

# **KRISHNA INSTITUTE OF MEDICAL SCIENCES, KARAD.**

## **FELLOWSHIP PROGRAM IN NEONATOLOGY**

### **1. INTRODUCTION:**

Krishna Institute Of Medical Sciences has a modern, well-equipped and sophisticated neonatal intensive care unit (NICU), which can provide all three levels of neonatal care and has dedicated and experienced transport team to transfer newborn and children from other health facilities. The intensive care nursery has a capacity of 20 beds for level 2 and 3 care. There is a Paediatric Department which has 40,000 OPD attendance and 3,500 indoor admissions per year. NICU has the capacity to ventilate babies with invasive ventilation including 1 high frequency ventilator and monitoring with support of experienced medical and nursing staff. In addition, there is facility to provide non-invasive respiratory support with continuous positive airway pressure (CPAP) and bi-level positive airway pressure (BiPAP) devices. Bio Medical Engineer is available round the clock for the trouble free and smooth functioning of the life support equipment. NICU provides IV fluid administration with infusion pumps and syringe pumps, hence accurate volume delivery is ensured. There are multiple multi channel vital sign monitors, which are capable of measuring blood pressure both invasively and non-invasively with ETCO<sub>2</sub> monitoring facility. Every baby requiring continuous pulse oximetry has its own dedicated pulse oximeter. NICU has abilities to support Paediatric Surgeons and Cardiologists pre and post operatively. Cardiac Echo and EEG services are also available. There is availability of portable x-ray and ultrasonography round the clock and hospital has 24-hour laboratory support for urgent investigations including blood gas analysis. CT and MRI Scan are available in close by facilities and the baby is transported to and fro for these investigations accompanied by trained Paediatrician.

Neonatal Transport Services -The unit also provides 24 hrs neonatal transport services from periphery by a paediatrician to retrieve a newborn and is able to provide artificial ventilation & IV fluid administration as and when required. Hospital plans to use transport ventilator to support transfer from outside destinations.

#### **NICU Staff:**

The unit is staffed with well trained and experienced fulltime Consultants. Parents have a chance to interact with one of them on a regular basis. NICU is also staffed with well trained and experienced nurses.

## **2. PREAMBLE**

Neonatology has made outstanding progress in recent years. India faces the biggest newborn health challenge of any country in the world. Every year 20% of worlds infants – 26 millions babies are born in this vast country, of these 1.2 million die in the first four weeks of life, accounting for 30% of neonatal deaths world wide each year. The very scale of neonatal mortality and morbidity in India seem an insurmountable challenge. Yet India is on the threshold of a neonatal survival revolution due to commitment to newborn health shared by the Government agencies, health care professionals and academic institutions.

Academic institutions can contribute by means of training, research and community work. Aim of the fellowship programme in Neonatology is to provide basic and advanced training in neonatology to produce competent doctors, who are able to provide clinical care of highest order to the newborn infants. There is tremendous scope for such training programmes as only few centers in India.

## **3. OBJECTIVES**

### **Knowledge**

- a. To be conversant with common neonatal problems – their etiology, pathophysiology, diagnosis, management and prevention
- b. To acquire knowledge regarding neonatal morbidity and mortality and prevention strategies to decrease these.
- c. To be aware of and recognize importance of multi disciplinary approach in the management of neonatal problems.
- d. To acquire knowledge with respect to neonatal care in the community
- e. To acquire knowledge with respect to organizing and planning neonatal intensive care units and managing neonates requiring intensive care

## **Practice**

1. To be able to analyse neonatal health problems and develops preventive strategies to decrease neonatal morbidity and mortality at hospital and community level
2. To provide primary, secondary and tertiary level care of the highest standard to critically ill neonates.
3. To be able to plan, establish and manage level I , II and III neonatal care units.
4. To be able to use and maintain equipments required in the NICU

## **Attitudes / Communication**

- a. To take rational decisions in the face of ethical dilemmas in neonatal and perinatal practice
- b. To exhibit communication skills of a high order and demonstrate compassionate attributes befitting a caring neonatologist
- c. To be able to counsel parents regarding neonatal problems including genetic and hereditary diseases

## **4. ELIGIBILITY FOR ADMISSION**

Any student of Indian nationality who has completed the M.C.I. recognized M.D. or D.N.B course in Pediatrics or Diploma in child health from a University in India is eligible for this one-year fellowship programme.

