DISSERTATION

IN

NHM HARYANA

A STUDY ON

QUALITY ASSESSMENT OF SPECIAL NEW BORN CARE UNITS (SNCU) IN FIVE DISTRICT OF HARYANA

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POST GRADUATE DIPLOMA IN HOSPITAL AND HEALTH MANAGEMENT

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INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH,

NEW DELHI

CERTIFICATE OF APPROVAL

The following dissertation titled "**Quality Assessment of Special New Born Care Units (SNCU) in five districts of Haryana**" is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post-Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

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Name of the Student: ZEESHAN ASIF

Dissertation Organisation: NATIONAL HEALTH MISSION, HARYANA

Area of Dissertation: FACILITY BASED NEWBORN CARE

Attendance: 96%

Objectives achieved: 1) Quality assessment of selected SNCUs using a standard checklist (self-assessment).
2) To develop & validate the scoring system to conduct analysis

Deliverables: 1) To conduct semi-structured interviews of Staff & Parents/Relatives
2) Share the Qualitative findings with the district/State officials apart from the checklist.

Strengths: Good interpersonal skills, analytical, Hard working.

Suggestions for Improvement: Report writing

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Medical Officer
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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled Quality Assurance of Special New Born Care Units (SNCU's) in five district of Haryana and submitted by (Name) ZEESHAN ASIF

Enrollment No. PG/12/108

under the supervision of Dr. Anandhi Ramachandran

for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from 2012 to 2014

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.

Zeeshan

Signature

CERTIFICATE OF DISSERTATION COMPLETION

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Zeeshan Asif has successfully completed his dissertation in our organization from February 5th 2014 to April 30th 2014. During the dissertation he worked on **"Quality Assessment of Special Newborn Care Units in Five districts of Haryana"** and also coordinated for all child health programmes under the guidance of me and my team at National Health Mission, Haryana.

We wish him good luck for his future assignments.

(Signature)

Deputy Director CH & FW
Director General Health
Services Haryana, Panchkula

TO WHOMSOEVER MAY CONCERN

This is to certify that ZEESHAN ASIF student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone internship training at NHM - HARYANA from 3.2.2014 to 3.5.2014.

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.
The Internship is in fulfilment of the course requirements.
I wish him all success in all his future endeavors.

Dean, Academics and Student Affairs
IIHMR, New Delhi

Professor
IIHMR, New Delhi

ACKNOWLEDGMENT

"Any accomplishment requires the grace of god as well as help and good wishes of many people and this work is not different."

This perspicuous piece of acknowledgement is an opportunity and humble privilege for me to express my deepest sense of gratitude and indebtness to those people without whose help, assistance and guidance, the present work would have been impossible.

I extend my sincere thanks to **Dr**. **Rakesh Gupta (MD NRHM-Haryana)** for his endeavour and genuine support. I express my gratitude to him for encouraging me at every moment throughout the internship period.

I am very grateful to **Dr. Suresh Kumar Dalpath (DD, CH Division, NRHM-Haryana**.) for his guidance, encouragement, constant supervision and valuable help during my study period.

I thank with profound honor and regards **Dr. Krishan Kumar (MO, CH Branch, NRHM-Haryana)** for his scholarly research guidance, constant supervision, timely advice, moral support and selfless help, without which this study would not have been possible.

I am highly indebted to **Dr. L.P. Singh (Director, IIHMR, New Delhi) & Dr. Anandhi Ramachandran (Assistant Professor IIHMR, New Delhi**) for their valuable advice, help and encouragement during the study period. I gratefully acknowledge the assistance and critical remarks rendered by faculty members to bring it in effect.

I must render my sincere thanks to the **DIO's of these five districts** for their cooperation and support. I am also thankful to CMO's of these districts for their support. I am thankful to **Dr. Mandar S. Kannure** (Consultant Child Health) for his guidance and support in completion of the study.

My obligations are especially to my parents from whom I learnt the art of dedication, sincerity and patience, which has helped me throughout the work period. Their love and blessings were and will remain my constant guide.

Place: Panchkula Zeeshan Asif

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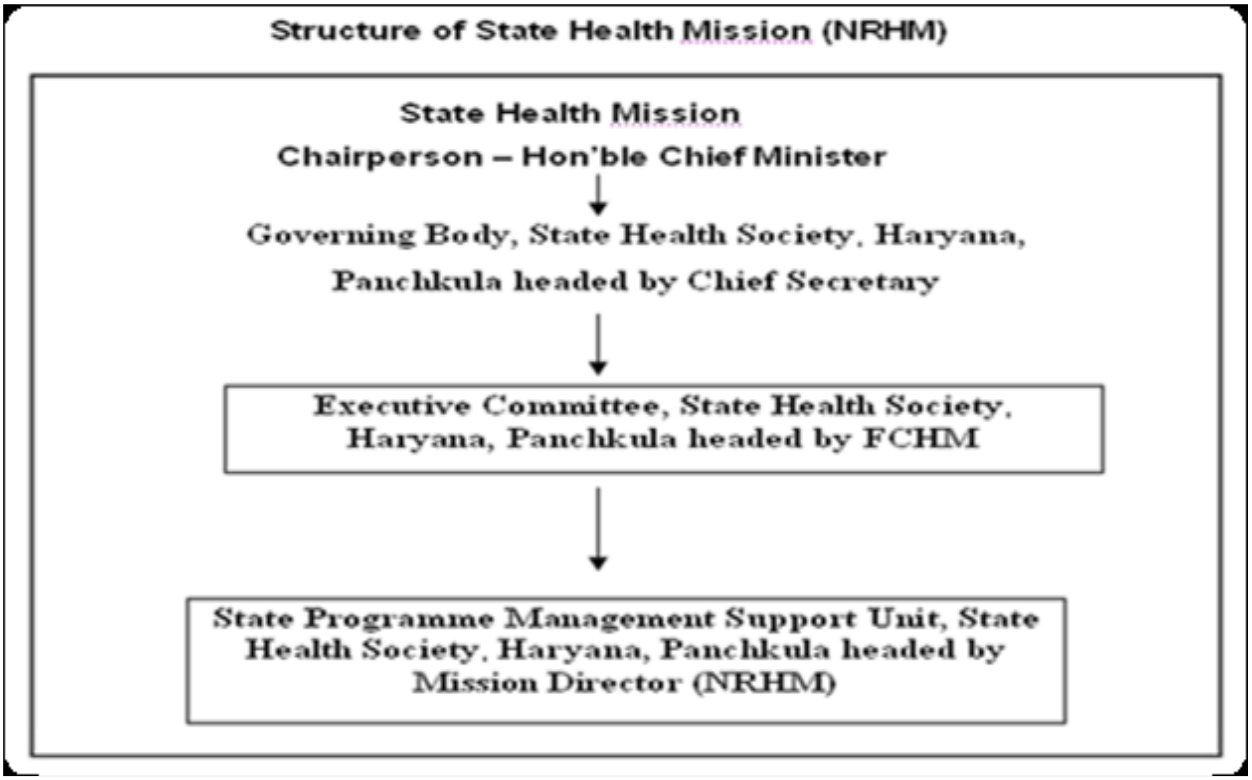
1. ORGANIZATION PROFILE

A. Introduction

The National Rural Health Mission seeks to provide effective health care to rural population throughout the country. It aims to undertake architectural correction of the health system to enable to effectively handle increased allocations as promised under the National Common Minimum programme. It has as its key components provision of a female health activist in each village; a village health plan prepared through a local team headed by the Health & Sanitation Committee of the Panchayat. It aims at effective integration of health concern with determinants of health like sanitation & hygiene, nutrition, and safe drinking water through a District Plan for Health. As per mandate under NRHM the State Health Society has been reconstituted under the Chairmanship of Chief Secretary, Haryana adopting multi department approach and involvement of all stake holders.

 Mission – Mission of NRHM is to improve the quality of life of people by providing better Health Services. It strives to help people improve their productivity and reduce risks of diseases and injury in a cost-effective way.

 Vision--NRHM seek to establish long-term relationships with groups and individuals to enable them to continue to work to achieve optimal health. It delivers cost-competitive health promotion services with patient's satisfaction and accountability.



B. Some of functions and duties of health department:

Health department has manifold functions and duties which are as under:- 1. Provide promotive , preventive , curative and rehabilitative services to the community through primary health care delivery system.

2. Provide equitable and quality health care at primary, secondary and tertiary level.
3. Extension, expansion and consolidation of rural health infrastructure.
4. Respond to the local community health needs and request.
5. It takes many steps for population stabilization.
6. Provide Reproductive and Child Health Services with the objective of reducing MMR & IMR.
7. Provide immunization services against vaccine preventive diseases of childhood as well as pregnant mothers against tetanus during child birth.
8. Provide Family Welfare Services.
9. Provide Essential Obstetric Care.
10. Enforcement of PNDT Act to prevent Sex Determination

C. Programme Implementation Plan for 2012-13

State of Haryana has made steady progress in NRHM implementation during first phase of NRHM (2007-2012). State has now reached the stage from where it requires taking a leap forward. There has been considerable increase in the funds absorption capacity over the last few years, particularly after 2008-09. NRHM have however identified certain loose ends which need to be tightened up in the next phase. 2012-13 continues to retain the proposal of 2011-12, barring few structural changes necessitated by sub optional achievement in certain areas.

Program management needs a revamp both at state and district level. While on one hand state is averse to creating extra posts under NRHM but on the other this need people who can manage the program at district and sub district level. Community processes and main streaming of AYUSH have been weak areas. This year NRHM is proposing to link these two weak areas to strengthen both of them. It is proposed that MO (AYUSH) will function as community process manager at block level to look after ASHA, SMS, IBSY and HBPNC programs. AYUSH doctors otherwise well equipped to handle such programs have been underutilized. They will be paid extra honorarium for community process work.

ASHA program in Haryana has started moving; there has been increasing realization that if ASHA moves everything else would move along with it. There are two structural changes proposed this year in ASHA program: first, there will be an ASHA

supervisor from among the best performing ASHA at PHC level who will be paid extra honorarium for the work and second, there will be increased honorarium for ASHA for ensuring service delivery to SC and BPL population. In 2012-13, proposing 3000 new ASHAs in rural areas according to population norms. It is also proposed to have ASHA in urban areas to provide much needed extension services in urban slums.

