

**PRC Report Series 2019 -7
2018-19:11**

**Assessment of Newborn Care Corners (NBCC) &
Newborn Stabilization Units (NBSU) in Secondary
level health care facilities in Kerala**

Dr. A. SREERANJINI

Dr. SARITHA P VISWAN

Mr. ANILKUMAR K

**Population Research Centre
Ministry of Health and Family Welfare
Government of India
University of Kerala,
Thiruvananthapuram
2019**

Contents

	<i>Foreword</i>	2
	<i>List of Tables</i>	2
	<i>Executive summary</i>	3
1.0	Introduction	4
2.0	Objectives	10
3.0	Data and methods	11
4.0	Findings and Discussion	11
4.1	State profile of NBSU	12
4.2	Parassala Taluk Head Quarters Hospital	14
4.3	Chirayinkeezhu Taluk Hospital	17
4.4	Nedumangad District Hospital	19
4.5	Taluk Head Quarters Hospital Nedumkandam	23
4.6	Thodupuzha District Hospital	25
4.7	Perinthalmanna District Hospital	26
4.8	Tirur District Hospital	31
4.9	Nilambur District Hospital	35
5.0	Conclusion	37
	References	39

Foreword

Newborn care is accorded specific importance in the state of Kerala in its attempt to seek further declines in neonatal mortality. The importance of newborn health care at the public healthcare facilities was given emphasis during the decade 1990-2000. Inpatient care of small and sick newborns in the public health system got a boost through facility-based newborn care (FBNC) with the launch of the National Rural Health Mission. This has led to a nationwide creation of Facility-based newborn care (FBNC) such as Newborn Care Corners (NBCC) at every point of child birth, newborn stabilization units (NBSUs) at First Referral Units (FRUs) and special newborn care units (SNCUs) at district hospitals. FBNC refers to round-the-clock clinical services provided by skilled personnel at healthcare facilities. The authors here attempt to assess the functioning of NBSUs at public health facilities in Kerala.

The authors place on record sincere gratitude to the Secretary, Health and Family Welfare, Government of Kerala for permitting to carry out the study. Sincere gratitude goes to the Public Relations Officers, Pediatricians and Nursing staff, superintendent of the hospitals for providing necessary support to carrying out the study.

I appreciate the authors of the study Dr. A. Sreeranjini, Research Investigator, Dr. Saritha P Viswan, Data Assistant and Mr. Anilkumar K, Research Investigator of the PRC in successfully completing the study. The gaps identified will definitely help the policy makers and planners in improving and refining the working of NBSUs in health care facilities in Kerala.

Kariavattom

March 2019

Dr. P Mohanachandran Nair

Director- in – charge

List of tables

Table number	Table title	Page number
4.1.1	List of functional NBSUs in Hospitals of Kerala as on November 2018 according to two sources of information	9-10
4.2.1	New born services available at Taluk Head Quarters Hospital Parassala.	12
4.3.1	New born services available at Taluk Headquarters Hospital Chirayinkeezhu.	14
4.4.1	New born services available at District Hospital Nedumangad.	16
4.5.1	New born services available at Taluk Head Quarters Hospital Nedumkandam	19
4.6.1	New born services available at District Hospital Thodupuzha	22
4.7.1	New born services available at District Hospital Perinthalmanna	24
4.8.1	New born services available at District Hospital Tirur.	27
4.9.1	New born services available at District Hospital Nilambur.	35

Executive Summary

India carries the single largest share (around 25-30%) of neonatal deaths in the world. Neonatal deaths constitute two-thirds of infant deaths in India; 45% of the deaths occur within the first two days of life. Kerala ranks highest in terms of health indicators and is also ranked lowest in terms of neonatal deaths with six per 1000 live births against the national average of 25, yet the rate of neonatal deaths remains stagnant for more than three years. Kerala has unique and specific challenges of sustaining the attained status and to further reduce effective new born strategies are attempted. Three levels of neonatal care are 'Newborn care corners' 'NBSUs and SNCUs. When SNCUs cater to the newborn care in district level hospitals, the NBSUs take this role in the Taluk hospitals. All delivery points have the NBCCs. The present study attempts to assess the status of availability of NBCCs & NBSU and services being provided in public health facilities

The study revealed that some of the facilities visited are lacking sufficient space for the functioning of the NBSU. The availability of infrastructure was moderate as most of the equipment is available. No separate staff is dedicated for the functioning of the NBSU and the human resource available is inadequate even for the regular functioning of the hospital. The NBSU units were set up in most of the facilities on a prior date but some of them have not yet started working. The reasons indicated were inadequacy of space near post natal wards, space limitation within the unit to properly arrange the four units and other designated spaces, lack of designated staff for managing the unit, lack of trained personnel. Majority of the hospitals have functioning equipment, water and electricity mostly available and civil structure as per guidelines. Repair of damaged equipment must be done on a regular basis under annual maintenance contract to enable timely and proper care to all new born. NBSU and NBCC available in the hospitals are having structural area rather than functional area. The major bottleneck in getting the unit operational and sustaining it is the unavailability of designated manpower at NBSUs. Most of the facilities lack trained staff and the routine posting and transfer of trained staff also pose problems in some of the facilities. Most of the facilities have inadequate and overcrowded labor room and post natal wards. This also is a hindrance in imparting proper care at the NBSUs.

Assessment of Newborn Care Corners (NBCC) & Newborn Stabilization Units (NBSU) in secondary level health care facilities in Kerala

1.0 Introduction

Improving or withstanding the child survival must be the priority of any region. The neonatal mortality (mortality within 28 days of death) rate of India is 25 and ranked 31 among the 184 countries. The highest neonatal rate is reported in India as among the other countries of the world. In India about 0.75 million neonate deaths is reported every year, the highest for any country in the world. India carries the single largest share (around 25-30%) of neonatal deaths in the world. Neonatal deaths constitute two-thirds of infant deaths in India; 45% of the deaths occur within the first two days of life. Reducing child mortality is the goal 4 set by the MDG set by the UNICEF. According to expert opinion (UNICEF Kerala – Tamil Nadu region chief Job Zachariah) it is argued that concentrating more on the proper breast feeding practices and treating congenital disease in newborns the neonatal deaths can be further reduced. The three major causes of neonatal deaths worldwide are infections (36%, which includes sepsis /pneumonia, tetanus and diarrhoea), pre-term (28%), and birth asphyxia (23%).

¹India has recognized the importance of newborn health at the public healthcare facilities during the decade 1990-2000. Inpatient care of small and sick newborns in the public health system got a boost through facility-based newborn care (FBNC) with the launch of the National Rural Health Mission. Facility based care includes essential care at birth and care of sick babies in different facilities. This has led to a nationwide creation of Facility-based newborn care (FBNC) such as Newborn Care Corners (NBCC) at every point of child birth, newborn stabilization units (NBSUs) at First Referral Units (FRUs) and special newborn care units (SNCUs) at district hospitals. FBNC refers to round-the-clock clinical services provided by skilled personnel at healthcare facilities. It has been estimated that about 70% of neonatal

¹Birth asphyxia - medical condition resulting from deprivation of oxygen to a newborn infant that lasts long enough during the birth process to cause physical harm, usually to the brain.

deaths could be prevented if proven interventions are implemented effectively with high coverage.

Three levels of neonatal care are envisaged. Newborn care corners are established at every level to provide essential care at birth, including resuscitation. Level I care includes referral of sick newborns from Primary Health Centres (PHCs) to higher centres and care at Neonatal Stabilization Units (NSUs/NBSUs) in the first referral units. These are 4 bedded units with trained doctors and nurses for stabilization of sick newborns.

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 Care Newborn Units (SCNUs) at the district hospital level. These units are equipped to handle sick newborns other than those who need ventilator support and surgical care. The level III units are the neonatal intensive care units. It has been estimated that around 15-20% of all newborns require level II care in rural settings. NBCC(New Born Care Corner) to be available in the Labour Rooms(LR) at all points of childbirth including PHCs and Sub centres identified as MCH level 1. In CHCs and FRUs identified as MCH level 2 hospitals NBCCs must be set at Labour rooms and Operation Theatre (OT) and NBSUs at the facility. At District Hospital identified as MCH Level III NBCCs must be set at Labour rooms and Operation Theatre(OT) and Special Newborn Care Unit (SNCU)

NBCC is a space within the delivery room where immediate care is provided to all newborns. NBCC provides an acceptable environment for all infants at birth, and it is mandatory for all delivery points at all levels in the health system including operation theatres. NBSU is the first point of referral for the sick newborns that have not received the desired attention and have remained as a weak link in most districts. Other challenges include shortage of paediatricians, poor infrastructural facilities and absence of mechanisms for the timely repair of equipment. It is thus important to assess the status of availability of NBCCs and NBSUs and to understand the operational wedges that affect the effectiveness. To deliver utmost care it is proposed in the guidelines that trainings must imparted to Medical officers, Staff nurses and ANMs at CHC/FRUs and 24x7 PHCs where deliveries are taking place. The proposed trainings are F-IMNCI (Facility Based Integrated Management of

Neonatal and Childhood Illness), NSSK (Navajat Shishu Suraksha Karyakram) and FBNC (Facility Based Newborn Care).