## **5. DURATION OF COURSE**

Total 12 months from the date of joining the course.

## **6. MEDIUM OF INSTRUCTION**

English

**7. ATTENDANCE:** 80% attendance

## **8. COURSE CONTENTS**

### **KNOWLEDGE**

#### **A) Basic Sciences**

- Feto-placental physiology
- Neonatal adaptation
- Fluid and electrolyte balance
- Blood gas and acid base disorders
- Thermoregulation and Kangaroo Mother Care

#### **B) General Neonatology**

- Neonatal resuscitation
- Birth injury and birth asphyxia
- Normal newborn and common neonatal problems
- Preterm and low birth weight neonates
- Follow - up of high risk neonate
- Assessment of gestation, neonatal behaviour, neonatal reflexes
- Developmental assessment, detection of neuromotor delay, developmentally supportive care
- Immunization including immunization of a preterm neonate
- Discharge planning
- Communicating neonatal death
- Neonatal transport
- Traditional practices in neonatal medicine
- Neonatal equipments
- Neonatal procedures
- Organization of neonatal care including level I,II & III care

## **C) Fetal Medicine**

- Perinatal and neonatal mortality, morbidity & epidemiology
- Fetal and neonatal consequences of high risk pregnancy
- Fetal monitoring : Clinical, electronic, invasive and non-invasive
- Intrapartum monitoring and procedures
- Medical diseases affecting pregnancy and fetus

## **D) Systemic neonatology**

### **i) Respiratory system**

- Examination and interpretation of respiratory signs and symptoms
- Congenital malformations of respiratory system
- Pulmonary diseases: Hyaline membrane disease, transient tachypnea, meconium aspiration, pneumonia, pulmonary air leak syndromes, pulmonary hemorrhage, persistent fetal circulation, developmental defects
- Apnea
- Oxygen therapy and its monitoring
- Neonatal ventilation : principles and practices
- Pulmonary infections
- Miscellaneous pulmonary disorders

### **ii) Cardiovascular system**

- Fetal circulation, transition from fetal to neonatal physiology
- Examination and interpretation of cardiovascular signs and symptoms
- Congenital heart diseases
- Hypertension in neonates
- Shock : pathophysiology, monitoring, management
- Congestive cardiac failure
- Other cardiac disorders

### **iii) Gastrointestinal system and hepatobiliary system**

- Disorders of liver and biliary system
- Bilirubin metabolism
- Neonatal jaundice: diagnosis, monitoring, Management (Phototherapy, exchange transfusion and others)
- Conjugated hyperbilirubinemia
- Congenital malformations
- Necrotising enterocolitis
- Diarrheal diseases
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### **iv) Renal system**

- Developmental disorders
- Renal functions
- Acute renal failure
- Urinary tract infection

### **v) Endocrine and metabolic**

- Hypoglycemia, hyperglycemia
- Calcium disorders
- Magnesium disorders
- Pituitary disorders
- Thyroid disorders
- Adrenal disorders
- Ambiguous genitalia
- Inborn errors of metabolism
- Other endocrine and metabolic disorders

### **vi) Hematology**

- Clinical evaluation of a neonate with hematological problems
- Anemia
- Polycythemia
- Bleeding and coagulation disorders
- Rh and ABO hemolytic disease

- Hydrops fetalis : Immune and Non-immune
- Other hemolytic disease

#### **vii) Neurology**

- Neurological evaluation
- Neonatal seizures
- Intracranial hemorrhage
- Hypoxic ischemic encephalopathy
- CNS malformation and neural tube defects
- Developmental assessment