State has proposed a new weekly Iron Folic Acid supplementation (WIFS) program for adolescent girls in colleges in all the districts. This will supplement the efforts of Indira Bal Swasthya Yojana (IBSY) for controlling anemia in children and adolescents.
Analysis of expenditure in last few years has revealed that while salary component has been almost fully utilized, the expenditure in services and procurement has not been commensurate. In new PIP, it has been proposed to link honorarium with performance- there will be fixed component of honorarium which will be same as in last PIP plus a variable component which will be based on performance and can go up to 50 percent of the fixed honorarium. State has proposed to bolster its procurement wing to cut down delays in procurement.

MANAGERIAL TASKS I DID WITH RESPECT TO THE DEPARTMENTS

During the three months of working period in the office, I mainly co-ordinated for the various programmes of child health . Also, I was involved in below mentioned activities.
After one month of extensive training period,I did three district visit for supportive supervision of various child health programmes such as

- Essential newborn care supportive supervision in Districts narnaul, sirsa, yamunagar
- Routine immunization supportive supervision in above all three districts.
- On job training to staff nurse and ANM on ENBCR.
- Data entry of all the finding then analysied the data and explain with higher authority of respective Districts person such civil surgeon,DIO.
- Quality assessment of Special newborn units in five Districts of Haryana which is als now the topic of my dissertation.

LEARNINGS IN INTERNSHIP TIME

1. I came to know about various health programmes managed by the organization.
2. Work culture in govt. organizations as we think, is not the same everywhere.
   In NRHM Haryana there is lot of pressure of work in most of departments .
3. This provided me an opportunity to field exposure .
4. I came to know the harsh reality of health conditions prevalent in Haryana state.
5. I learned the various programmes run by GOI regarging Child Health Programmes
   I got the training of
   Essential new born care,
   Routine Immunization,
   Home base New born care,
   IMNCI (integrated management of newborn child illines.

7. Research type activities are very less held in NRHM, Haryana. This project by me created a niche in NRHM to think about the involvement of Researchers & health managers in their organization.
8. I also attended review meetings of CMO & also aware with points discussed in IMR reduction. These provided me a lot of knowledge & a platform to learn.
9. Last but not the least, I came to know that career in public health management is not as easy

INTRODUCTION

In India, 26 million babies are born every year, and 940,000 babies die before one month of life. India carries the single largest share (around 25-30%) of neonatal deaths in the world. The neonatal period is only 28 days; yet, Neonatal Mortality Rate (NMR) contributes to about two-thirds of Infant Mortality Rate (IMR) and about half of Under-5 Mortality Rate (U5MR).

There is a growing recognition that to meet national goals and the Millennium Development Goals (MDGs) to bring down childhood mortality, a substantial reduction in NMR is needed, and reducing deaths in the first week of life is essential to make progress. The Government of India (GOI) is committed to improve the availability of quality newborn care services in addition to renewing efforts in providing quality health care for women, infants and young children under the National Rural Health Mission (NRHM) and its Reproductive and Child Health Programme (RCH II).

Preventable morbidities such as hypothermia, asphyxia, infections, prematurity and respiratory distress continue to be the main causes of mortality in the neonatal period. There is an increasing need to focus on newborn care and survival for significant reduction in IMR and U5MR and strengthen the care of sick, premature, low birth weight newborns at the various levels of facilities right from the moment to birth through the neonatal period.

One of the key steps in this direction is the establishment of Facility Based Newborn Care (FBNC) services at various levels of health care facilities. FBNC has a significant potential for improving newborn survival and can reduce neonatal mortality by as much as 25-30%.

Neonatal care at different levels under FBNC program

Three levels of neonatal care under the FBNC program are as following:

Level I care includes referral of sick newborns from Primary Health Centre's (PHCs) to higher centres and care at Neonatal Stabilization Units (NSUs) in the first referral units. Care in the NSUs includes stabilization of sick newborns and care of low-birth weight (LBW) babies not requiring intensive care.

Level II care includes functioning of Special Newborn Care Units (SNCUs) at the district hospital and some of the sub district hospital level. These units are being established at any health facility where the delivery load is more than 3000 per year and are equipped to handle sick newborns other than those who need ventilator support and surgical care. It has been estimated that around 15-20% of all newborns require level II care in rural settings.

Level III units are the Neonatal Intensive Care Units (NICU) which provides all care including assisted ventilation and major surgery.

Under this initiative, MOHFW established Special Newborn Care Unit (SNCU) in 2009-10 focusing on comprehensive care to a sick newborn.

Special Newborn Care Unit (SNCU)

SNCU is a neonatal unit in the vicinity of the labor room which provides Level 2/3 care (all care except assisted ventilation and major surgery) for sick newborns. All district hospitals and sub-district hospitals with more than 3000 deliveries per year should have a SNCU.

Expected services to be provided at SNCU:

Table 1: Expected services to be provided at SNCU

Care at birth	Care of normal newborn	Care of sick newborn
• Prevention of Infection • Provision of warmth • Resuscitation • Early initiation of Breastfeeding • Weighing the newborn	• Breast-feeding/ feedings support	• Managing of LBW babies < 1800 gm • Managing all sick newborns (except those requiring mechanical ventilation and major surgical interventions) • Post-natal care • Follow-up of high-risk newborns • Immunization services and referral services

(Source: Facility based Newborn Care Operational Guidelines 2011)

Components of SNCU

Baby Care Area: This should have at least 12-16 warming beds and may be divided into two interconnected rooms separated by transparent observation windows with the nurses' work place in between. This facilitates temporary closure of one section for disinfection.

Step-down Unit: This is an additional 5 bed step down unit where recovering neonates can stay i.e. neonates who don't need intensive monitoring.

Newborn Ward: This is an additional 10-20 beds, where both mother and the newborn stay together. This facility is to be used for neonates who require minimal support such as for phototherapy, for uncomplicated LBW babies (>1800gm) requiring only observation and those babies who require only intravenous antibiotic therapy.

Ancillary area: Distinct support space should be provided for all other services that are routinely performed in the SNCU. The ancillary area should include space for the following:

- Nursing work station, hand washing and gowning area at the entrance
- Side Laboratory Room
- Follow-up clinic
- Examination Area
- Clean area for mixing intravenous fluids and medications
- Store Room and Power Room
- Teaching and Training Room
- Place for in-house facility for washing, drying, boiling and autoclaving
- Duty Room for doctors and Nurses
- Place for promotion of breast-feeding and learning mother craft etc.

Human resources for Special Newborn Care Unit

A 12-bedded unit (plus 4 beds for the step-down area) requires at least one pediatrician (M.D.-Pediatrics) or a trained doctor round-the-clock. Assuming that one doctor provides back-up of 8 hours, at least three trained doctors (M.B.B.S.) should be available at the facility. It is proposed that one pediatrician trained in neonatology should be posted at the unit, supported by two or three medical officers trained in FBNC. There should be three nurses in each shift, round-the-clock and sufficient nurses (G.N.M.) recruited to provide for leave vacancy and contingency.

In addition to doctors and paramedics, dedicated support staff should be available to clean the unit at least once during every shift and more often depending on the need. A part-time lab technician, a counsellor and a data entry operator (PGDCA) should also be posted at the unit.

Criteria for admission to SNCU:

Any newborn with following criteria should be immediately admitted to the SNCU:

- Birth weight <1800gm or gestation <34 weeks
- Large baby (>4.0kg)
- Perinatal asphyxia
- Apnea or gasping
- Refusal to feed
- Respiratory distress (Rate >60 or grunt/retractions)
- Severe jaundice (Appears <24 hrs/stains palms and soles/lasts >2 weeks)
- Hypothermia <35.4 degree C or hyperthermia (>37.5 degree C)
- Central cyanosis
- Shock (Cold periphery with CFT>3 seconds and weak & fast pulse)
- Coma, convulsions or encephalopathy
- Abdominal Distension
- Diarrhea / Dysentery
- Bleeding
- Major malformations

Criteria for discharge from SNCU to home:

- Baby is able to maintain temperature without radiant warmer
- Baby is haemodynamically stable (normal CFT, strong peripheral pulses)
- Baby accepting breast feeds well
- Baby has documented weight gain for 3 consecutive days; and the weight is more than 1.5kg
- Primary illness has resolved

In addition to the above, mother should be confident of taking care of the baby at home.

Training of SNCU staff on newborn care

To ensure that the staff has the necessary skills to provide the appropriate level of care, the medical and paramedical staff posted at SNCU need to undergo:

Navjaat Shishu Suraksha Karyakram (NSSK):

NSSK addresses important interventions of care at birth, that is basic newborn resuscitation, prevention of hypothermia, prevention of infection, early initiation of breast feeding, and equips the staff with 2 days knowledge and skill based training to provide essential newborn care in primary health care settings.

Facility based IMNCI (F-IMNCI) training:

F-IMNCI is skill-based training, based on a participatory approach combining classroom sessions with hands-on clinical sessions. Medical officers and nurses not trained in IMNCI and

working at health facilities should receive the full package of training with 11 days duration of training and 5 days for those already trained in IMNCI.

Facility based newborn care (FBNC) training:

All doctors and nurses posted in SNCUs need to undergo a more intensive training programme at a recognized centre. The training programme includes 4 days skill-based training on essential and special care. Besides skills on clinical management, additional training is provided on housekeeping and maintenance of the equipment.

Observer ship training: This programme includes 2 weeks training for all doctors and nurses posted in SNCU.

Equipments for SNCU

Modern day neonatal intensive care necessitates the use of biomedical equipment for optimum care of sick and small newborn babies. The essential equipments for SNCU are given below:

A. **Equipment for thermal control:** Radiant warmers, Incubators, Transport incubators etc.
B. **Equipment for monitoring:** Pulse Oximeters, Apnea monitors, BP monitors, Thermometers, Weighing scales, Transcutaneous Bilirubin meter and Blood gas monitor etc.
C. **Equipment for treatment purpose:** Phototherapy units, Infusion pumps etc.
D. **Equipment for monitoring therapy:** Oxygen analyzer, Flux meter etc.
E. **Life saving equipments:** Manual resuscitator, Oxygen concentrator, CPAP machine, Neonatal ventilators etc.
F. **Miscellaneous:** Suction machine, Breast pump etc.

Cost of setting up SNCU

SNCUs require a huge investment in terms of money and other resources. It is estimated that Rs 40-60 lacs are spent to establish a single unit. Since SNCUs are expected to play a key role in saving newborn lives and the huge investment they require, it becomes essential to monitor their functioning and ensure newborn care services are provided effectively.