The requirements for setting up of NBCC

Designation of newborn care corner in labour room

Labour rooms in every facility at every level are required to have appropriate facility for providing essential care to newborns and for resuscitating those who might require it. Newborn care corner in this document refers to the space within the labour room for providing immediate newborn care to all newborns.

Services to be provided at the corner

Newborn care corner provides an acceptable environment for all infants at birth. Services provided in the Newborn care corner include essential care at birth, resuscitation, provision of warmth, early initiation of breastfeeding, weighing the neonate

Configuration of the corner

Clear floor area should be provided for in the room for newborn care corner. It should be within the labour room, 20-30 sq ft in size, where a radiant warmer is kept. Resuscitation kit should be placed in the radiant warmer. Availability of oxygen source is desirable but not essential. The area should be away from draughts of air and should have appropriate power connection for plugging in the radiant warmer.

Human resources:

Staffing: One staff nurse or ANM is desirable in addition to the one conducting the delivery for providing appropriate care at birth

Training: All staff posted at the labour rooms should be trained in providing essential care at birth and basic resuscitation.

The requirements for setting up of NBSU

Every first referral unit must have clearly established arrangements for the prompt, safe and effective resuscitation of babies and for the care of sick newborns. Most sick newborns can be stabilised at this level. Services to be provided at a Stabilisation Unit at an FRU or an equivalent facility are: Care at birth, provision of warmth, resuscitation, monitoring of vital signs, initial care and stabilization of sick newborns, care of low birth weight newborns not requiring intensive care, initiating breast feeding and feeding support and referral services.

Configuration of a stabilisation unit

The stabilization unit should be located within or in close proximity of the maternity ward, space of approximately 40-50 sq. ft. per bed is needed, where four radiant warmers can be kept, in a total space of around 200 sq. ft. provision of hand washing and containment of infection control should be there, if it is not a part of the delivery room

Human resources

Staffing: One dedicated nursing staff needs to be available round-the-clock for newborn care in the stabilisation unit. One Medical Officer skilled in newborn care or paediatrician is required for clinical care and oversight

Training: Doctors and nurses posted in the stabilisation unit must undergo skill-based training for 3-4 days.

Referral services: Each unit accepting sick newborns and required to make neonatal referrals should have, or have access to, an appropriately staffed and equipped transport service.

Resuscitation of new born, breast feeding, prevention and management of hypothermia, kangaroo mother care in health facilities and community-based case management of pneumonia are the effective postnatal methods to improve the health of the new born. According to the SRS 2013 report, over 12 percent of all deaths occur below one year of age. However the neonatal mortality rate (NMR)

declined from 52 per 1000 live births in 1990 to 28 per 1000 live births in 2013, but the rate of decline has been slow and lags behind that of infant and under-five child mortality rates. Out of the total neonatal deaths, the early neonatal deaths are relatively more. It cause effective interventions do not reach societies who need them the most. This gap is due to poor coverage within the health system, shortage of health care providers, and issues related to access to referral services. During the year 2013, the early NMR was estimated to be 22 and late neonatal death is 6 per 1000 live births (SRS 2013). These trends highlight the importance and requirement of intervention in reducing the deaths during the neonatal period.

Though Kerala ranks highest in terms of health indicators also ranked lowest in terms of neonatal deaths with six per 1000 live births against the national average of 25, the rate of neonatal deaths remains stagnant for more than three years. Kerala has unique and specific challenges of sustaining the attained status and further reduce if possible with effective utilization of the resources. According to the available statistic it is found that 14,135 NBCCs established at delivery points to provide essential newborn care, 1,810 NBSUs established at CHCs/FRUs, 548 SNCUs established at district/sub-district hospitals or medical colleges and More than 6,300 personnel provided FBNC training .It was further estimated that health facility based interventions can reduce neonatal mortality by 23-50% in different settings. Facility-based newborn care, thus, has a significant potential for improving the survival of newborns.

2.0 Objectives

Hence the study aims to focus the following objectives

- To assess the status of availability of NBCCs & NBSU and services being provided in public health facilities
- To examine whether the NBCC and NBSU are functioning as per the guide lines
- To understand the availability of pediatrician and supporting staff and timely repair of equipment etc.

3.0 Data and methods

The study was carried out in three districts: Thiruvananthapuram, Malappuram and Idukki. Based on fund availability and time period, the assessment was carried out in nine secondary level health facilities including DH, THQH and TH. The criterion for the selection of districts is based on the state requirement. The inclusion of the hospitals is based on the performance in the number of deliveries. The facilities selected for study are as follows

- 1) Thiruvananthapuram - THQH Parrassala, DH Nedumangad and THQH Chirayinkeezh
- 2) Malappuram - DH Thirur, DH Perinthalmanna and DH Nilambur
- 3) Idukki - DH Thodupuzha, TH Adimali and THQH Nedumkanda

The study was conducted in eight out of nine facilities. It was found that in THQH Adimaly the NBSU unit is properly arranged but this unit is not working properly after May 2018 due to inadequacy of staff as reported by the facility.

4.0 Findings and Discussion

The study was conducted to assess the functioning of NBCCs and NBSUs in three districts of Kerala. The assessment was based on an analysis of secondary data from the nine units that had been functioning for at least one year. A cross-sectional investigation was also conducted to assess the availability of human resources, equipment, and quality care.

4.1 State profile of NBSU

As per 2018 November there are 48 NBSUs working in Kerala and there are 16 units with radiant warmers set at the facility are reported to be non-working based on the state reporting format. The reasons for non-functioning are mainly due to unavailability of designated staff and limitation for allocation of space. The format of reporting has many inconsistencies with 2 facilities reported (General hospital Muvattupuzha and W&C Hospital Mattancherry) the number of admissions in NBSU as more than the number of live birth.

Table 4.1.1: List of functional NBSUs in Hospitals of Kerala as on November 2018 according to two sources of information

Name of districts	Data from state reporting format		Data from DHS	
	No. of NBSUs	List of institutions with NBSU	No. of NBSUs	List of institutions with NBSU
Thiruvananthapuram	3	DH Nedumangad District Model Hospital Peroorkkada Taluk Head Quarters Hospital Parassala	1	DH Nedumangad
Kollam	2	Taluk Head Quarters Hospital Karunagappally Taluk Head Quarters Hospital Kottarakkara	4	THQH Karunagappally THQH Kottarakkara THQH Punalur THQH Kadakkal
Pathanamthitta	4	District hospital Kozhenchery General hospital adoor Taluk Head Quarters Hospital Ranni General hospital Pathanamthitta	1	DH Kozhenchery
Alappuzha	4	District Hospital Mavelikkara District Hospital Chengannur Taluk Head Quarters Hospital Haripad Taluk Head Quarters Hospital Kayamkulam	5	DH Mavelikkara THQH Chegannur THQH Haripad THQH Kayamkulam THQH Cherthala
Kottayam	4	General Hospital Changanassery General Hospital Pala General Hospital Kanjirappally Taluk Head Quarters Hospital vaikom	4	THQH Chaganassery GH Pala THQH Kanjirappally THQH Vaikom
Idukki	2	Taluk Head Quarters Hospital Nedumkandam Taluk Head Quarters Hospital Thodupuzha	3	THQH Nedukandom THQH Thodupuzha THQH Adimali
Ernakulam	7	Taluk Head Quarters Hospital N.Paravur Taluk Head Quarters Hospital Peumbavoor Women & Children's Mattanchery District Hospital ALUVA Medical Collage Hospital Kalamassery General Hospital Muvattupuzha General Hospital Ernakulam	4	THQH North Paravoor THQH Perumbavoor W&C Mattanchery District Hospital ALUVA
Thrissur	3	Taluk Head Quarters Hospital Chalakudy, Taluk Head Quarters Hospital CHAVAKAD Taluk Head Quarters Hospital KODUNGALLUR	5	THQH Chalakkudy THQH Chavakkad THQH Kodugallur THQH Kunnankulam THQH Vadakkanchery
Palakkad	2	Taluk Head Quarters Hospital Alathur Taluk Head Quarters Hospital Ottappalam	2	THQH Alathur THQH Ottapalam
Malappuram	5	District Hospital Perinthalmanna District Hospital Tirur Taluk Head Quarters Hospital Tirurangadi Taluk Head Quarters Hospital Ponnani Taluk Head Quarters Hospital Malappuram	5	THQH Perithalmanna THQH Tirur THQH Tirurangadi THQH Ponnani CHC Edappal
Kozhikkode	2	Taluk Hospital Thamarassery Taluk Hospital Perambra	4	THQH Thamarassery THQH Perambra THQH Kuttiyadi THQH Koyilandi
Wayanad	4	District Hospital ,Mananthavady General Hospital Kalpetta THQH Sulthan Bathery Community Health Centre ,Meenangady	3	DH Manathavady GH Kalpetta THQH Sulthanbathey
Kannur	4	General Hospital Thalassery	3	GH Thalassery

Name of districts	Data from state reporting format		Data from DHS	
	No. of NBSUs	List of institutions with NBSU	No. of NBSUs	List of institutions with NBSU
		W & C hospital Mangattuparamba		
		Taluk HeadQuarters Hospital Thaliparamba		THQH Thaliparamba
		Taluk Hospital Payyannur		THQH Payyannur
Kasaragod	2	District Hospital, Kanhangad	2	DH Kanhangad
		General Hospital, Kasaragod		GH Kasaragod

It could be suspected the inclusion of out born admission but the total of inborn and outborn admissions also not matching with the reported one. In two of the facilities the total deliveries and NBSU admission are the same number (Chavakkad and Kodungalloor THQHs) of figures which may be the admission to the NBCC. The Thiruvananthapuram district have the highest number of non-functional units(5) the other non-functional units are in Kozhikkode (2) and one units each in Kollam, Pathanamthitta, Idukki, Thrissur, Palakkad, Malappuram, Wayanad and Kannur districts. The Adimali Taluk Hospital mentioned non-functioning of the centre at the reporting format itself.