#### **viii) Nutrition**

- Breast feeding
- Lactation management
- Lactation counseling and education
- Recommended daily requirements of nutrients
- Enteral feeding in special situations including LBW / preterm neonate
- Vitamins and micronutrients in newborn health and disease
- Parenteral nutrition

#### **ix) Surgery and Orthopedics**

- Neonatal surgical conditions
- Pre and post operative management
- Neonatal Orthopedic problems : Congenital and acquired

#### **x) Neonatal Ophthalmology** – Retinopathy of prematurity

#### **xi) Neonatal Dermatology** – Common problems

#### **E. Neonatal Infections**

- Intrauterine infections
- Perinatal HIV
- Bacterial infection

- Viral infections
- Fungal infections
- Septicemia
- Meningitis
- Osteomyelitis and arthritis
- Pneumonias
- Diarrhea
- Nosocomial infections
- Superficial infections
- Infection control measures

#### **F. Community Neonatology**

- Vital statistics, health system
- Causes of neonatal and perinatal mortality
- Neonatal care priorities
- Care at primary health center
- Care of secondary level
- Role of different health functionaries
- National programmes pertaining to newborn care
- National Neonatology Forum

#### **G. Investigations and imaging**

- Laboratory medicine
- Normal values
- X-rays, ultrasound, MRI, CT Scan etc

#### **Clinical Skills**

- Neonatal resuscitation
- Neonatal examination, anthropometry
- Gestation assessment
- Developmental assessment
- Blood sampling : Capillary, venous, arterial
- Cannulation of peripheral artery and umbilical arterial catheterization

- Intraosseous needle insertion
- Neonatal ventilation
- Monitoring : Non-invasive
- Enteral feeding (Katori-spoon, gavage, breast)
- Lactation management
- Lumbar puncture
- Suprapubic aspiration
- Placing of intercostal tube
- Exchange transfusion : peripheral and central
- Peritoneal dialysis
- Phototherapy
- Kangaroo Mother Care
- Chest physiotherapy
- Endotracheal tube suction
- Fundus examination and ROP screening.
- Limb restraintment
- Bed side tests : Shake test, apt test, sepsis screen, hematocrit, urine analysis
- CSF analysis, Kleihauer technique etc.,
- Neonatal drug therapy
- Nursery house keeping routines and asperis procedures
- Universal precautions
- Handling, effective utilization and trouble shooting of neonatal equipment
- Infection control
- Interpretation of investigations and imaging studies
- Record keeping
- Computer data entry

### **Education / Training**

- Teaching skills : Lectures, Tutorials
- Participatory and small group learning skill

### **Self-Directed Learning**

- Learning need assessment, literature search, evaluating evidence

## Communication

- Communication with parents, families and community
- Counselling parents
- Communicating neonatal death
- Obtaining informed consent
- Genetic counseling

## 9. TEACHING LEARNING ACTIVITIES

Learning will be self directed and will take place as a continuous process but in addition the following formal sessions are recommended

### 1. Academic session

In addition to attending all the academic sessions, the candidate needs to make a minimum number of presentations in these academic sessions during the training period of 1 year

	Frequency #	Min. No of Presentations
a. Seminars / Symposia	1 per month	5
b. Journal club	1 per month	5
c. Perinatal meeting	Once in 2 months	4
d. Clinical case conference	1 per month	5
e. Bedside presentation	1 per month	5
f. Interdepartmental meeting with Radiology / Pediatric surgery and others	1 per month	
g. Grand rounds	Once in 2 weeks	
h. Mortality meeting and audit meeting	1 per month	
i. Record meetings	Once in 2 weeks	
j. Teaching learning process will also take place during the daily ward rounds and during teaching rounds		
# May be increased if required		

**Clinical postings:**

Total period of fellowship course is 12 months

**Essential Rotation**

- Obstetrics department 15 days
- Pediatric surgery\* 15 days

**Conference, CME's and Workshops**

During the one year training period he/she should attend at least

One State / National Conference

One CME Programme

Should present a paper in the conference

**Teaching**

The candidate will be involved in teaching nursing students, nursing staff, undergraduate and post - graduate students.