Evidence of effectiveness of level II newborn care in rural settings

There has been little evidence of feasibility and effectiveness of level II newborn care in rural settings. From one of the pioneering studies done in Purulia district in West Bengal, It was demonstrated that strengthening of secondary-level care can lead to significant reduction in mortality among admitted newborns and was further estimated to lead to reduction in neonatal mortality of the entire district. This study was conducted in a district hospital with 6500 deliveries a year. Baseline data for 10 months were compared with 2 years data of SNCU operation.

Compared with the baseline neonatal mortality in the district hospital the neonatal mortality rate among admitted newborns reduced by 14% in the first year and by 21% in the second year after the SCNU became functional. At the population level, this was estimated to have led to reduction in the NMR by about 10% in the district in two years.

Another study was conducted to assess the functioning of SNCUs in eight rural districts of India. The evaluation was based on an analysis of secondary data from the eight units that had been functioning for at least one year. A cross-sectional survey was also conducted to assess the availability of human resources, equipment, and quality care. Descriptive statistics were used for analyzing the inputs (resources) and outcomes (morbidity and mortality). The rate of mortality among admitted neonates was taken as the key outcome variable to assess the performance of the units. It was shown that the case-fatality rate was reduced from 4% to 40% within one year of their functioning. Proportional mortality due to sepsis and low birth weight (LBW) declined significantly over two years (LBW <2.5 kg). The major reasons for admission and the major causes of deaths were birth asphyxia, sepsis, and LBW/prematurity. The units had a varying nurse: bed ratio (1:0.5-1:1.3). The bed occupancy rate ranged from 28% to 155% (median 103%), and the average duration of stay ranged from two days to 15 days (median 4.75 days). Repair and maintenance of equipment were a major concern

RATIONALE OF STUDY

- SNCUs are expected to play a key role in saving newborn lives. Huge investment required, so it becomes essential to monitor their functioning and effectivity.

- New RCH initiatives such as JSY, JSSK are gaining ground and hence SNCU network need to be well-strengthened

- The Government of India (GOI) is committed to improve the availability of quality newborn care services in addition to renewing efforts in providing quality health care for women, infants and young children under the National Rural Health Mission (NRHM) and its Reproductive and Child Health Programme (RCH II). There is an increasing need to focus on newborn care and survival for significant reduction in IMR and U5MR and strengthen the care of sick, premature, low birth weight newborns at the various levels of facilities right from the moment to birth through the neonatal period. Hence, the need has emerged to evaluate the overall functioning of SNCUs in terms of utilization, performance on the basis of geographical and ecological factors, treatment outcome, socio-demographic and clinical factors, and functionality, availability and adequacy of the facilities at SNCU. As identifying the gaps, it help in the decision making process and the corrective actions can be taken immediately.

This study can be held in all the other districts of Haryana by Child Health Department, If State, through this tool, achieves a score of Mandatory >80 of each parameter in each of its facilities, Haryana can achieve the best Indian standards in Neonatal Care.

- **REVIEW OF LITERATURE**

1. O

perational guide on FBNC has been developed to facilitate planning, establishment, operationalization and monitoring of newborn care facilities at various levels of public health facilities. The guidelines given here will assist programme managers and service providers at national, state and district level in planning and delivering FBNC. The first section of the guide focuses on specifications and processes related to establishment of new facilities, while the second section provides technical guidance (key clinical protocols) to service providers working in newborn care facilities for managing sick newborns. The guidelines have been put together based on recommendations of an expert group that was set up by the Gal and included experts from medical colleges, professional bodies- National Neonatology Forum {NNF)and Indian Academy of Paediatrics (IAP) -and from UNICEF,WHO,USAID and NIPI.

The operational guide includes information on various aspects that need to be addressed for ensuring quality newborn care services and is organized in two sections.

Section I: Setting up, costing and operational steps

Section II: Key clinical protocols and other technical documents

Terminology

Newborn Care Corner (NBCC)

NBCC is a space within the delivery room in any health facility where immediate care is provided to all new borns at birth. This area is MANDATORY for all health facilities where deliveries are conducted.

Newborn Stabilization Unit (NBSU)

NBSU is a facility within or in close proximity of the maternity ward where sick and low birth weight new borns can be cared for during short periods. All

FRUs/CHCs need to have a neonatal stabilization unit, in addition to the newborn care corner.

Special Newborn Care Unit (SNCU)

SNCU is a neonatal unit in the vicinity of the labor room which will provide special care (all care except assisted ventilation and major surgery) for sick newborns. Any facility with more than 3,000 deliveries per year should have an SNCU (most district hospitals and some sub-district hospitals would fulfill this criteria).

1…Sutapa Bandyopadhyay Neogi, Sumit Malhotra, Sanjay Zodpey, and Pavitra Mohan (2011); **Assessment of Special Care Newborn Units in India**

The study was conducted to assess the functioning of SCNUs in eight rural districts of India. The evaluation was based on an analysis of secondary data from the eight units that had been functioning for at least one year. A cross-sectional survey was also conducted to assess the availability of human resources, equipment, and quality care. Descriptive statistics were used for analyzing the inputs (resources) and outcomes (morbidity and mortality). The rate of mortality among admitted neonates was taken as the key outcome variable to assess the performance of the units. Chi-square test was used for analyzing the trend of case-fatality rate over a period of 3-5 years considering the first year of operationalization as the base. Correlation coefficients were estimated to understand the possible association of case-fatality rate with factors, such as bed: doctor ratio, bed: nurse ratio, average duration of stay, and bed occupancy rate, and the asepsis score was determined. The rates of admission increased from a median of 16.7 per 100 deliveries in 2008 to 19.5 per 100 deliveries in 2009. The case-fatality rate reduced from 4% to 40% within one year of their functioning. Proportional mortality due to sepsis and low birth weight (LBW) declined significantly over two years (LBW <2.5 kg). The major reasons for admission and the major causes of deaths were birth asphyxia, sepsis, and LBW/prematurity. The units had a varying nurse: bed ratio (1:0.5-1:1.3). The bed occupancy rate ranged from 28% to 155% (median 103%), and the average duration of stay ranged from two days to 15 days (median 4.75 days). Repair and maintenance of equipment were a major concern. It is possible to set up and manage quality SCNUs and improve the survival of new born with LBW and sepsis in developing countries, although several challenges relating to human resources, maintenance of equipment, and maintenance of asepsis remain.

2. Gary L Darmstadt, Zulfiqar A Bhutta, Simon Cousens, Taghreed Adam, Neff Walker, Luc de Bernis, for the Lancet Neonatal Survival Steering Team; **Evidence-based, cost-effective interventions: how many newborn babies can we save?**

In this article of the neonatal survival series, we identify 16 interventions with proven efficacy (implementation under ideal conditions) for neonatal survival and combine them into packages for scaling up in health systems, according to three service delivery modes (outreach, family-community, and facility-based clinical care). All the packages

of care are cost effective compared with single interventions. Universal (99%) coverage of these interventions could avert an estimated 41–72% of neonatal deaths worldwide.

3. A.sen, D.Mahalanbis, A.K. Singh, T.K. Som, S. Bandyopadhyay (2009)
   To evaluate the impact of creating a sick newborn care unit (SNCU) in a district hospital on neonatal mortality rate (NMR). This study was conducted in a district hospital with 6500 deliveries a year. A 14 bed SNCU that included controlled environment, individual warming and monitoring devices, infusion pump, central oxygen and oxygen concentrators, resuscitation and exchange transfusion, portable X-ray and in-house laboratory was created. Doctors and nursing personnel were trained. Baseline data for 10 months were compared with 2 years data of SNCU operation. A 14 bed SNCU that included controlled environment, individual warming and monitoring devices, infusion pump, central oxygen and oxygen concentrators, resuscitation and exchange transfusion, portable X-ray and in-house laboratory was created. Doctors and nursing personnel were trained. Baseline data for 10 months were compared with 2 years data of SNCU operation. Compared with the baseline neonatal mortality in the district hospital, neonatal mortality was reduced by 14% in the first year and by 21% in the second year after SNCU became functional. Estimated neonatal deaths averted were 329, which would reduce NMR of the district from 55 to 47 in 2 years

4. A study of neonatal admission into a newborn special care unit. Nigeria journal of peadiatric 1994:21:20: A retrospective study of newborn babies admitted over a period of six year into the Newborn special care unit(NBSCU).the number of babies admitted was 5376.babies of LBW comprised 25.7percent of total admission.there was progressive annual increase in the admission of outborn babies from 0.7 percent in 1982 to 21.4 in 1987.there similar annual increase in admission of babies of LBW from 17.3 to 51.8percent.the overall mortality was high at 10.5 percent of the cases.

OBJECTIVE:

General Objective:

To assess the quality of services provided by Special Newborn Care Units (SNCU) and monitor and identify gaps in the functioning of SNCUs in selected districts of Haryana.

Specific objectives:

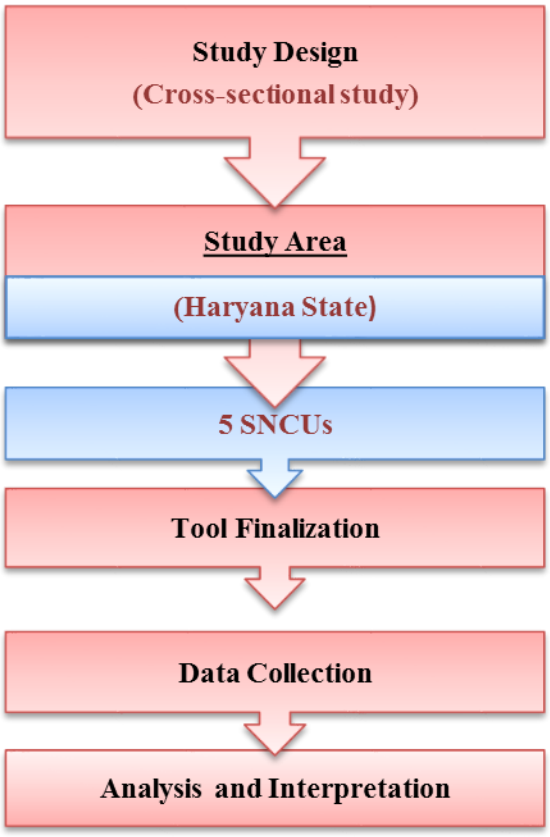
- To assess the quality of services provided by Special Newborn Care Units (SNCU) in Selected districts of Haryana on basis of following factors

- ✓ Services
- ✓ Infrastructure
- ✓ Equipments
- ✓ Human Resources
- ✓ Protocols and processes
- ✓ Facilities of thermoregulation
- ✓ Drugs ,fluid and nutrition
- ✓ Labor room/OT and resuscitation
- ✓ Infection control practices
- ✓ Laboratory facilities
- ✓ Case record maintenance

❖ To monitor and identify gaps in the functioning of SNCUs in selected districts of Haryana with help of national neonatal forum tool.