The other inconsistencies in the reporting format are some of the hospital not reported available radiant warmers but admission in NBSU are reported e.g. Peroorkada hospital of Thiruvananthapuram district has no reported number of beds for radiant warmers but have admissions in NBSU. We got two source of data for the hospitals with NBSU in Kerala and their other reported statistics. The facilities with working NBSU were none matching for the two sets of data, and the data for the same month were also not comparable.

This part provides the present status of the NBCCs and NBSUS functions in the hospitals and the services offered. The assessment is based on the facility based new born care guidelines. The new born stabilization units have been established in the state since the initiative of NHM programmes.

4.2 Parassala Taluk Head Quarters Hospital

Parassala is a suburb of Trivandrum city at the southern end of Kerala. The hospital has been upgraded to Taluk Head Quarters Hospital on 12th February 2014. The hospital has 119 sanctioned bed and 6 beds for dialysis unit. Currently there are 225 available beds. It has a designated area for labour room, operation theatre and laboratory which has all the facilities with some overcrowding. Construction of new building is going on and it is reported that after completing the work it is planned to relocate the maternal and child care to there, which would resolve the space constraints.

New born care corner and NBSU have been established in 2013 and October 2018 respectively. Nodal officer for the facility based new born care is the Pediatrician. Decision for admission is taken by the pediatrician. Only 2 doctors available at the facility in total for providing all round care and for on-call duty.No separate posting. Two staff nurse from general pool(regular) and two NHM staff nurse were given the charge of NBSUs.

The duty staff were not adequately trained for imparting care at the NBSU for new born as only one staff nurse is trained on Navajatha Sishu Suraksha Karyakram(NSSK).

NBCC is located each at the labour room and OT as per the guidelines. NBSU is set near labour room and maternity ward with an area of around 90-100 square feet. Four beds available at the NBSU with resuscitation facility and three has the phototherapy unit. There are dedicated beds at post natal ward for rooming in. No separate area dedicated for breast feeding at the NBSU, it is available only in the post-operative ward. Side lab with NBSU is not available. Allocation of separate space for laundry, side lab, boiling, autoclaving area, IV fluid mixing etc. will be done after shifting to the new building. Currently power laundry is out sourced. No separated space dedicated for utility area for storing supplies for regular use and for storing used and contaminated material. Now it is stored commonly with that of the labour room supplies. No duty rooms, for doctor or nurse, near the NBSU is not available for providing immediate care for those who admitted there.

Water supply, 24 hour power supply, enough lighting, easily cleanable floors, functional ambulance service for referral (hospital ambulance) were available as per the requirements.

Equipment as per the requirements were available at the NBCC and NBSU except the pump suction and electronic weighing scale available only at the labour room.

Table 4.2.1: New born services available at Taluk Head Quarters Hospital Parassala.

Care at birth	NBCC	NBSU
1.Prevention of infection	yes	yes
2. Provision of warmth	yes	yes
3. Resuscitation	yes	yes
4. Early initiation of breastfeeding	yes	yes
5. Weighing the newborn	yes	yes
Care of normal new born		
6. Breast feeding/feeding support	yes	yes
Care of sick new born		
7. Identification and prompt referral of 'at risk' and 'sick' new born	Yes	
8. Management of low birth weight infants \geq 1800 grams with no other complication		Yes
9. Phototherapy for newborns with hyper-bilirubinemia*		Yes- manageable level only
10. Management of newborn sepsis		Yes
11. Stabilization and referral of sick newborns and those with very low birth weight		Yes
13. Referral services		Yes
14. Immunization services	Yes	Yes
Infrastructure		
Beds	2	4
Location	LR, OT	Near labour room and ward
Area	Not less than 20sqft	Around 90 sqft
Bed dedicated in PN ward for rooming in		Yes
Breast feeding room		Yes (Near Labour room)
Power supply		Yes
Water supply		Yes
Hand washing Area		Yes
Lighting		Yes-Tube light
Floor Surface		Tiled
Wall surface		Tiled
Area for Mixing IV fluid		No- only in Labour room
Area for Boiling and autoclaving		No separate autoclaving area
Utility area for storing supplies for regular use		Shared with labour room
Soiled utility for storing used and contaminated materials		No, Waste is segregated in colour coded bins and out sourced
Area for laundry		Out sourced
Side lab		No- Hospital facility is used for lab test
Doctors duty room		Yes- general duty room
SNs duty room		Yes- general duty room
Referral ambulance	Yes	Yes, hospital Ambulance
Equipment		
Radiant warmer with neo-natal ambu bag	Yes (OT, LR)	Yes -4 warmer+ 1 ambu bag
Resuscitator,	Yes	yes
Weighing Scale Spring/electronic	Yes	Shared with labour room
Pump Suction	Yes	No- Shared with labour room
Thermometer	Yes	Yes
Syringe hub cutter	Yes	yes
Light for examination- mobile	Yes	yes
Phototherapy unit		Yes-4 (2in NBSU+1 in post-operative ward)
Laryngoscope set		Yes (2)- kept in labour room and in OT
Health personals		
Doctors	2 doctors on rotational basis	2 doctors on rotational basis
SN	Labour room SNs-managed NBCC) Total 4SN+ 1 head nurse	Labour room SNs-managed NBSU) Total 4SN+ 1 head nurse

Training		
NSSK	1SN	No
F-IMNC	2 doctors	No

Children born with apnea or gasping, respiratory distress, hypothermia, hyperthermia, central cyanosis, shock, bleeding requires blood or component transfusion, delayed cry, jaundice, sepsis and pre-term and underweight are admitted to the NBSU. Given care until the child got stabilized and either discharged or referred to higher facility if further care required.

Prevention of infection, provision of warmth, resuscitation, early initiation of breast feeding and weighing the new born are the care given at the time of birth for all new born. Sick new born with very high levels of bilirubin and very low birth weight babies are referred to higher facilities. All other services like immunization, provision of phototherapy, management of babies with weight greater than 1800, management of sepsis are provided for the new born. No services given at NBSU for the out born cases.

Average delivery per month is 78 and of that 37(47.13%) are cesarean delivery. During the year of 2018 no pre term deliveries are reported. Only six babies weigh less than 2500g during the year. After the functioning started in October 2018 only 2 term babies weighed greater than 2500g were admitted to provide phototherapy as identified with jaundice and discharged after stabilization in 2 and 5 days of admission.

4.3 Chirayinkeezhu Taluk Hospital

Chirayinkeezhu Taluk is a Taluk (tehsil) in Thiruvananthapuram district in the Indian state of Kerala. It is situated in the northern part of the Thiruvananthapuram district. It comprises 29 villages and two municipalities. Chirayinkeezhu has a network of backwaters and canals, which is quite typical of Kerala.

It is one among the 7 taluk hospitals in Thiruvananthapuram and has the status as head quarter hospital. Monthly average delivery of 75 is carried out in the year 2018.

Person in charge of the facility based new born care is the pediatrician and he makes the decision for the provision of care needed to stabilize the sick new born. Three pediatricians and four staff nurses on rotation manage the new born care. No staff

trained in the NSSK, F-IMNC or FBNC. Out of the four staff nurses two of them are deputed for the day shift and one each for the evening and night shifts. The hospital has available laboratory facility. Apnea or gasping, respiratory distress, hypothermia, hyperthermia, central cyanosis, shock, bleeding requires blood or component transfusion, sepsis and birth asphyxia, low birth weight and pre-term babies without major complications are stabilized and managed at the facility. High levels of hypothermia and hyperthermia are referred to higher facility after stabilization.

Table 4.3.1: New born services available at Taluk Head Quarters Hospital Chirayinkeezhu.