**Special Training Programme**

The candidate must attend and be certified in the following training programs

Neonatal resuscitation programme (NALS)

Human lactation management #

**Log Book**

Log book for evaluation of the following

- Interpersonal and communication skills
- Medical knowledge
- Patient Care
- Practice Care
- Practice based learning and improvement
- Professionalism
- Systems-based practice
- Attendance and availability
- Enthusiasm and responsiveness

\* May not be required if surgical neonates are managed in the NICU

# Subject to the availability of course during training period

## 10. SCHEME OF EXAMINATION

**Paper - 1:** General Neonatology, Infections Perinatology,

Community neonatology 100 Marks

**Paper - 2:** Clinical Neonatology, Systemic Neonatology 100 Marks

**Case Presentation + Viva Voce** 200 Marks

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**Total number of marks** 400 Marks

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**A) Theory (2 papers of 100 Marks each) = 200 Marks**

Type of question papers (Each paper will have):

2 Long Questions of 20 Marks each = 40 Marks

6 Short Essay Questions of 10 Marks each = 60 Marks

**Total = 100 Marks**

**B) Practical Examination = 200 Marks**

**Case Presentation (1 Long Case- 70 marks & 2 Short Cases of 40 marks each)**

**Case 1 Neonate in ICU 70 Marks**

**Case 2 Stable neonate 40 Marks**

**Case 3 Neonatal follow up case till one year of age 40 Marks**

**Total 150 Marks**

**Viva- Voce 50 Marks**

- Instruments
- X-rays
- Medications
- Case scenario and laboratory report interpretation

**C) Maximum Marks**

<b>Theory</b>	<b>Practical</b>	<b>Viva</b>	<b>Grand Total</b>
200	150	50	400

## 11. RECOMMENDED BOOKS (LATEST EDITIONS)

Sl. No.	Name of the text book	Author
1	Diseases of the newborn	Taeusch HW, Ballard RA
2	Neonatology Pathophysiology and Management of the newborn	Avery GB, Fletcher MA
3	Textbook of Neonatology	Rennie M, Robertson NRC
4	Care of the newborn	Singh M
5	Manual of Neonatal Care	Clothery's
6	Care of the high risk neonate	Klaus MH, Fanaroff AA
7	Infectious diseases of the fetus and newborn infant	Remington JS, Klein JO
8	Assisted ventilation of the neonate	Goldsmith JP, Karotkin EH
9	Smith's recognizable patterns of human malformation	Jones KL
10	Neonatal-Perinatal Medicine Diseases of the fetus and infant	Avroy A Fanaroff, Richard J Martin
11	Avery Diseases of Newborn	S.Avery Taecsh Ballard
12	Polin & Fox :Fetal And Neonatal Physiology	Richard A Polin ,William Fox
13	Breast feeding :A guide to the medical profession	Ruth A. Lawrence.
14	Physical Diagnosis in Neonatology	Mary Ann Fletcher
15	Neurology Of Newborn	Joseph J.Volpe
16	Moss and Admas Heart diseases in Infants ,Children & adolescents including the fetus & young Adult	Emmanouilides,Riemenschneider,Allen & Gutgesell

### **Recommended Journals**

- Clinics in Perinatology
- Archives of diseases of childhood
- Journal of pediatrics
- Pediatrics
- Pediatric Clinics of North America
- Indian Pediatrics
- Indian Journal of Pediatrics
- Journal of Neonatology (National Neonatology Forum of India)
- Seminars in neonatology
- Tropical pediatrics
- Journal of Perinatology
- Pediatrics Today
- Recent Advance in Pediatrics
- Acta paediatrica: an international Journal of Pediatrics.