DATA & METHODS

❖ The study will be conducted to assess the functioning of selected SNCUs in the districts of Haryana.



Materials & Methods

Study area- Five districts of Haryana

Study Design - Cross-sectional study.

Study period –

Study population- Special newborn care unit of five districts of Haryana

Sampling Frame – SNCU are selected as per performance and convenience.

Sample Size – Total five SNCU, one at each district

Study Tool – A pre-designed, pre-tested structured questionnaire**.**

Data Collection Technique – Primary data collected from the SNCU's that have been functioning for past one year through NNF Self-Assessment Tool.

Data collection was done by me in the appointed SNCU for the study**.** For reference in future during data collection, an instruction manual was formulated by my state consultant of SNCU. I visited the SNCUs of district Gurgaon, Mewat, Rohtak, Narnaul, Bhiwani and filled the format developed for the study. Data collection was done in 10 days.

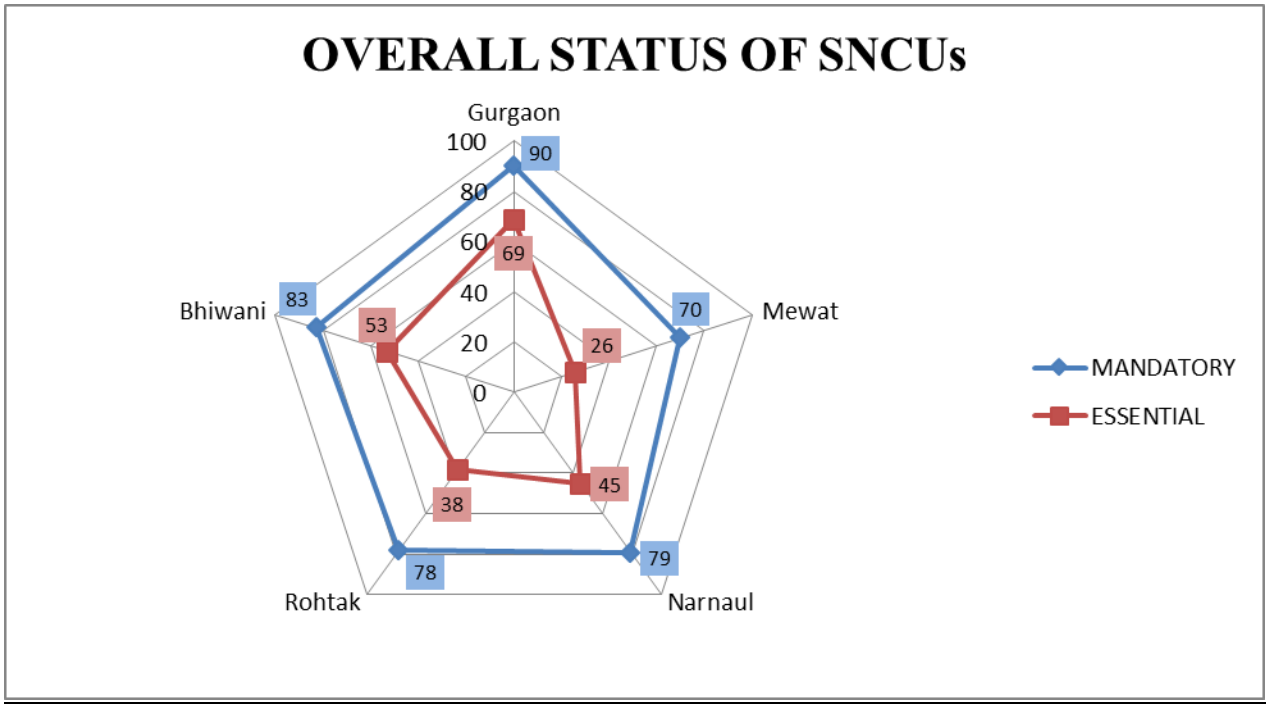
Following methods were used for data collection:

1. Recording secondary data on case wise information from SNCU record sheets/ registers and online software of SNCU at facility (data over the period of last 1 years (2013 - 2014).
2. These checklists (NNF format) captured information on following points
    - Services
    - Infrastructure
    - Equipments
    - Human Resources
    - Protocols and processes
    - Facilities of thermoregulation
    - Drugs ,fluid and nutrition

- Labor room/OT and resuscitation
- Infection control practices
- Laboratory facilities
- Case record maintenance

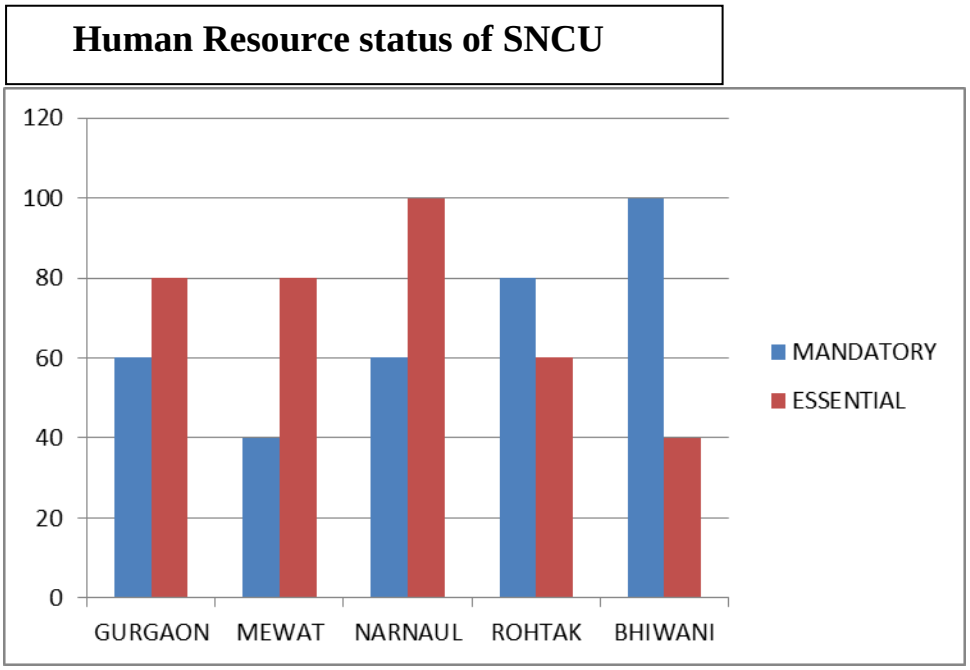
3. The national neonatal tools consist of two part i.e. Mandatory and Essential so all the above parameter were evaluated on the basis of mandatory and essential criteria. Proposed target for achieving the accreditation of SNCUs are Mandatory-100% and Essential-75%.
4. Structured tool to capture data on the variables to be explored for association with treatment outcome.

FINDINGS:-



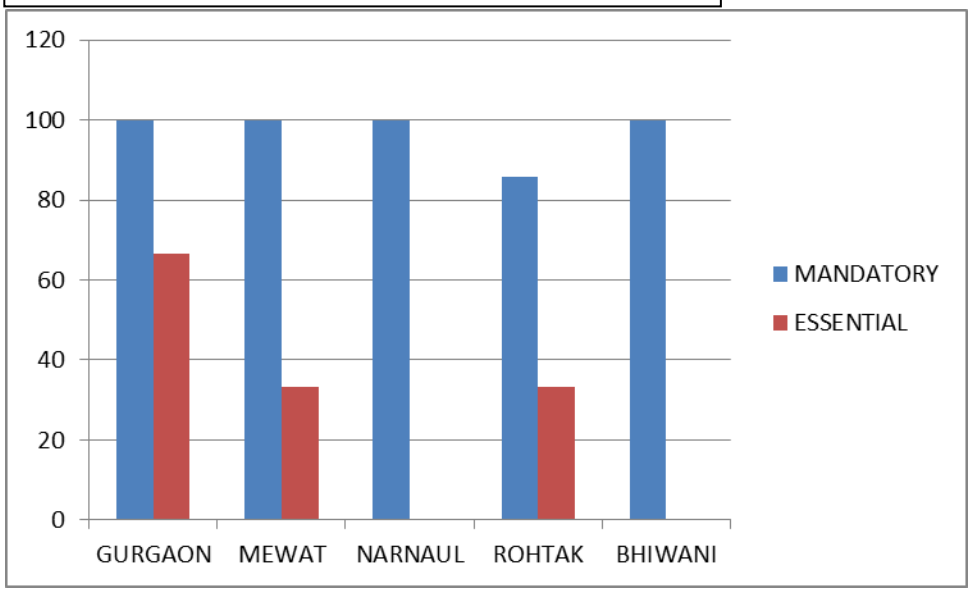
Above graph shows the overall status of SNCU in each districts of as per mandatory and essential Scoring in which Gurgaon scored Mandatory 90% Essential 69%; Mewat scored Mandatory-70%, Essential-26%; Narnaul scored Mandatory-79%, Essential-45%; Rohtak scored Mandatory-78%, Essential-38%; Bhiwani scored Mandatory-83%, Essential-53%. Above graph shows that progress in matching up with the Mandatory criteria is far better than Essential Criteria. Scope of improvement is there in all the districts with Mewat needs more focus on both the mandatory and essential criteria. As seen in the graph a great deal of improvement is required in all the districts regarding the achievement of essential criteria of accreditation.