Care at birth	NBCC	NICU(NBSU is not functioning)
1. Prevention of infection	yes	yes
2. Provision of warmth	yes	yes
3. Resuscitation	yes	yes
4. Early initiation of breastfeeding	yes	yes
5. Weighing the newborn	yes	yes
Care of normal new born		
6. Breast feeding/feeding support	yes	yes
Care of sick new born		
7. Identification and prompt referral of 'at risk' and 'sick' new born	Yes	
8. Management of low birth weight infants ≥ 1800 grams with no other complication		Yes
9. Phototherapy for newborns with hyper-bilirubinemia*		Yes
10. Management of newborn sepsis		Yes
11. Stabilization and referral of sick newborns and those with very low birth weight		Yes
13. Referral services		Yes
14. Immunization services	Yes	Yes
Infrastructure		
Beds	2	1bed in NBSU(not functioning)
Location	LR, OT	Near labour room
Area	Not less than 20sqft	More than 60 sqft
Bed dedicated in PN ward for rooming in		Yes
Breast feeding room		Yes- common
Power supply		Yes
Water supply		Yes
Hand washing Area		Yes- labour room
Lighting		Yes-Tube light (no LCD/LED)
Floor Surface		Tiled
Wall surface		Tiled
Area for Mixing IV fluid		No- only in Labour room
Area for Boiling and autoclaving		No- common
Utility area for storing supplies for regular use		No- labour room
Soiled utility for storing used and contaminated materials		No, Waste is segregated in colour coded bins and out sourced
Area for laundry		Hospital laundry system
Side lab		No- Hospital facility is used for lab test
Doctors duty room		Yes-common
SNs duty room		Yes- common
Referral ambulance	Yes	Yes, hospital Ambulance
Equipment		

Radiant warmer with neo-natal ambu bag	Yes (OT, LR)	No, 3 warmers in NICU
Resuscitator,	Yes	No
Weighing Scale Spring/electronic	Yes	No (sharing with labour room)
Pump Suction	No	No
Thermometer	Yes	Yes
Syringe hub cutter	Yes	Yes
Light for examination- mobile	No- using warmer light	Using warmer light
Phototherapy unit		Yes (NICU, maternity ward, post natal ward)
Laryngoscope set		Yes (1)- kept in labour room
Health personals		
Doctors	3 doctors on rotational basis	3 doctors on rotational basis
SN	Labour room staff provide service. Total 4 SNs. (2- Morning shift and each for evening and night)	Labour room staff provide service. Total 4 SNs. (2- Morning shift and each for evening and night)
Training		
NSSK	No	No
F-IMNC	No	No

Three warmers and one phototherapy unit with resuscitation and other equipment are arranged in a separate room for the NBSU (NICU) but the unit not functioning on the date of visit. Instead they are providing all the initial care and stabilization needed at the corners set at the labour room or OT. Six phototherapy units are set at the facility at 4 in maternity unit, and two in pay ward. Radiant warmer, ambu bag, weighing scale, pump suction, thermo meter, hub cutter, laryngoscope are available in the labour room. For examination purposes warmer light is used instead of mobile light. Even though the NBSU is not working as per the guidelines it is reported that basic care for all new born and care for the sick new born babies are provided at the facility if it is manageable for them. Cases which could not be managed at these points of care are referred to the higher referral facility.

While discussing the short falls it is informed that the facility has huge requirements of staff. Only one anesthetist is available at the facility to manage the deliveries and other surgeries and of the total sanctioned strength of 34 staff nurse, eleven positions of are vacant. It is managed with the contract recruitment of NHM (2), special recruitment (1), DMO(6), HMC(9). As they are assigned with other duties they require appointment of the vacant positions to fruitfully manage the requirements.

Average delivery per month is 75 and of that 28(37.43%) are cesarean delivery. Three pre term deliveries are reported in the year 2018. The number of babies weighing between 1500g-2499g were 96 during the year. Resuscitation were required for six children at the time of birth. Of the total deliveries (895), twenty children were referred to higher facilities for specialized care. The children managed with phototherapy or antibiotics during the year 2018 was 92 and discharged. Of

those who were given further care after delivery 48 were given phototherapy and 34 were given antibiotics to manage complications.

4.4 Nedumangad District Hospital

This hospital is located in the Nedumangad municipality, seventeen km away from the district headquarters. It started as a Taluk hospital and was converted into a district hospital during the year 2005. It is a 225 bedded hospital. The hospital has facilities like OP/IP Departments, an equipped Labour room, Operation Theatre, Laboratory, Pharmacy, X Ray, ECG etc. and 24 hours services and twenty five staff nurses. Labour room quality improvement initiatives have been started to attain the LaQshya Standards.

New born care corners and new born stabilization units function in the facility. Since 2014, the NBCC has functioned while NBSU unit started to function on January 2019 only. The overall charge of the FBNC has been usually entrusted with the paediatricians on duty other than the medical superintendent. The Paediatrician on duty takes decision for all admission in the paediatric ward or NBSU for Phototherapy, resuscitation and other treatments. Each unit of NBCC is placed in the Labour room and in OT.

Table 4.4.1: New born services available at Taluk Head Quarters Hospital Nedumangadu.

Care at birth	NBCC	NBSU
1. Prevention of infection	yes	yes
2. Provision of warmth	yes	yes
3. Resuscitation	yes	yes
4. Early initiation of breastfeeding	yes	yes
5. Weighing the newborn	yes	yes
Care of normal new born		
6. Breast feeding/feeding support	yes	yes
Care of sick new born		
7. Identification and prompt referral of 'at risk' and 'sick' new born	Yes	
8. Management of low birth weight infants \geq 1800 grams with no other complication		Yes
9. Phototherapy for newborns with hyperbilirubinemia*		Yes
10. Management of newborn sepsis		Yes
11. Stabilization and referral of sick newborns and those with very low birth weight		Yes
13. Referral services		Yes
14. Immunization services	Yes	Yes
Infrastructure		
Beds	2	1
Location	LR, OT	In the corridor of labour room

Area	Not less than 20sqft	More than 50 sqft
Bed dedicated in PN ward for rooming in		Yes
Breast feeding room		Yes- common
Power supply		Yes
Water supply		Yes
Hand washing Area		Yes
Lighting		Yes-Tube light (no LCD/LED)
Floor Surface		Tiled
Wall surface		Tiled
Area for Mixing IV fluid		No- only in Labour room
Area for Boiling and autoclaving		No- common
Utility area for storing supplies for regular use		No- labour room
Soiled utility for storing used and contaminated materials		No, Waste is segregated in colour coded bins and out sourced
Area for laundry		Hospital laundry system
Side lab		No- Hospital facility is used for lab test
Doctors duty room		Yes
SNs duty room		Yes
Referral ambulance	Yes	Yes, hospital Ambulance
Equipment		
Radiant warmer with neo-natal ambu bag	Yes (OT, LR)	Yes
Resuscitator,	Yes	Yes
Weighing Scale Spring/electronic	Yes	Yes
Pump Suction	Yes	yes
Thermometer	Yes	Yes
Syringe hub cutter	Yes	yes
Light for examination- mobile	Yes	No
Phototherapy unit		Yes (1NBSU+6 pediatric ward)
Laryngoscope set		Yes (1)- kept in labour room
Health personals		
Doctors	2 doctors on rotational basis	2 doctors on rotational basis
SN	Labour room staff nurses provide service. Total 5 -1 head nurse+4 SNs. (3-Morning shift and each for evening and night)	Labour room staff provide service. Total 5 -1 head nurse+4 SNs. (3-Morning shift and each for evening and night)
Training		
NSSK	No	No
F-IMNC	No	No

There is a separate space dedicated for setting up of NBCC and NBSU with an area approximate 20 sq.ft and 70 sq.ft respectively. The NBSU is set up near the labour room with one bed. There is a separate phototherapy unit which functions near the Paediatric ward. A total of 7 phototherapy units, 4 warmers and two resuscitators are available in the hospital. The other equipment available in the labour room are laryngoscope (2) ambu bag (2) baby weighing scales, pump suction, thermometer, mobile light. Syringe hub cutter etc.

The children with respiratory distress, sepsis, Jaundice, poor activity, difficulty in feeding are admitted and stabilized and are then transferred to mother side, otherwise it is referred to higher facility for better treatment. The babies who show the symptoms or who are identified by perinatal asphyxia, hypothermia/hyperthermia, central cyanosis, apnea/gasping, birth weight less than

1800, severe malformations, severe shock cases and those babies who require blood/ blood transfusion are referred to the SAT Hospital, Trivandrum.

An assessment of the functioning of NBSU reveals that most of the admission criteria are not strictly followed. There are no additional paediatrician/ MOs and Staff nurses being appointed in the NBSU. The paediatrician/ MOs and Staff nurses manage all the children admitted in the NBCC and in the NBSU on rotational basis. There are 4 Paediatric Medical officers and five staff nurses services available in the Labour room. In the morning shift, out of the 4 staff nurses and one head nurse, two SNs and one head nurse are deputed in the morning shift and one each for the evening and night shift. Presently any of the medical officer or SNs in this facility not receiving trainings likes NSSK, FBNC, F-IMNC. Intermittent transfer of the trained staff creates underutilization of imparted training for the concerned facility. So, trained staff is always not available in the Labour room and in the NBSU unit. So they demand for training programmes like NSSK and FBNC. Insufficiency of SNs in this hospital restricts the proper functioning. The requirement of two more SNs for the labour room is reported. Three more paediatricians are needed for the new NICU which starts in the hospital. Space constrain is felt in the NICU.

