in hospital (N=24)

Location of SNCU	Available (%)	n
Within the vicinity of the maternity complex	4%	1
Within the hospital campus	92%	23
Outside the hospital campus	4%	1

According to FBNC Guideline, 2011 SNCU should be in vicinity of labour room but 23 SNCUs out of 24 were within the hospital boundary, 1 was within maternity complex and 1 was outside the hospital. The average distance between labour room and SNCU was 157 meter (s.d 217.4).

Human Resource availability in SNCUs (n=24)

HR	Atleast one available (%)	n	Atleast one designated (%)	n
Paediatrician	91.7%	22	33.33%	8
medical officer	66.7%	16	50.00%	12
staff nurse	100%	24	100%	24
ANM	37.5%	9	33.33%	8
Lab assistant	16.5%	4	8.33%	2
Data entry	91.7%	22	79.17%	19

According to FBNC guideline, 2011 there should be one paediatrician or one trained doctor round the clock, three nurses in each shift and part time lab assistant and data operator in one SNCU but in 24 SNCUs, 8.3% Paediatricians (atleast one) were not available, as per recommendation there should be Atleast one paediatrician or one medical officer round-the-clock; 33.3% Medical Officers (atleast one) were not available, only staff nurses were 100% available in 24 SNCUs; 62.5% ANM nurses (atleast one) were not available; We found huge shortage of lab assistants, 83.3% lab assistants (atleast one) were not available. Paediatricians or medical officers were not available exclusively for SNCU they were also assigned to another department of the hospital.

In 24 SNCUs, 66.8% Paediatricians (atleast one) were not exclusively designated; 50% medical officers (atleast one) were not exclusively designated; 66.8% ANMs (atleast one) were not available; there was huge shortage of lab assistants, 91.7% lab assistants (atleast one) were not exclusively designated.

Availability of demarcated space in patient care area and ancillary service area (N=24)

Demarcated space in patient care areas	Available (%)	N	Demarcated space in ancillary service areas	Available (%)	n
Inborn unit (separate room)	91.7%	22	Doc/Nurse Room/ Changing Room	100%	24

Out born unit (separate room)	91.7%	22	Storage Unit	66.7%	16
Inborn Unit and Outborn Unit part of single	8.3%	2	Room for Autoclaving/Sterilization	58.3%	14
			Demarcated space/room for Lab	79.2%	19
			Demarcated space/room for Breast feeding	75%	18
			Demarcated space for KMC Corner/Area	50%	12
			Demarcated space for Triaging Room	41.7%	10

According to FBNC guideline, 2011 patient care area of SNCU should be with two interconnected room separated by transparent window, one room for inborn unit and another one for outborn unit but inpatient care area of 24 SNCUs, 8.3% were not with interconnected room and 91.7% were with part of single.

According to FBNC guideline, 2011 ancillary area of SNCU should include separate area for nurse changing room, storage unit, sterilization, laboratory, breastfeeding and triaging but in ancillary service area of 24 SNCUs, 41.7% demarcated space was not available for sterilization room; 50% demarcated space for KMC corner was not available; 58.3% demarcated space was for Triaging room.

Availability and functionality of equipments in (N=24)

Equipments:	At least one Available (%)	n	Equipments	At least one functional (%)	n
Radiant warmer	100%	24	Radiant warmer	62.5%	15

Focus light	16.7%	4	Focus light	12.5%	3
Oxygen concentrator	95.8%	23	Oxygen concentrator	70.8%	17
Single surface phototherapy	20.8%	5	Single surface phototherapy	20.8%	5
Double surface phototherapy	20.8%	5	Double surface phototherapy	4.2%	1
Suction machine	79.2%	19	Suction machine	12.5%	3
Air conditioner	95.8%	23	Air conditioner	33.3%	8

According to FBNC guideline, 2011 one SNCU should be equipped with 12 radiant warmer, 6 focus light, 4 oxygen concentrator, 6 single surface phototherapy, 2 suction machine and 2 A.C but in 24 SNCUs, 83.3% focus lights (atleast one) were not available, 4.2% oxygen concentrators (atleast one) were not available, 79.2% single surface and double surface phototherapy equipments were not available, 20.8% suction machines (atleast one) were not available, and 4.2% air conditioners (atleast one) were not available.