Now the below graph shows the scoring of Mandatory, Essential per individual component:-



Above graphs shows that only Bhiwani has achieved 100% in the mandatory criteria and Narnaul has achieved 100% in essential criteria. Gurgaon-mandatory-60%, essential-80%, Mewat-mandatory-40%, essential-80%, Narnaul-mandatory-60%, essential-100%, Rohtak- mandatory-80%, essential-60%,Bhiwani- mandatory-100%, essential-40%,

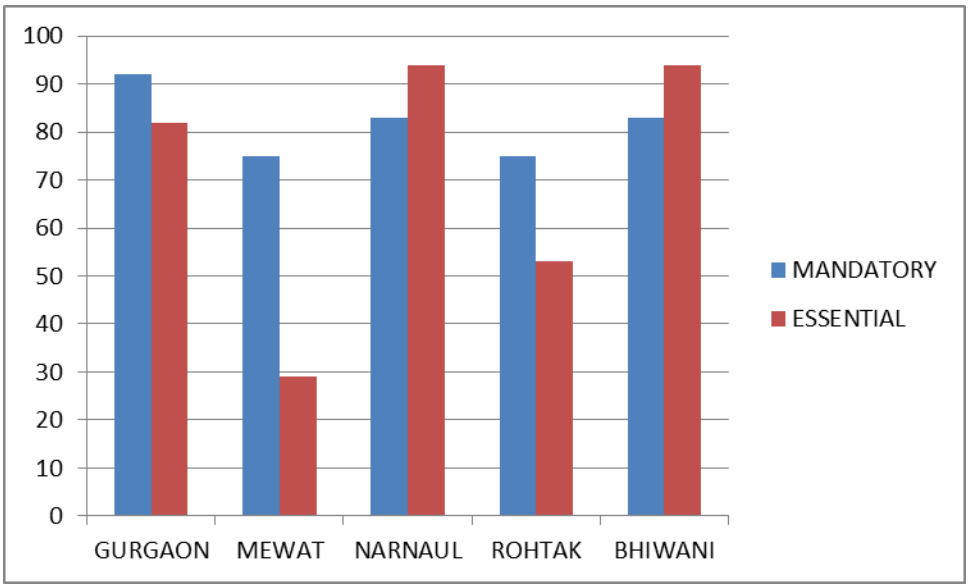
Service status of SNCU at Districts



Above graphs shows the services status of SNCUs in which Gurgaon, Mewat, Narnaul, Bhiwani are scoring 100% in the mandatory criteria, but Rohtak needs improvement to attain the 100% figure. Great focus needs to be given on the esential parameters beacause they are low scoring in all the districts and Narnaul, Rohtak have not even scored in the essential criteria.

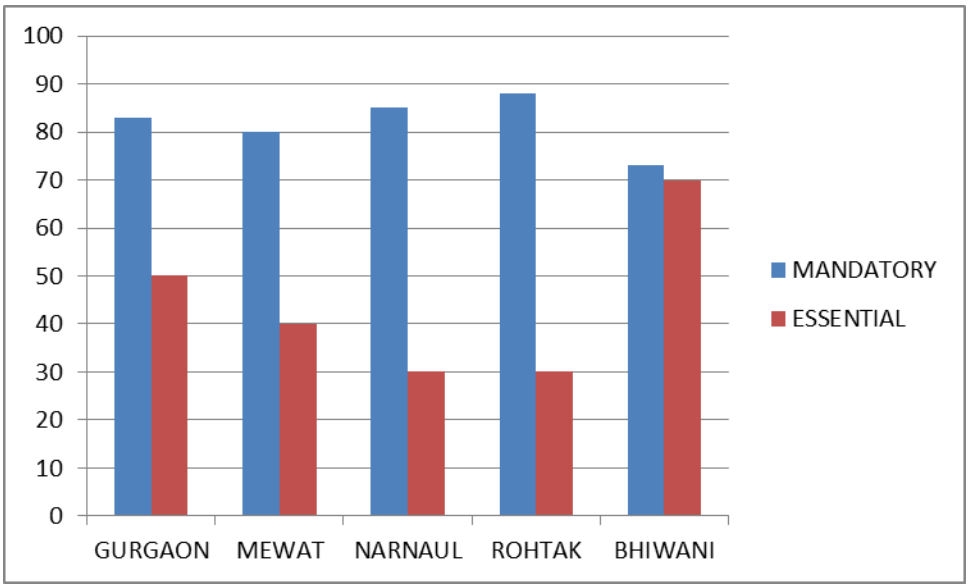
INFRASTRUCTURE:-

Infrastructure status of SNCU at Districts



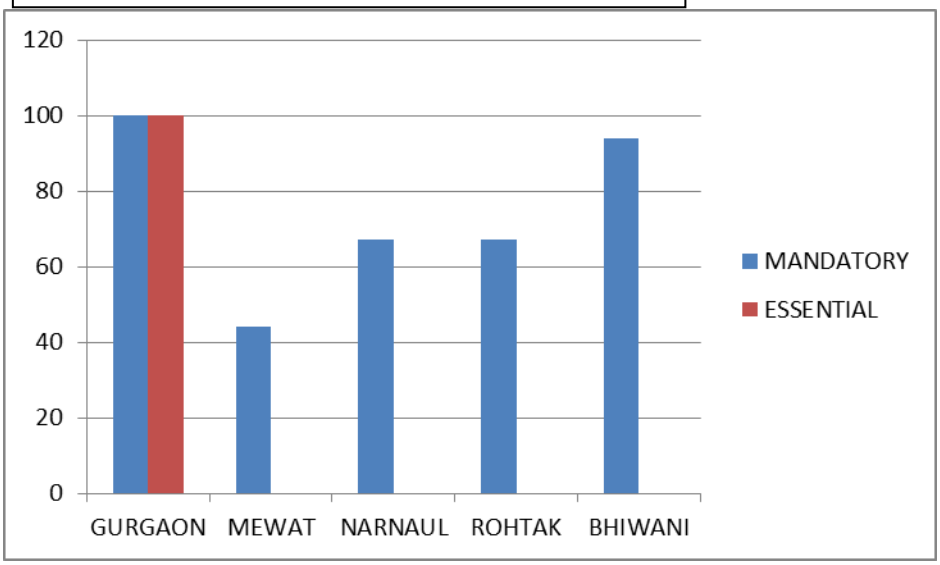
Above Graph shows the the scoring of infrastructure status of SNCU of each Districts in which Narnaul and Bhiwani score almost above 80% in Mandatory and above 90% in Essential scoring,while Gurgaon scored above 90% in Mandatory and above 80% in essential scoring, Mewat and Rohtak are scoring on the lower side. Both are scoring 75% in mandatory criteria while mewat in scoring only 29% in the essential criteria.

Equipments status of SNCU at districts



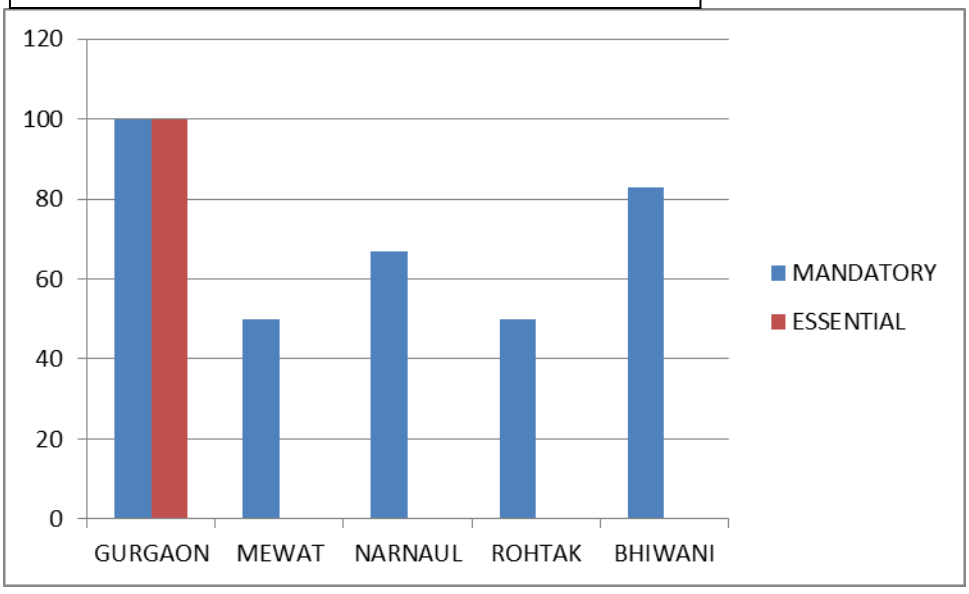
Above Graph shows the the scoring of Equipments status of SNCU of each Districts in which Gurgaon, Narnaul, Rohtak are above 80% in mandatory criteria, while Mewat is scoring 80% in the mandatory criteria and bhiwani scoring the least 73% among the 5 districts. In the essential criteria bhiwani scoring the highest 70% followed by Gurgaon at 50%, Mewat-40% and Narnaul and Rohtak at 30%.

Protocols status of SNCU at districts

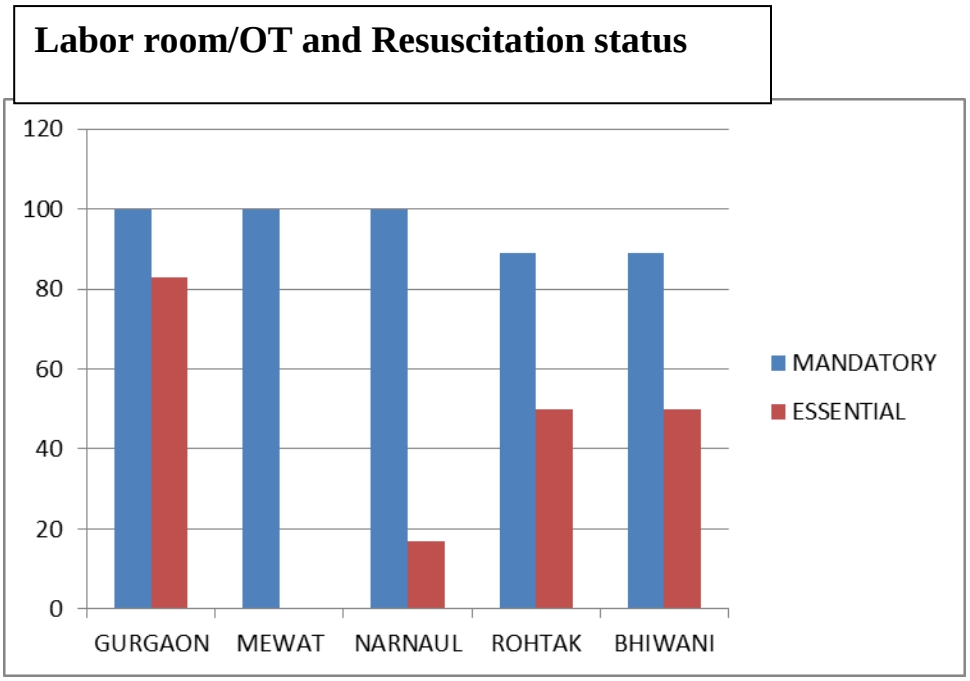


Above graph shows that only Gurgaon is scoring in essential section, while all other districts are scoring zero in essential criteria.and Mandatory scoring of Gurgaon-100%, Mewat-44%, Narnaul-67%, Rohtak-67%, Bhiwani-94%.