The required tests are done in the laboratory of the main hospital. All the necessary equipment and instruments for examination and monitoring are reported to be available. The mothers feeding area is common for all mothers, without any designated area in the NBSU. Drug storage facility, hand washing area, space for breast feeding, utility area, soiled utility area etc are arranged in Labour room only and not in the NBSU. The autoclave and laundry in the main hospital is used for sterilization and disinfection. Round the clock availability of supply of electricity and water is assured. As regards the electrical fittings, well lit lights are instead of CFL/LED light. The furniture is sufficient. For referral, the hospital ambulance is used.

DH Nedumangad provides services like prevention of infection, provision of warmth, resuscitation, early initiation of breast feeding, weighing the new born are the immediate care given to all babies after birth. Immediate breast feeding support is given to the mother with normal delivery. For the sick new born, prevention of infection including management of newborn sepsis, provision of warmth, and

phototherapy for new born with hyper billurumia, Immunization, breastfeeding support is given and prompt referral is made.

On an average about 110 deliveries were handled in the hospital. During the year 2018, the total deliveries were 1313, of which 47. 8 percent were C- section deliveries. Children weighed less than 2500 grams were 7 percent of the total delivery. There is no NBSU admission made during the year 2018 because the unit became operationalized only on January 2019. Only one admission is done after the initiation of NBSU unit. The reason for that admission was delayed crying of the baby as it was a forceps delivery. Oxygen support and suction is applied for the recovery of baby. Seven referrals have been made to the specialized hospital during the year 2018 due to coffee coloured vomiting, respiratory problem, APR 3 at 1 min and 9 at 5 min, high bilirubin etc.

Nedumangad Hospital does not use separate register for recording the NBSU admission because only one admission is done in the NBSU after initiation. Labour room register is maintained and are updated. Referrals are noted in the Labour room register itself. Staff nurses reported that the data regarding the admissions in the NBSU is submitted in the NHM office.

The charge pediatrician and the SNs rate the overall functioning of the NBSU in the hospital to be moderate. The shortage of sufficient number of trained staff nurses on round the clock basis hinder the effective functioning of units. They demand one more bed in the NBSU and sufficient human resource (SNs, Hospital attender etc.) for the proper functioning.

4.5 Taluk Head Quarters Hospital Nedumkandam

Separate designated areas are available for labour room, operation theatre and essential laboratory services. The NBSU has started working in February 2012. Head nurse is in charge of it and decision for admission to the unit is taken by the peadiatrian in charge. Generally children with apnea or gasping, respiratory distress, hypothermia, hyperthermia, central cyanosis, shock, sepsis, bilirubin, foetal distress are admitted to the unit for stabilization.

Table 4.5.1: New born services available at Taluk Head Quarters Hospital Nedumkandam.

Care at birth	NBCC	NBSU
1.Prevention of infection	yes	yes

2. Provision of warmth	yes	yes
3. Resuscitation	yes	yes
4. Early initiation of breastfeeding	yes	yes
5. Weighing the newborn	yes	yes
Care of normal new born		
6. Breast feeding/feeding support	yes	yes
Care of sick new born		
7. Identification and prompt referral of 'at risk' and 'sick' new born	Yes	
8. Management of low birth weight infants >= 1800 grams with no other complication		Yes
9. Phototherapy for newborns with hyper-bilirubinemia*		Yes
10. Management of newborn sepsis		Yes- very sick babies are referred
11. Stabilization and referral of sick newborns and those with very low birth weight		Yes
13. Referral services		Yes
14. Immunization services	Yes	Yes
Infrastructure		
Beds	2 (1+1)	4
Location	LR, OT	Near paediatric ward
Area	About 20sqft	150sqft
Bed dedicated in PN ward for rooming in		No
Breast feeding room		No
Power supply		Yes
Water supply		Yes
Hand washing Area		Yes
Lighting		Tube light
Floor Surface		Tiled
Wall surface		Tiled
Area for Mixing IV fluid		No
Area for Boiling and autoclaving		In labour room
Utility area for storing supplies for regular use		Facility in labour room
Soiled utility for storing used and contaminated materials		No. Waste is segregated in colour coded bins and out sourced
Area for laundry		Out sourced
Side lab		No- Hospital facility is used for lab test
Doctors duty room		No, General duty room
SNs duty room		No, General duty room
Referral ambulance	Yes	Yes, hospital Ambulance and private vehicles
Equipment		
Radiant warmer with neo-natal ambu bag	Yes (OT, LR)	Yes
Resuscitator,	Yes	Yes
Weighing Scale Spring/electronic	Yes	Yes
Pump Suction	No	Yes
Thermometer	Yes	Yes
Syringe hub cutter	Yes	Yes
Light for examination- mobile	No	yes
Phototherapy unit		Yes-4
Laryngoscope set		Yes
Health personals		
Doctors	2 Pediatricians on rotational basis. After 10' clock on call duty	2 Pediatricians on rotational basis. After 10' clock on call duty
SN	Staff Nurses in Labour room- 3shifts	Staff Nurses in Labour room - 3shifts
Training		
NSSK	-	
F-IMNC	-	

If the problem persist for more days they will refer to higher facility otherwise manage within the facility itself. New born with significant bleeding that requires blood or component transfusion are referred to higher facilities for more specialized care.

Two paediatricians are in charge of the deliveries conducted at the hospital and they are in charge of those who are admitted to the NBCC or NBSU. The staff nurses are deputed from the regular pool for the NBSU unit also. The facility at present has no trained doctors or nurses on NSSK, F-IMNC or FNBC. NBCC is set in both within the labour room and operation theatre as per the requirements. However NBSU is set near the paediatric ward with an area of more than 150 sq.ft. and far distant from the postnatal ward. Four phototherapy units are available at the NBSU. As the NBSU is set near the paediatric ward the general duty rooms for doctors and nurse are available near the unit. But the accessibility for the inborn is difficult as it is far away from the OT, LR and post natal ward. Considering the amenities there are dedicated space for breast feeding, space for mixing of IV fluids. For the laundry requirements of the NBSU they are using the general laundry. Separate space for utility room, area for boiling or autoclaving, soiled utility room, stores, side lab are not available for the unit. Private vehicle is used for referral transport and no ambulance available at the facility. Uninterrupted power and water supplies, well lighted rooms are available. All equipment available at the NBSU except the syringe hub cutter but it is available at the NBCC. It is reported that most of the services are provided at the NBSU and if not manageable refer to higher facilities.

The hospital has an average monthly delivery of 62 in the previous year. Of which 49% were cesarean deliveries. About 12% of the deliveries were low birth weight babies of less than 2500. Only 5 pre-term birth were reported during the year. It is also reported that only 6 children at birth were required resuscitation assistance at birth.

No out born admitted to the NBSU during 2018. 93 new born were given care at the NBSU during the year. In that 7 were having weight between 1500 and 2499g. The gestation period for five new born were between 34-37 weeks. Major reasons for admission to the unit was jaundice. Of the admission to the unit 48 of them were admitted with jaundice requiring phototherapy, 23 for sepsis/pneumonia /meningitis and twelve were for other reasons. Ten of the admitted cases were referred to higher

facilities for more specialized care. Only 4 new born were admitted for more than seven days and average days of admission was 5 days.

They themselves rate the functioning of NBSU as moderate. There exist enough number of beds and sufficient space available for the unit. Almost all infrastructure are available and it is rated as moderate and similar to other hospitals here also they reported the poor availability of human resources at the centre.

4.6 Thodupuzha District hospital

Designated area for labour room and OT were available and also the essential laboratory services. The new born stabilization unit has been started working in November 2013 and paediatrician is in charge of the unit and responsible for making admission to the unit. Newborns with hyper or hyperthermia, jaundice or sepsis only are given care at the unit. Other cases with respiratory distress, very low birth weight i.e. less than 1800 and of pre-term are not given care and are referred to the higher facility for more specialized care.

Two medical officers are trained in NSSK and FBNC and staff nurses currently in the facility are not received any training for newborn care. It is reported that those who trained earlier were transferred to some other facility on routine transfer and posting.

Separate room is set as NBSU near the maternity ward with five units for phototherapy. Area for hand washing and for boiling and autoclaving are available in the unit. But no separate area available for breast feeding, mixing of IV fluids, area for laundry, soiled utility room, side lab, store room. Uninterrupted power and water supplies and easily washable floor and wall surfaces are there in the unit.

It is reported that all the equipment are available for both NBCC and NBSU. Basic care at birth like prevention of infection, provision of warmth, resuscitation early initiation of feeding and feeding support are given at the NBCC. Care of the sick new born is taken care at the NBSU. Management of low birth weight for infants weighing less than 1800gm, phototherapy, hyper and hypo bilirubinemia, sepsis are managed at the centre and infants with severe problems which could not be managed at the centre is referred to higher facilities.