Among available equipments 87.5% focus light (atleast one) were not functional;29.2% oxygen concentrator (atleast one) were not functional;79.2% single surface phototherapy (atleast one) were not functional;95.8% double surface phototherapy equipments (atleast one) were not functional;87.5% suction machines (atleast one) were not functional;66.7% air conditioners (atleast one) were not functional.

Availability and functionality of equipments and accessories (N=24)

Equipments & accessories	Atleast one available (%)	n	Atleast one functional (%)	n
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Ambu Bag 250 ml	87.5%	21	87.5%	21
Laryngoscope with blade	70.8%	17	70.8%	17
Infusion Pump	87.5%	21	79.2%	19
Oxygen hood	100.0%	24	100.0%	24
Digital Thermometer	87.5%	21	75.0%	18
Manual/Digital weight machine	100.0%	24	100.0%	24
Pulse oximeter with probe (Neonatal)	95.8%	23	79.2%	19
Stethoscope pediatric	91.7%	22	87.5%	21
Neonatal BP instrument digital	20.8%	5	12.5%	3
Infanto-meter	45.8%	11	33.3%	8
Sterilization Drum	75.0%	18	70.8%	17
Glucometer with dip stick	75.0%	18	75.0%	18
X ray (portable)	4.2%	1	4.2%	1
Oxygen cylinder	95.8%	23	95.8%	23
Oxygen tubings	87.5%	21	87.5%	21
Neonatal nasal prongs	83.3%	20	79.2%	19

In 24SNCUs, 24.5% Ambu bags 250ml (atleast one) were not available;29.2% laryngoscope with blade (atleast one) were not available;79.2% neonatal BP instrument digital (atleast one) were not available;54.2% Infanto meter (atleast one) were not available;25% sterilization drum (atleast one) were not available;25% glucometer with deep stick (atleast one) were not available;95.8% X-ray portable (atleast one) were not available.

Among available accessories many accessories were not functional, 25% digital thermometer (atleast one) were not functional ;20.8% pulse oximeter with probe (atleast one) were not funtional;87.5% neonatal BP instrument digital (atleast one) were not functional;66.7% Infanto meter (atleast one) were not functional;29.2% sterilization drum (atleast one) were not functional;25% glucometer with deep stick (atleast one) were not functional;95.8% X-ray portable (atleast one) were not functional.

Infection Control:

Housekeeping routines(N=24)

Frequency of cleaning the floor	Practice Available (%)	n	Used for cleaning the floor	Practice available (%)	n
Once a day	12.5%	3	Water	16.7%	4
Twice a day	45.8%	11	Detergent/Phenyl	79.2%	19
Thrice a day	33.3%	8	Hypochlorite Solution	12.5%	3
Before every use	0.0%	0	Phenol/Lysol	12.5%	3
Irregular	8.3%	2	Other	0.0%	0
Other	0.0%	0			

In 24 SNCUs, 8.3% cleans the floor irregular;12.5% cleans the once a day and 45.8% cleans the floor twice a day. And 16.7% uses water for cleaning the floor;12.5% uses hypochlorite solution and 12.5%uses phenol for cleaning the floor.

Disinfection of equipments(N=24)

For Cups, Paladai and Spoon					
Frequency of cleaning the cups, Paladai and Spoon	Practice Available (%)	N	Mainly used to clean cup, paladai and spoon	Practice Available (%)	n
Once a day	4.2%	1	Normal water	4.2%	1
Twice a day	4.2%	1	Normal water detergent	16.7%	4
Thrice a day	0.0%	0	Boiling water	4.2%	1
Before/After every use	25.0%	6	Boiling water+ detergent	12.5%	3
Irregular	4.2%	1	Others	4.2%	1
Not Applicable	58.3%	14			
Other	4.2%	1			
For Mask					
Frequency of cleaning neonatal mask size 0/1	Practice Available (%)	N	Used for cleaning neonatal mask	Practice Available (%)	n
Before every use	33.3%	8	Surgical Spirit	29.2%	7
Once every day (irrespective of usage)	4.2%	1	Soap water	29.2%	7
Once weekly	4.2%	1	Heat	0.0%	0
Irregular	33.3%	8	Glutaraldehyde 2%	0.0%	0
Before and after every use	20.8%	5	Other	58.3%	14
After every use	4.2%	1			
For Laryngoscope					
Frequency of cleaning the Laryngoscope?	Practice available (%)	N	Used for cleaning the laryngoscope	Practice Available (%)	n
Before every use	12.5%	24	Surgical Spirit	29.2%	7
Once every day (irrespective of usage)	4.2%	24	Soap water	8.3%	2
Once weekly	0.0%	24	Heat	0.0%	0
Irregular	66.7%	24	Glutaraldehyde 2%	0.0%	0
Before and after every use	12.5%	24	Other	70.8%	17
After every use	4.2%	24	Before/After every use	25.0%	6