Drugs fluids and nutrition status

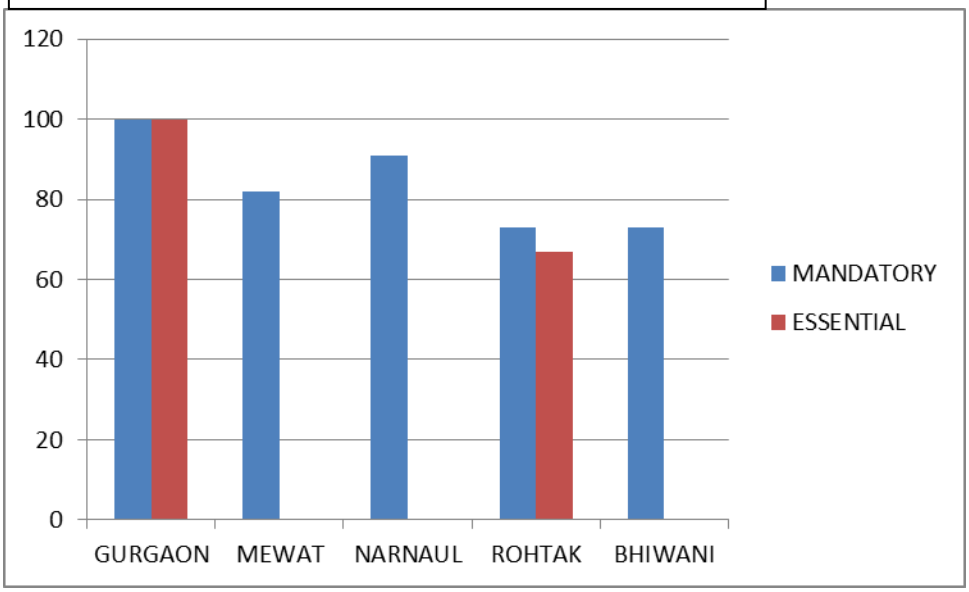


Above graph shows that Gurgaon is scoring 100% in both mandatory and essential sections, while all other districts are showing zero score in essential section. In mandatory section Mewat and Rohtak are scoring 50%, Narnaul-67% and Bhiwani is scoring 83%.



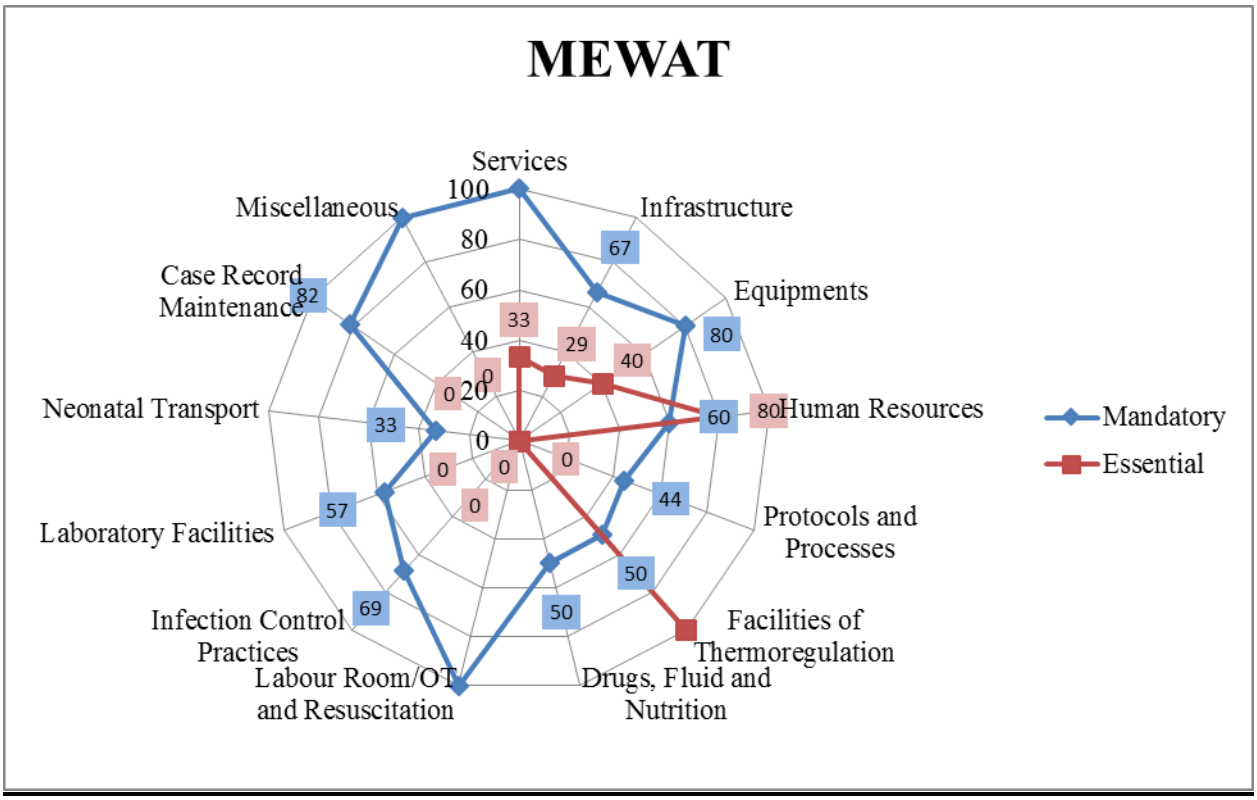
Above graph shows status of New born care corner in labour room/ OT and status of Resuscitation,in the districts. Gurgaon, Mewat, Narnaul are scoring 100% in mandatory criteria while Rohtak and Bhiwani scoring 89% in mandatory criteria. In the Essential criteria Gurgaon-83%, Rohtak and bhiwani-50%, Narnaul-17% and Mewat-0%.

Case Record Maintenance

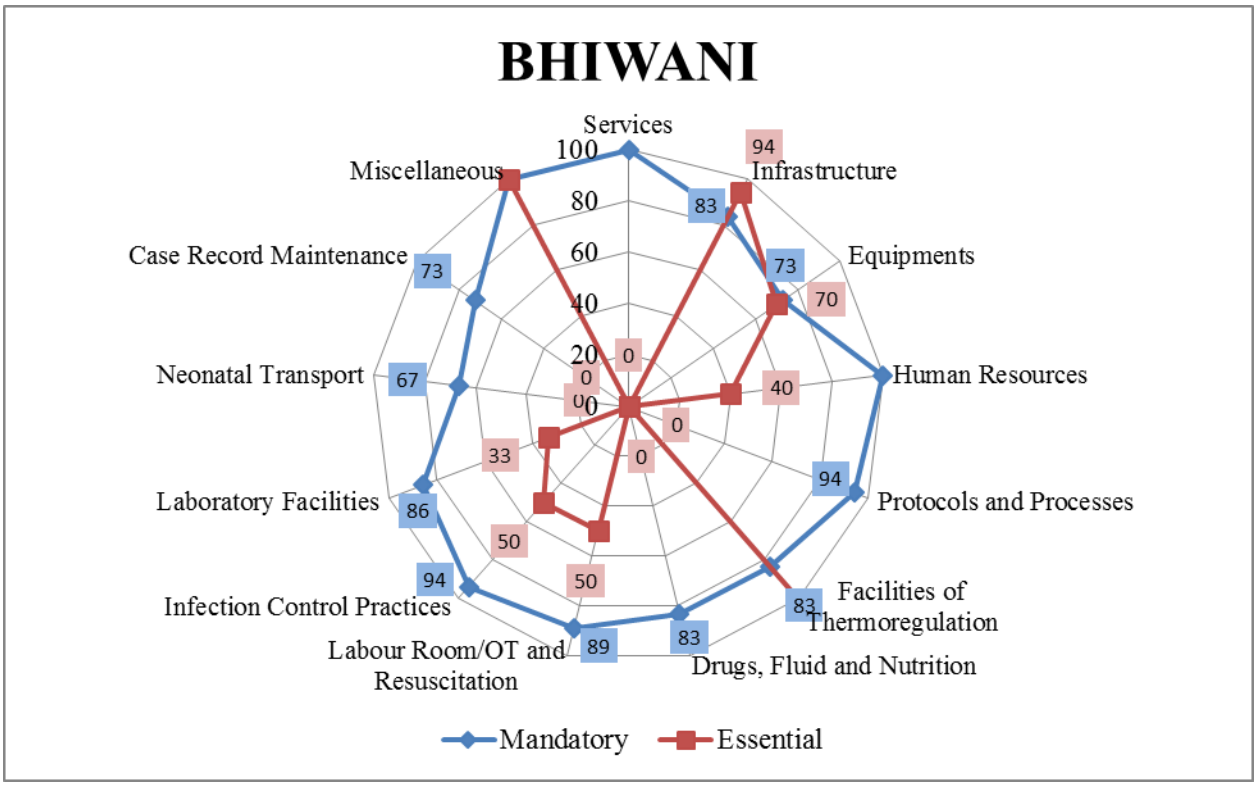


Above graphs shows status of maintaing case sheet of delivery and baby notes in which Gurgaon scored 100 in both the criteria. Rohtak and Bhiwni scored 73% in mandatory. Narnaul scored 91 % in mandatory while Mewat scored 82%. In essential Rohtak scored 67% while Mewat, Narnaul, Bhiwani scored zero percent.

SNCU scoring status of each Districts on basis of each parameters which were used to assess the quality of special new born care units.



The Mandatory Criteria (Blue) in the graph depicts the target to be achieved in each section available at the facility. The Essential Criteria (Red) depicts the target to be achieved in each section available at the facility. There is a wide scope of improvement in both the sections, but more focus need to be given on the essential criteria.