The average monthly delivery carried out at the facility was 74 in the year 2018. About 56% of the total deliveries were cesarean and 14% were weighed less than 2500g and above 1500g. Even though about 17%(153 out of 889) of the newborns

were admitted to the NBSU it is found that majority(135) of them were admitted for jaundice requiring phototherapy and remaining for sepsis or pneumonia. Of the total admissions to the NBSU 7 were referred for specialized care to higher facilities. The average duration of stay at the unit was three days.

Table 4.6.1:New born services available at District Hospital Thodupuzha.

Care at birth	NBCC	NBSU
1.Prevention of infection	yes	yes
2. Provision of warmth	yes	yes
3. Resuscitation	yes	yes
4. Early initiation of breastfeeding	yes	yes
5. Weighing the newborn	yes	yes
Care of normal new born		
6. Breast feeding/feeding support	yes	yes
Care of sick new born		
7. Identification and prompt referral of 'at risk' and 'sick' new born	Yes	
8. Management of low birth weight infants ≥ 1800 grams with no other complication		Yes
9. Phototherapy for newborns with hyper-bilirubinemia*		Yes
10. Management of newborn sepsis		Yes- very sick babies are referred
11. Stabilization and referral of sick newborns and those with very low birth weight		Yes
13. Referral services		Yes
14. Immunization services	Yes	Yes
Infrastructure		
Beds	2	6
Location	LR, OT	near maternity ward
Area	About 20sqft	More than 150sqft
Bed dedicated in PN ward for rooming in		No
Breast feeding room		No
Power supply		Yes
Water supply		Yes
Hand washing Area		Yes
Lighting		Tube light
Floor Surface		Tiled
Wall surface		Tiled
Area for Mixing IV fluid		No
Area for Boiling and autoclaving		Use general autoclaving system
Utility area for storing supplies for regular use		Facility in labour room
Soiled utility for storing used and contaminated materials		Facility in maternity ward. Waste is segregated in colour coded bins and out sourced
Area for laundry		Use Washing machine in the labour room
Side lab		No- Hospital facility is used for lab test
Doctors duty room		No, General duty room
SNs duty room		No, General duty room
Referral ambulance	Yes	Yes, hospital Ambulance
Equipment		
Radiant warmer with neo-natal ambu bag	Yes (OT, LR)	No
Resuscitator,	Yes	No
Weighing Scale Spring/electronic	Yes	No
Pump Suction	Yes	No
Thermometer	Yes	Yes
Syringe hub cutter	Yes	Yes
Light for examination- mobile	No	No
Phototherapy unit		Yes-5
Laryngoscope set		Yes in Labour room
Health personals		
Doctors	2 Pediatricians on rotational basis. After 10' clock on call duty	2 Pediatricians on rotational basis. After 10' clock on call duty

SN	4 Staff Nurses in Labour room- 3shifts	4 Staff Nurses same in Labour room - 3shifts
Training		
NSSK	2 doctors trained staff nurses transferred to other hospital	
F-IMNC	1 doctors	

4.7 Perinthalmanna DH

DH Perinthalmanna is situated in the middle of Perinthalmanna town with an area of 3.27 acres plot of land. The hospital is established in the 1952. There are 13 specialties functioning in the hospital. Hospital is functioning in different buildings such as Administrative block, Casualty, OP department, paediatric ward, medical ward, surgical ward, labor ward, IP ward, post OP ward, X-ray, pharmacy etc. Some other facilities like canteen, conference hall, comfort station, and mortuary are also in the hospital premises.

According to the hospital staff, the NBCC unit has started functioning in 2005 while, the NICU (NBSU) has started functioning April 2018. One New born care corner is located in the labour room and another one is in the operation theatre with area not less than 20 sqft. There is no separate NBSU unit, it named as NICU. It has two rooms, with an area of more than 300 sqft. The decision for all admission in the pediatric ward or NICU for Phototherapy, resuscitation and other treatments has been taken by the Pediatrician.

In the NICU two phototherapy unit and two warmer is put in one room and the other room consists of one ventilator, 2 phototherapy units and 2 warmers. The ventilator, two phototherapy machines and two radiant warmers are now not in use. In addition to that two phototherapy units and 1 warmer is placed in the postoperative ward. Ambu bag, Resuscitator, thermometers are available in both NBCC and NBSU. But syringe hub cutter, baby weighing scales electronics and mobile light are available only in NBCC. The weighing scale available in the NICU is not functioning for more than 4-5 months. One Laryngoscope set is put in NBSU. There is no facility for pump suction.

No bed is dedicated in post natal ward for rooming in while two phototherapy unit and one radiant warmer are put in the ward. In addition to that, a six bedded room is arranged to mothers for staying and feeding. Drug storage facility, hand washing

area, area for mixing IV fluids, clean utility area etc. are set up only in the children ward not in the NICU. Clean utility area is arranged for storing supplies to regular use. The laundry service is outsourced by the hospital. The autoclave in the main hospital is used for sterilization and disinfection. The required tests are done in the laboratory of the main hospital. All the necessary equipment and instruments for examination are reported to be available in the lab. Round the clock availability of supply of electricity and water is assured. As regards the electrical fittings, tube lights are used instead of CFL/LED light. There is no separate duty room for doctors and SNs in the NICU, they used the general duty rooms. For a referral, the hospital ambulance is used.

Table 4.7.1: New born services available at District Hospital Perinthalmanna.

Care at birth	NBCC	NICU(NBSU)
1. Prevention of infection	yes	yes
2. Provision of warmth	yes	yes
3. Resuscitation	yes	yes
4. Early initiation of breastfeeding	yes	yes
5. Weighing the newborn	yes	yes
Care of normal new born		
6. Breast feeding/feeding support	yes	yes
Care of sick new born		
7. Identification and prompt referral of 'at risk' and 'sick' new born	Yes	Yes
8. Management of low birth weight infants ≥ 1800 grams with no other complication		Yes
9. Phototherapy for newborns with hyper-bilirubinemia*		Yes
10. Management of newborn sepsis		Yes
11. Stabilization and referral of sick newborns and those with very low birth weight		Yes (with no other complications)
13. Referral services		Yes
14. Immunization services	Yes	Yes
Infrastructure		
Beds	2	2 (functional)
Location	LR, OT	Upstairs of Labour room
Area		More than 200 sqft
Bed dedicated in PN ward for rooming in		1 warmer and 2 Phototherapy unit. No other beds
Breast feeding room		A 6 bedded mothers room for staying and feeding
Power supply		Yes
Water supply		Yes
Hand washing Area		Yes
Lighting		Yes-Tube light (no LCD/LED)
Floor Surface		Tiled
Wall surface		Tiled
Area for Mixing IV fluid		No- only in children ward
Area for Boiling and autoclaving		No- only in OT
Utility area for storing supplies for regular use		Yes
Soiled utility for storing used and contaminated materials		No, Waste is segregated in colour coded bins and out sourced
Area for laundry		Out sourcing
Side lab		No- Hospital facility is used for lab test
Doctors duty room		No, General duty room

SNs duty room		No, General duty room
Referral ambulance	Yes	Yes, hospital Ambulance
Equipment		
Radiant warmer with neo-natal ambu bag	Yes (OT, LR)	Yes (2F+ 2 NF)
Resuscitator,	Yes	Yes (1)
Weighing Scale Spring/electronic	Yes	Yes – non functional
Pump Suction	No	No
Thermometer	Yes	Yes
Syringe hub cutter	Yes	No
Light for examination- mobile	Yes	No
Phototherapy unit		Yes (2F+2 NF)
Laryngoscope set		Yes (1)
Health personals		
Doctors	3 doctors on rotational basis	3doctors on rotational basis
SN	1 each for three shift (SNs at Labour room)	1 each for three shift
Training		
NSSK	2 SNs	
F-IMNC		1SN

This facility was assessed for the availability of trained personnel in new born. It was noted that this facility has 3 pediatricians, one is on regular, another one is on working arrangement and the third one is the chief medical officer (pediatric specialist). The chief medical officer offers pediatric service also, because of the inadequacy of Pediatricians in the hospital. These three pediatricians provide newborn care services up to 1 pm and then usually are available on call. Three staff nurses are available to provide services in the NICU on round-the-clock. The labour room staff nurses handled most deliveries and they were largely responsible for rendering immediate essential newborn care services in the New born corner. Presently two staff Nurses in the Labor room and 1 SN in the NICU are trained in NSSK and F-IMNCI respectively.

With regard to the admission criteria, Apnea or gasping, respiratory distress, Hypothermia, Hyperthermia, central cyanosis, children with Jaundice, Sepsis, gestation less than 34 weeks or weight less than 1800 g, Intrauterine growth restriction (IUGR) etc are admitted and treated. After stabilization no other further complications the child is kept with the mother side or referred to a higher facility for specialized care. Severe shock cases and those babies who require blood/ blood transfusion are directly referred to major hospitals.