BMW management(N=22)

INBORN			OUTBORN		
Colour coded	Available (%)	n	Colour coded	Available (%)	N
Red	40.9	9	Red	45.5	10
Yellow	36.4	8	Yellow	45.5	10
White	4.5	1	White	4.5	1
Blue	18.2	4	Blue	13.6	3
Black	22.7	5	Black	22.7	5

In 22 SNCUs out of 24 SNCUs had BMW management.40.9% red colour coded container found in inborn unit and 45.5% red colour coded container found in outborn;36.4% white colour coded dustbin found in inborn and 4.5% in outborn;18.2% blue colour coded found in inborn and 13.6 percent in outborn;22.7% black colour coded container found in inborn unit and 22.7%found in outborn unit.

We found less number of colour coded polythene bags in all container. We observed what they drop in the coloured coded dustbin in Inborn and Outborn units. Nurses had less knowledge of waste management and they drop dressing waste, gloves, syringes in the white container, in our observation they drop glassware and metallic waste in any type of container as per choice. We observed fewer numbers of SNCUs had colour coded dustbin with hypochlorite solution.

Drugs available in SNCU (N=24)

IV Fluids	Atleast one Available (%)	n	Emergency Medicine	Atleast one available (%)	n
5% Dextrose	62.5%	15	Inj. Aminophylline	62.5%	15
10% Dextrose	100.0%	24	Inj. Phenobarbitone	70.8%	17
Ringers Lactate	33.3%	8	Inj. Phenytoin	70.8%	17
Normal saline(NS)	91.7%	22	Inj. Calcium gluconate	95.8%	23
Isolate P	75.0%	18	Inj. Dopamine	50.0%	12
25% Dextrose vials	41.7%	10	Inj. Midazolam	25.0%	6
Glucose 50% (injection)	8.3%	2	Diazepam	25.0%	6
			Inj. Adrenaline	75.0%	18
Antibiotics			Tab. Perinorm for mother	0.0%	0
Inj. Ampicillin	29.2%	7	Inj. Dexamethasone	41.7%	10
Inj. Cefotaxime	83.3%	20	Inj. Hydrocortisone	50.0%	12
Inj. Gentamicin	54.2%	13	Inj. Potassium Chloride	12.5%	3
Inj. Amikacin	83.3%	20	Inj. Magnesium Sulphate (50%)	8.3%	2
Inj. Amoxycillin + Cloxacillin	8.3%	2	Sodium Bicarbonate	50.0%	12
Metronidazole (injection)	50.0%	12	Atropine (injection)	45.8%	11
Inj. Vitamin K1 (Phytonadione)	79.2%	19	Frusemide (injection)	8.3%	2
			Pheniramine maleate (injection)	12.5%	3
Analgesic			Sterile Water	50.0%	12
Inj. Paracetamol	29.2%	7	Sprite	87.5%	21
Diclofenac sodium (injection)	4.2%	1	Hand sanitizer	33.3%	8
			Betadine	37.5%	9
			Phenol	25.0%	6
			Lysol	16.7%	4
			Liquid soap	83.3%	20

In 24 SNCUs, we made this drugs data on the availability of one quantity of each drug. We Categorized drugs in IV fluids, Antibiotics, Analgesic and emergency medicine. In some of SNCUs found there were not separate indent for SNCUs, commonly indent for the hospital was made. After observing indent register we found the delay in procurement of medicine in SNCU and some of SNCUs much stock of drugs was available.

LAB in SNCUs(N=24)

Available LAB (%)	n	Equipments	Atleast one available (%)	n	Atleast one functional (%)	n	LAB services provided in SNCU (%)	n
20.8%	5	Microscope, binocular	8.3%	2	8.3%	2	0.0%	0
		Bilirubinometer	20.8%	5	20.8%	5		
		Centrifuge	4.2%	1	4.2%	1		

In 24 SNCUs 20.8% SNCUs were with side laboratory inside the SNCU. In these 5 laboratory, Lab services were not available either they were locked and was being used as another purpose.