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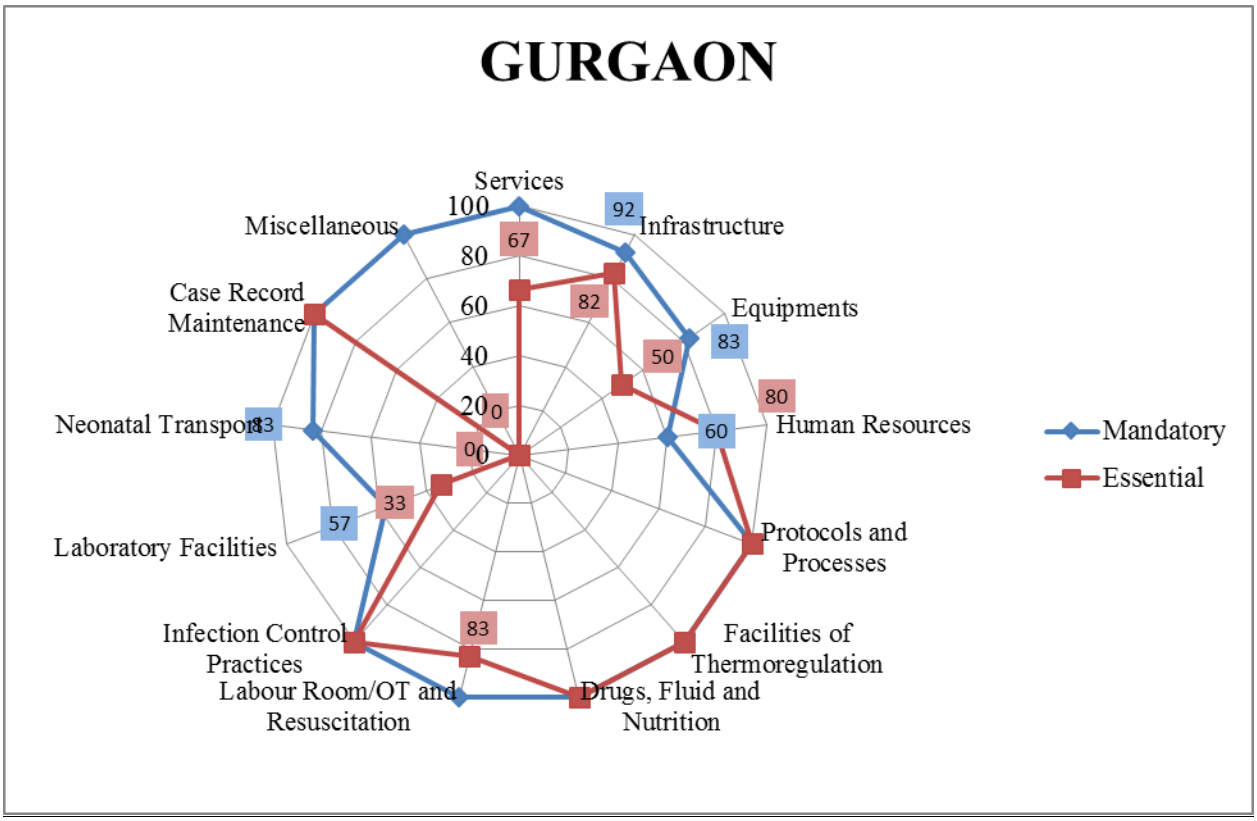

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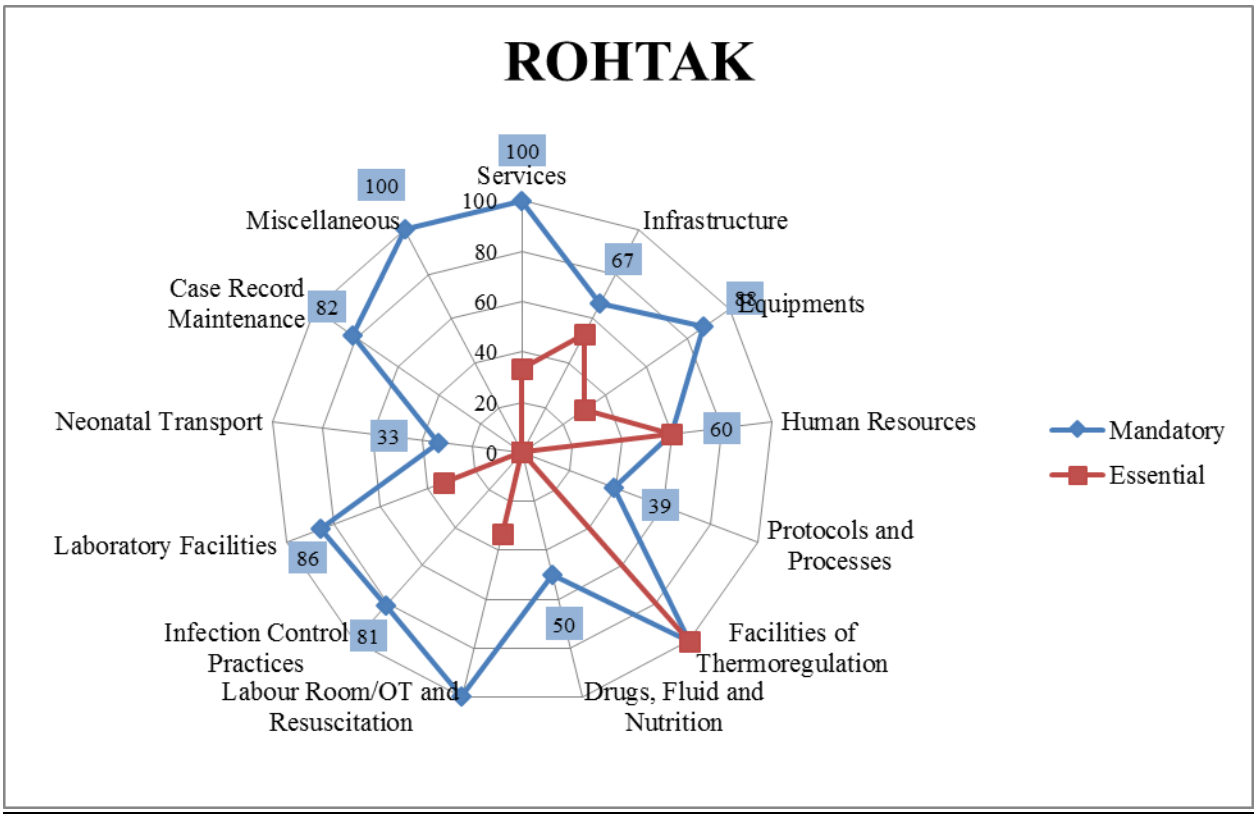

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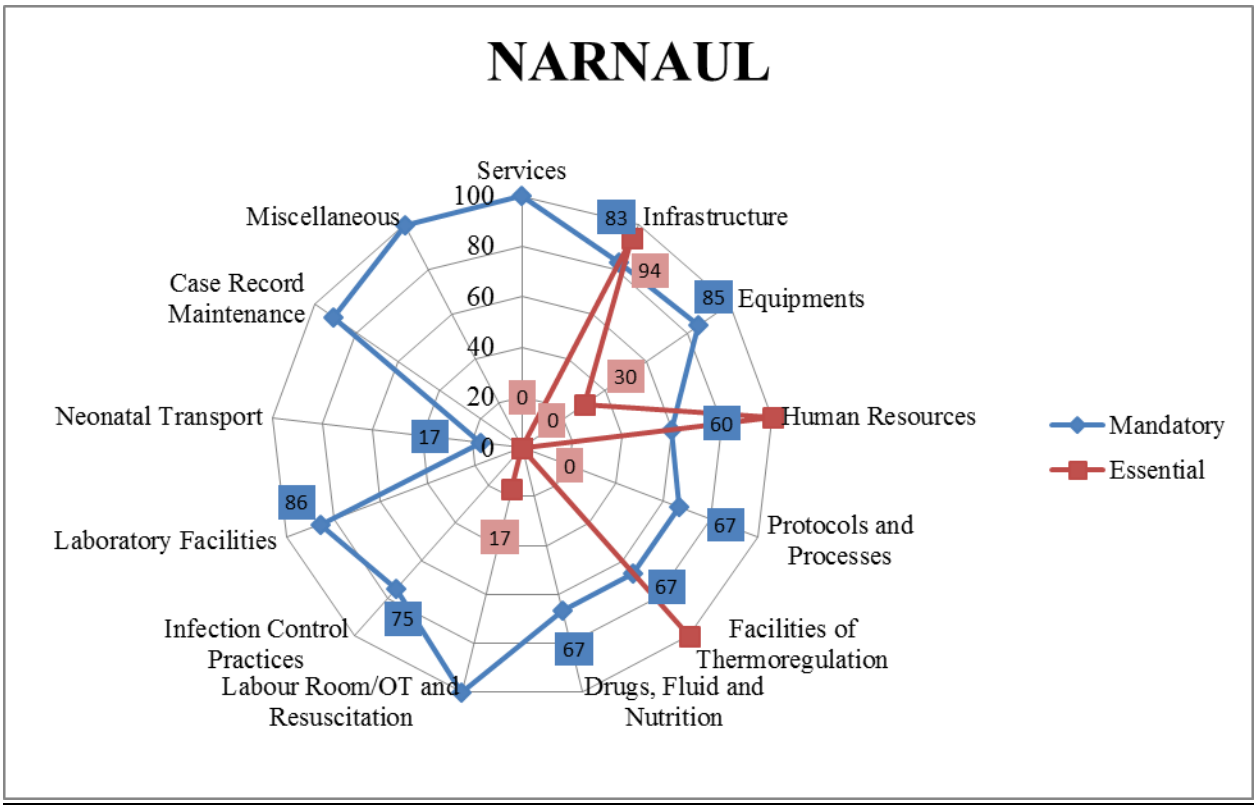

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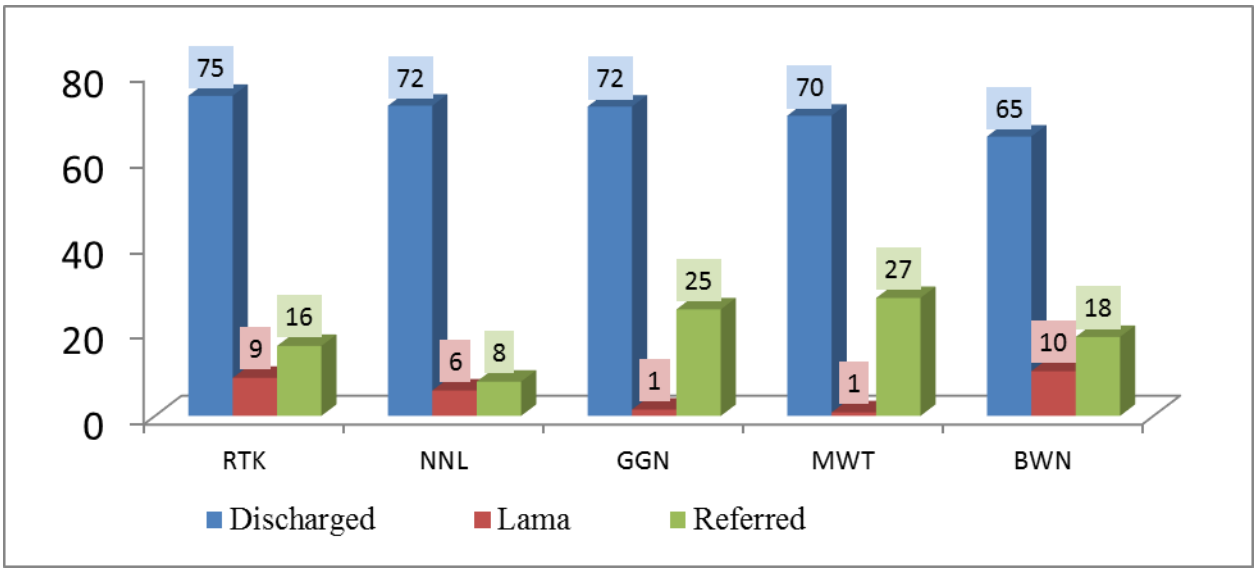
Treatment Outcome in SNCUs



Discussion:-

It was observed that the mandatory and essential criteria were not met in any of the SNCUs. According to the guidelines each component should be met for accreditation, nevertheless the total score was satisfactory. This was conveyed to the respective SNCU in-charge and necessary actions were taken to meet up the requirements.