All essential newborn care at birth is provided to all newborn in the facility. Immediate initiation and support for breastfeeding are given to all mothers with normal delivery. For the sick inborn and outborn babies, prevention of infection

including management of newborn sepsis, provision of warmth, phototherapy for newborn with hyper billurumia, immunization, breastfeeding support is given and prompt referral is made if necessary.

During the year from January 2018 to December 2018, 1615 deliveries were performed in DH Perinthalmanna of which, 687 deliveries percent were C- section i.e. around 43percent. i.e. On an average, it is 147 deliveries per month. Birth weight is not marked in the labour room register. The NICU is operationalized only in April 2018. During the period from April 2018 to November 2018, 291 (147 males and 144 female) inborn babies and 2 (1 male and 1 female) outborn were admitted in NICU. Out of the 291 inborn babies were admitted due to following reasons: 201- high Bilurubin, 219 for phototherapy, 141 for Oxygen support and 166 treated with antibiotics. At the same period, the number of referrals at higher facilities was 20 and all others were cured and discharged. During the period from April 2018 to December 2018, duration of stay 4-7 days were 95children, 1-3 days were 75 children and more than 7 days were 61 children. Only two children stayed less than one day.

A register is kept to mark the admissions in the NICU. Staff nurses reported that the data regarding the admissions in the NICU is submitted in the NHM office since January 2019.

The Pediatricians and SNs rated the new born care facilities in the hospital. The corner is functioning well with the active service of staff nurses in the labour room and while the NICU is functioning at moderate level due to the shortage of trained staff and limited infrastructure. The availability of the trained staff and essential infrastructure and optimum practice to use the equipment should improve the effective and active functioning of units. They all request the provision of functional mandatory equipment, practice for using the equipment, infrastructure and adequate human resource for the proper functioning.

4.8 Tirur District Hospital

DH Tirur is situated in Tirur Municipality. This hospital started functioning as Taluk hospital and in 2016 it was converted to DH Tirur. Now there are 217 beds

functioning against the sanctioned bed strength of 164. The major specialty services offered are general medicine, general surgery, gynaecology, dental, oncology, orthopaedics, ophthalmology, ENT, and psychiatry.

Essential new born care service is provided from this hospital. According to the hospital staff, the NBCC unit has started functioning in 2005 while the NBSU has started functioning 2010. One New Born Care Corner is located in the labour room with limited space and another one is in the operation theatre. One phototherapy unit is also set in the labour room. Due to the lack of limited space presently there is no separate NBSU unit arranged. A new MCH unit is inaugurated on December 2018 with all facilities. A new and spacious NBSU unit with all infrastructure facility is planned in the new MCH building. The decision for all admission in the pediatric ward for phototherapy, resuscitation and other treatments has been taken by the Pediatrician in charge. All the four medical officers and 3 staff nurses in the labour room are in charge of all children admitted in the NBSU as well as NBCC. These 4 pediatricians are available in the hospital up to 1 O'clock and after 1 p.m. they are working on a call duty basis. Three staff nurses are working on a shift basis in the labour room. With regard to the training, all pediatricians and 3 SNs received training in NSSK while 2 pediatricians and one have trained in F- IMNCI

Table 4.8.1: New born services available at District Hospital Tirur.

Care at birth	NBCC	NICU(NBSU)
1.Prevention of infection	yes	yes
2. Provision of warmth	yes	yes
3. Resuscitation	yes	yes
4. Early initiation of breastfeeding	yes	yes
5. Weighing the newborn	yes	yes
Care of normal new born		
6. Breast feeding/feeding support	yes	yes
Care of sick new born		
7. Identification and prompt referral of 'at risk' and 'sick' new born	Yes	
8. Management of low birth weight infants \geq 1800 grams with no other complication		Yes
9. Phototherapy for newborns with hyper-bilirubinemia*		Yes
10. Management of newborn sepsis		Yes
11. Stabilization and referral of sick newborns and those with very low birth weight		Yes (with no other complications)
13. Referral services		Yes
14. Immunization services	Yes	Yes
Infrastructure		
Beds	2	NBSU is not arranged as a separate unit. New NBSU is to be planned to set up in the newly constructed MCH unit near labour room

Location	LR, OT	To be set up near labour room
Area	About 20sqft	No-(is planned about 200 sqft in the new MCH Unit)
Bed dedicated in PN ward for rooming in		No
Breast feeding room		No - (set up in New NBSU unit)
Power supply		Yes
Water supply		Yes
Hand washing Area		Yes
Lighting		No-Tube light (LCD/LED is used in the New building)
Floor Surface		Tiled
Wall surface		Tiled
Area for Mixing IV fluid		No
Area for Boiling and autoclaving		Now in OT only
Utility area for storing supplies for regular use		Yes- in labour room
Soiled utility for storing used and contaminated materials		No, Waste is segregated in colour coded bins and out sourced
Area for laundry		Out sourcing- doobby
Side lab		No- Hospital facility is used for lab test
Doctors duty room		No, General duty room
SNs duty room		No, General duty room
Referral ambulance	Yes	Yes, hospital Ambulance and contract with she- taxi
Equipment		
Radiant warmer with neo-natal ambu bag	Yes (OT, LR)	Yes (4), out of which one is in use. 3- kept in the new NBSU unit for installation
Resuscitator,	Yes	No
Weighing Scale Spring/electronic	Yes	Yes – not functional for more than 4-5 months
Pump Suction	Yes-not functional	No
Thermometer	Yes	Yes
Syringe hub cutter	Yes	Yes
Light for examination- mobile	No	No
Phototherapy unit		Yes-1 setup in Labour room 2 - kept in the new NBSU unit for installation
Laryngoscope set		Yes (2)
Health personals		
Doctors	4 doctors on rotational basis. After 10' clock on call duty	4 doctors on rotational basis. After 10' clock on call duty
SN	3 Staff Nurses in Labour room- 3shifts	3 Staff Nurses same in Labour room - 3shifts
Training		
NSSK	4 doctors +3 SNs	
F-IMNC	2 doctors +1SN	

With respect to equipment, this hospital has 6 warmers, one resuscitator, thermometers, syringe hub cutter, and three phototherapy units. There are two weighing scales but one is not functional. The pump suction is also not functional and there is no mobile light for examine the newborns and sick newborns.

No dedicated bed in the PN ward for rooming in. In the present set up, no separate space dedicated for breast feeding whereas in the new MCH building, space has demarcated for breast feeding. 24X 7 basis power supply and water supply is

established at the facility. Drug storage facility, hand washing area, area for mixing IV fluids, clean utility area, soiled utility area are available in the Labour room. The laundry service is outsourced by the hospital. The autoclave in the OT is now used for sterilization and disinfection. The required tests are done in the laboratory of the main hospital. The electrical fittings, tube lights are used instead of CFL/LED light in the present labour room. There is no separate duty room for doctors and SNs; they used the general duty rooms. For referral, the hospital ambulance and she- taxi is used.

Children identified with symptoms like Hypothermia, Hyperthermia, Jaundice, Sepsis, shock gestation less than 34 weeks or weight greater than 1800 g are admitted and treated. Child with respiratory distress, if symptoms are persisting after stabilization they are referred to higher facility. After measuring the saturation level of central cyanosis the pediatrician decides whether that case is continued in the hospital or not. Babies who require blood/ blood transfusion are directly referred to major hospitals.

With regard to the type of services, care at birth, care of normal new born and care of sick newborn are provided to the new born. Services like prevention of infection, provision of warmth, resuscitation, early initiation of breast feeding, weighing of new born are given to a baby immediately after birth. For the immediate initiation of breastfeeding, proper support is given to all mothers with normal delivery. For the sick inborn babies, all essential care at birth is given immediately after birth and then manage cases with infection including sepsis, given phototherapy for newborn with hyper bilirubin, stabilize children with birth weight less than 1800g. The sick children with no further complication is kept in the hospital with mother side. Severe and complicated cases are referred to higher facility for special treatment.

Total deliveries performed in DH Tirur during the year from January 2018 to December 2018 were 1075, of which 408 deliveries were C- section i.e. around 38 percent. Average deliveries during the year 2018 are 90 per month. Out of the total 1075 deliveries, 112 babies were born with birth weight less than 2500g and 2 of them are still birth. During the period from April 2018 to December 2018, 135 males and 118 female babies were admitted due to reasons like high bilirubin, hypothermia, hypoglycemia, birth asphyxia, sepsis/ meningitis/ Pneumonia. One

hundred and four babies with high bilirubin used phototherapy, 19 with hypothermia depended warmer support. One hundred and sixty five children suffered from sepsis/ meningitis/ pneumonia. At the same period, the number of referrals at higher facilities was 31 and all others were cured and discharged. During the period from April 2018 to December 2018, children treated with antibiotics stayed at the hospital for 5-7 days and children depended phototherapy stayed for 2-3 days. In the same period 31 babies are referred to specialty hospitals for special care.

A register is kept to mark the admissions done in the new born care units. Staff nurses reported that the data on admissions in the new born care unit is regularly submitted to the NHM office, however the actual reporting format is not available.