Record and Register(N=24)

Record and Register		Type	Available	n
Case Record/sheet	1	Printed	95.8%	23
	2	Manual	0.0%	0
	3	Not Available	4.2%	1
Doctor's progress record	1	Printed	62.5%	15
	2	Manual	0.0%	0
	3	Not Available	37.5%	9
Nurses' monitoring record	1	Printed	87.5%	21
	2	Manual	4.2%	1
	3	Not Available	8.3%	2
Treatment sheet	1	Printed	95.8%	23
	2	Manual	0.0%	0
	3	Not Available	4.2%	1
Discharge card	1	Printed	83.3%	20
	2	Manual	0.0%	0
	3	Not Available	16.7%	4
Investigation slip	1	Printed	62.5%	15
	2	Manual	0.0%	0
	3	Not Available	37.5%	9
Death certificate	1	Printed	16.7%	4
	2	Manual	0.0%	0
	3	Not Available	83.3%	20
Indent Register	1	Printed	25.0%	6
	2	Manual	66.7%	16
	3	Not Available	8.3%	2
Phototherapy Register	1	Printed	0.0%	0
	2	Manual	12.5%	3
	3	Not Available	87.5%	21
Oxygen Register	1	Printed	0.0%	0
	2	Manual	37.5%	9
	3	Not Available	62.5%	15
Laundry/Linen Register	1	Printed	0.0%	0
	2	Manual	50.0%	12
	3	Not Available	50.0%	12
Hand over and take over for equipment/consumables	1	Printed	12.5%	3
	2	Manual	66.7%	16
	3	Not Available	20.8%	5
Referral card	1	Printed	70.8%	17
	2	Manual	4.2%	1
	3	Not Available	25.0%	6
Case Record/sheet	1	Printed	95.8%	23
	2	Manual	0.0%	0
	3	Not Available	4.2%	1

Most of the entries in the register were not legible and most Columns of the admission register were blank. We faced difficulty in collecting data of last 90 days admission from each of admission register. The handwriting was not understandable, and data of some babies were blank.

Result

As per Observation and collected data from 25 SNSUs, 92% SNCUs were within the health facility, 4% was outside the facility and 4% was within maternity ward. 36.4% SNCUs had exclusive MD(paediatrician) and 75% SNCUs had exclusive MBBS Doctor. The patient area was adequate, but we found in 19% SNCUs out of 21 SNCUs were kept newborns in one radiant warmer. 41.7% SNCUs had triage area, 50% had KMC area, 8.3% SNCUs had training room. In equipment, we found lack of many types of equipment such as 20.8 % SNCUs had single and double surface phototherapy. Once the equipment was crash it takes many days in repairing. We found lack of awareness in BMW management. Only 4.5% SNCU out of 22 SNCUs had white colour-coded container. Only 4.2% percent SNCU had Diclofenac injection(analgesic), 29.2 % SNCUs had ampicillin injection(antibiotics). 20.8% of SNCUs had separate laboratory but lab services were not available in the SNCUs. In last 90 days average 159.5 neonates (S.D 69.7) were admitted in all SNCUs

Suggestions

Based on the present study, the following suggestions can be taken into consideration:

- Clerical work related to SNCU on nurses should be minimized so that they can give their time on care of sick newborn.
- Adequate human resources including Lab Assistants and ANMs
- Training of all staff (Doctors and nurses) should be in a regular interval with evaluation of training.
- MD/MCH and MBBS should be exclusively available in SNCU round the clock.
- The government must work on patient trust, most of the parents don't rely on public health facility services.
- The stock of SNCU should be provided separately and there should be the provision of inventory control.
- 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 equipments.
- Availability of drugs and other required logistics by indenting in advance and supplies in time
- Equipment include for resuscitation, phototherapy and thermoregulation should be available as well as functional
- Regular training on Handwashing practice and BMW management with an evaluation of training.
- Housekeeping, cleaning need to be followed to prevent infection
- There should be provision for Continuous monitoring and evaluation of special care provided to sick neonates in SNCU

- To summarize, potential action have been taken to reduce infant mortality and morbidity but still health system of Bihar must ensure meaningful implementation of available policy/guideline related to SNCU

Conclusion

Gaps, those are trying to find for Strengthening the existed SNCU is crucial to address Neonatal mortality and Infant mortality and this study emphasized an utmost need of high skill building training to health personal posted in SNCU, practice of skills in resuscitation is also critical. Availability of functional equipments, optimal skills to use equipments and hand washing practice will be important to attain national and SDG. 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.

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