In the services section every district has scored satisfactorily, only Rohtak has scored 86%, The Essential criteria in the services section have a wide scope of improvement, Narnaul and Bhiwani have not even scored, while Gurgaon, Rohtak, Mewat have scored low. In the infrastructure section all the SNCU'S are well equipped with all the needed equipment's required for proper functioning of SNCU. Gurgaon have scored above 90%, Narnaul and Bhiwani have scored more than 80%, Mewat and Rohtak were the lowest scoring district with a score of 75%. Low scoring of mandatory section is due to non-availability of adequate building. SNCU is functioning in a single room where area per bed has been compromised. In the essential section Gurgaon, Narnaul Bhiwani has scored above 80%, Rohtak 53% and Mewat 29%. The issues leading to the low score in the building issues, Essential criteria such as Hand washing area, Doctors duty room, Nurses changing room, Breast feeding room are not available at some facilities. In the equipment section mandatory scoring has been above 80%in Gurgaon, Narnaul, Rohtak, Mewat has scored 80% and Bhiwani has scored 73%. The scores of the facilities can further be improved by addition of more oxygen delivery points to fulfill the criteria of oxygen delivery at each bed. In the essential section Bhiwani is scoring highest followed by Gurgaon, Mewat and Narnaul and Rohtak are the lowest scoring. Scores are low due to non-availability of equipment's such as ABG analysis, Multipara monitor for each bed, CT scan and MRI facilities. In protocol and processes section the scores are less in the mandatory criteria because there are many processes which are being followed in the SNCU but the protocols are neither displayed nor are they documented in the SNCU. Some of the processes which are not documented are grievance counseling, admission and discharge policy, policy of equipment management, troubleshooting of equipment, sepsis screening, and transport protocols. In neonatal resuscitation the labor rooms of all the selected districts are well equipped to manage any emergency arising in the newborn immediately after delivery.

In case of infection control practices, eight criteria were used to assess infection control practices in the SNCUs. The staff was well aware with the hand washing protocols and IEC material regarding hand washing was also displayed at the hand washing area. The lacking areas were, there was no written down antibiotic policy, written guidelines for equipment disinfection, periodic bacteriological surveillance was not conducted at any of the SNCU'S. In lab facilities, five criteria were required. All the districts have achieved the requisite target of mandatory but the essential score of all five districts were less than the targets so need to improvise them. The scores were less because there were some tests such as blood culture, ABG analysis, Thyroid tests which were not conducted at the facility. The facilities for neonatal transport play a main role in the hospital because if the infant is in critical condition, he/she has to be referred to higher institution. Mandatory criteria in this sector has been achieved at a satisfactory level in Gurgaon, Rohtak, Bhiwani but Mewat and Narnaul need to improve a lot in this section. It is due to non-availability of some equipment's such as pulse oxymeter, infusion pumps in the ambulance, follow up of the referred babies are not done at the facilities.

Conclusion

A modern sick newborn care facility created in a district hospital can substantially reduce hospital neonatal deaths and NMR of the district. This model may be an effective tool to reduce NMR of the country. Mandatory Requirements and Facilities for Thermoregulation were not met by any of the districts. Protocols and processes, Human Resources, Drugs, IV Fluids Management and Nutrition, Neonatal Resuscitation in Labor Rooms, Infection Control Practices and Case Record Maintenance criteria were met by maximum districts whereas district Mewat lacks in maximum sections.

Mewat and Narnaul district need improvement in Facilities for Neo-natal Transport. The criteria in Physical Infrastructure Facilities are needed to be improved in district Mewat.

Depending upon the NMR, SNCU's are much required in each district to prevent the deaths of newborn.

Suggestions

On the basis of analysis, an attempt has been made to present recommendations for strengthening SNCU's service delivery in Haryana. These recommendations are organized in sections as given below:

1) **Manpower:**
    - Number of sanctioned positions (4) of class IV staff must be fulfilled for the proper cleaning and dusting of SNCU.
    - Sanctioned positions of Medical Officers(4) for SNCU must be fulfilled for the better and smooth functioning of SNCUs .

2) **Training:**
    - All medical staff must be FBNC trained as early as possible after joining in SNCU and at least one FBNC trained MO must be available round the clock at the SNCU.
    - All staff members of SNCU must be trained in handling equipment's independently.

3) **Infrastructure:**
    - There must be separate area in SNCUs for mothers of out born babies and also a separate area for keeping asymptotic high risk babies along with their mothers with good nursing cover, beds and separate toilets/washrooms for mothers.
    - There must be some contingency space for shifting the unit in case of epidemics.
    - Power audit must be done in the unit.
    - There must be some medium like mike/bell for communication between staff available in the SNCU and parents/relatives of baby outside the SNCU so that no outsider have to enter inside the SNCU to know the condition of their admitted baby or to talk with the staff for any other reason. E.g. Mike was available at the entrance of SNCU of DH Narnaul for the parents/relatives of admitted baby to contact with the SNCU staff easily without entering into the unit.
    - Lab facility must be available at the unit. Facilities like blood culture, exchange transfusion, CPAP, short term ventilation, CT scan, echocardiography, portable X-ray be available also at the unit to improve the functioning of SNCU and also to reduce referral rate.
    - Counselors must be provided phone facility for counseling of parents and follow up of infant till one year. E.g. Bhiwani counselor did not have separate landline for follow up of community.

4) Equipment's and Supply:

- Equipment's for SNCU like radiant warmers, monitors, pulse oxymeter, suction machines, oxygen concentrators, breast pumps, head boxes etc. must be provided on the basis of delivery/admission load in each SNCU instead of as per standard only. But at least, each SNCU must have all equipment's as per standard. During the visits for this study, it was seen that most of the SNCUs were placing two babies under one radiant warmer.
- There must be transport incubators available with the unit in case of referral of baby to other facility.
- Repair of any equipment of SNCU must be done as early as possible and within the time limit.
- Guidelines/written instructions/protocols must be displayed in the unit to handle or operate equipment's and also for management of common newborn conditions. Staff must follow these guidelines. As in above study only few districts having protocols.
- Other general equipment's like washing machine for laundry, refrigerator for storing mother's milk and vaccines, vacuum cleaner for cleaning of unit, adequate number of surgical equipment sets and spot lamps must be provided separately to the unit.
- There must be separate generator /inverter, UPS for uninterrupted power supply in the unit.

5) Cleaning and disinfection:

- Guidelines/written instructions/protocols must be displayed in the unit for the unit's cleaning, disinfection and fumigation routines, for method of equipment cleaning and disinfection. Staff must follow these guidelines.
- There must be at least one wash basin with soap having mechanism which doesn't require use of washer's hands (e.g. elbow or foot operated taps) for every 5 beds. Poster on hand washing should be displayed at all hand washing stations
- Adequate quantity of disinfectants, soaps, diapers, eye patches for phototherapy, disposable hand wipes/sterile paper, colour coded BMW bins must be available in the unit.
- There must be an infection control committee for the periodic bacteriological surveillance of the unit.
- There must be separate uniform or gowns, slippers, masks, caps and gloves to enter in the unit and it must be followed by everyone entering into the Unit.
- There must be separate routes for clean and dirty linen going in and out of the unit and housekeeping staff must do vacuum cleaning of the unit regularly.

6) Case record management:

- Case sheets and old records related to SNCU must be available at any time and kept properly within the hospital.
- Signature of "on duty nurse'' must be present with the daily charting of temperature, pulse and fluid input/output in case sheets and growth chart which include height and weight regularly.

7) Software improvement:

- There must be a specified condition in software to accept lower value in "Age at marriage" than the "Mother's age".
- Data entry operator must be aware of the medical terms used in software and some training should also be given to them to enhance their knowledge about these terms so that the correct data must be entered in software. E.g. Gravida, Para, live birth etc.
- In final diagnosis, the option "Any other diagnosis" must be selected only when there is no other relevant
- Option found in the drop down list and it must be updated correctly in the space given.
- In case of inborn admission, there must be no need to enter the place of delivery. Mode of transport must be blocked automatically in this condition.
- Place of delivery must be entered correctly.

8) Improvement in admissions:

It is observed from analysis that there is a big difference in number of inborn and out born admissions in some SNCUs in Haryana. So it is important to increase number of out born admissions in SNCU by increasing their catchment area by maximizing referral from community and other health facilities to SNCU. There is a need to-

- Create awareness among community about all services provided at SNCU without any charges to save lives of newborns.
- Create awareness among community about free ambulance service provided by government for referral.
- Sensitize staff of private hospitals or nursing homes and peripheral health facilities to refer sick newborns as soon as possible to nearby SNCU.

9) Improvement in referral rate:

There is a need to reduce number of referrals from SNCU to higher centres by providing all required facilities (e.g. lab tests) at that level.

10) **Improvement in LAMA:**

There is a need to counsel and sensitize parents/relatives of newborn not to take their babies from SNCU to home against medical advice.

Limitations

1. **Difficulty in collecting case sheets from SNCU:**
    - During assessment, it is observed that most of the SNCUs are not maintaining their case records properly and the data required is not available physically in form of case sheets at some SNCUs. So, it is decided to extract this data from online software of SNCU.
    - Due to insufficient time available & lack of resources , this study was carried out with small sample. Although data are available, more results can be found.

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