In the present situation the performance of the facility is assessed exactly, even though moderate services are provided by using limited facility. Requirement of more beds are pointed out by the pediatricians. The corner is functioning well with active service of staff nurses in the labour room. Arrangements has to be done in repairing non-functional equipment in time. The fully equipped facilities in the new born care units, availability of sufficient trained staff and essential infrastructure as per guidelines should improve the effective and active functioning of units and it will lead to reduction in neo natal mortality and infant mortality. They all request the provision of functional mandatory equipment, practice for using the equipment, adequate infrastructure and sufficient human resource for the proper functioning.

4.9 Nilambur district hospital

Nilambur is a municipality and a taluk in the Malappuram district of the Indian state of Kerala. It is located close to the Nilgiris range of the Western Ghats on the banks of the Chaliyar River. It is about 40 kilometers from Malappuram city. Nilambur district hospital is a major service provider in that area. It has a designated area for labour room, operation theatre, essential laboratory services and ambulance which is also used for referral transport.

Table 4.8.1: New born services available at District Hospital Nilambur.

Care at birth	NBCC	NICU(NBSU)
1.Prevention of infection	yes	yes
2. Provision of warmth	yes	yes
3. Resuscitation	yes	yes
4. Early initiation of breastfeeding	yes	yes
5. Weighing the newborn	yes	yes

Care of normal new born		
6. Breast feeding/feeding support	yes	yes
Care of sick new born		
7. Identification and prompt referral of 'at risk' and 'sick' new born	Yes	Yes
8. Management of low birth weight infants >= 1800 grams with no other complication		Yes
9. Phototherapy for newborns with hyper-bilirubinemia*		Yes
10. Management of newborn sepsis		Yes
11. Stabilization and referral of sick newborns and those with very low birth weight		Yes (with no other complications)
13. Referral services		Yes
14. Immunization services	Yes	Yes
Infrastructure		
Beds	2	2 (functional)
Location	LR, OT	Near Labour room
Area	About 20sqft	More than 100 sqft
Bed dedicated in PN ward for rooming in		No
Breast feeding room		No- Near General OP only
Power supply		Yes
Water supply		Yes
Hand washing Area		Yes
Lighting		Yes-Tube light (no LCD/LED)
Floor Surface		Tiled
Wall surface		Tiled
Area for Mixing IV fluid		No
Area for Boiling and autoclaving		No- only in OT
Utility area for storing supplies for regular use		Yes
Soiled utility for storing used and contaminated materials		No, Waste is segregated in colour coded bins and out sourced
Area for laundry		Out sourcing- dooby
Side lab		No- Hospital facility is used for lab test
Doctors duty room		No, General duty room
SNs duty room		No, General duty room
Referral ambulance	Yes	Yes, hospital Ambulance
Equipment		
Radiant warmer with neo-natal ambu bag	Yes (OT, LR)	Yes (2F+ 2 NF)
Resuscitator,	Yes	Yes
Weighing Scale Spring/electronic	Yes	Yes – not functional for more than 4-5 months
Pump Suction	Yes-not functional	No
Thermometer	Yes	Yes
Syringe hub cutter	Yes	Yes
Light for examination- mobile	No	No
Phototherapy unit		Yes-2 Double surface at NBSU (1DS+2 SS) at Phototherapy Unit
Laryngoscope set		Yes (1)
Health personals		
Doctors	4 doctors on rotational basis. After 10' clock on call duty	4 doctors on rotational basis. After 10' clock on call duty
SN	Staff Nurses in Labour room	1head nurse & 2 Staff Nurse shift
Training		
NSSK	-	-
F-IMNC	-	-

The nodal officer and charge of FBNC activities is the pediatrician in charge. The NBCC has started functioning in 2005 and the NBSU started working in April 2015. Decision for admitting the new born or sick new born is taken by the pediatrician. The admission criteria is the children having apnea or gasping, respiratory distress, hypothermia, hyperthermia, central cyanosis, shock and requiring blood or

component transfusion. After stabilization in the NBSU the cases are managed in the facility if no further complications arise. Four pediatricians are available on rotational basis and after 1 O'clock the service is provided on call. One head nurse and 2 staff nurses are available for duty on rotational basis. Any of the pediatrician or staff nurses on duty are not trained in NSSK, FBNC or F-IMNC.

NBCC is working in OT and labour room. It has two beds and about 20 square feet of dedicated space. The NBCC is providing the basic care at birth including prevention of infection, provision of warmth, resuscitation, advice for early initiation of breastfeeding, and weighing the new born. NBSU is set near the labour room with an area of 100 square feet. In total five phototherapy units are set for providing care for the newborn in which three of them are double side phototherapy unit and the other two are single sided units. In addition to the NBSU set near labour room two phototherapy units set at the peadiatric ward for providing care for the out born. NBSU has a hand washing area and a small staff nurse duty room. The soiled materials are segregated and outsourced and the laundry service also done by the doobby. No separate clean utility area in the NBSU. The hospital lab facility is used for the laboratory services of the NBSU. Storage is available only at labour room for drug and other materials. Uninterrupted supply of water and electricity available at the centre. Of the equipments as per the guidelines most of them are available, however the pump suction is not working, mobile light is not available in the NBCC or NBSU.

Two NBSUs are working in the Nilambur facility one near the labour room and one at the peadiatric ward to provide care for both inborn and outborn. The average monthly deliveries conducted during the year 2018 was 145 and out of that about 21% were ceasarian deliveries. Almost 13% of the babies weigh less than 2500g and only about 1% were preterm births. In the same year 21 births were referred to higher facilities for specialised care which constitute 1.2% of the total deliveries in the year. The NBSU admission for the year 2018 was 83 forout born. General or common reasons for admission reported were sepsis, pneumonia, hypoglycemia, meningitis, respiratory infections and neonatal hyper bilirubin. 130 were admitted for phototherapy and 93were admitted for jaundice during the year 2018 which includes both out born and in born.

The hospital lack sufficient space for the functioning of the NBSU but adequate phototherapy beds were provided at the facility. They rate the availability of infrastructure as moderate as most of the equipment are available. No separate staff dedicated for the functioning of the NBSU and the human resource available is inadequate even for the regular functioning of the hospital.

5.0 Conclusions

NBSUs are really an innovation in newborn care within a district, beyond the district hospital by reducing the delay in initiation of appropriate care, stabilizing before referring to a higher centre. It helps to reduce overloading of SNCUs and reduce the cost of care if it is properly linked to SNCU and NBCC.

The NBSU units were set up in most of the facilities on a prior date but are not yet started working among some of them. The reasons indicated were inadequacy of space near post natal wards, space limitation within the unit to properly arrange the four units and other designated spaces, lack of designated staff for managing the unit, lack of trained personnel. Majority of the hospitals have functioning equipment, water and electricity mostly available and civil structure as per guidelines. Repair of damaged equipment must be done on a regular basis under annual maintenance contract to enable timely and proper care to all new born. NBSU and NBCC available in the hospitals are having structural area rather than functional area.

The major bottleneck in getting the unit operational and sustaining it is the unavailability of designated manpower at NBSUs. Most of the facilities lack trained staff and the routine posting and transfer of trained staff also pose problems in some of the facilities. Ensure training of available staff on identifying sick neonates on prioritizing management, assessment and treatment of newborns displaying emergency signs, to identify indications for admission to NBSU like hypothermia, hyperthermia, hypoglycemia etc., assist in feeding of low birth weight babies.

Most of the units set and underutilized in terms of admissions and duration of stay and the reason for it is reported as the inadequacy of staff or inconvenient area for

setting up the unit. Very basic and irregular record keeping as well as reporting exist in most of the facilities. Many of the hospital report the admissions in the NBCC as that of NBSU.

Referral transport is made available from the facility under various national or state schemes even though the facility doesn't own it. Referral is made to the district hospital from the Taluk or Taluk Head Quarters Hospital. Most of the facilities have inadequate and overcrowded labor room and post natal wards. This also is a hindrance in imparting proper care at the NBSUs.

Systems need to be strengthened with adequate space, proper training should be imparted at regular intervals for optimizing the output. Some facilities are functioning properly with the limited resources.

Proper awareness regarding the services available in the NBSUs can be given to beneficiaries so that people can access the facility to get newborn care for out born babies also.

References

1. Toolkit for setting up of special care newborn units, stabilization units and newborn corners. New Delhi: United Nations Children's Fund, 2008. 9 p.
2. <https://timesofindia.indiatimes.com/city/thiruvananthapuram/six-newborn-deaths-per-1000-live-births-in-kerala-is-preventable/articleshow/63031579.cms>

3. Estimating number of beds required for SCNU. In: Toolkit for setting up of special care newborn units, stabilization units and newborn corners. New Delhi:United Nations Children's Fund, 2008.
4. Darmstadt GL, Bhutta ZA, Cousens S, Adam T, Walker N, de bernis L; Lancet Neonatal Survival Steering Team. Evidence based, cost effective interventions: how many newborn babies can we save? Lancet 2005;365:977-88.