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# **FELLOWSHIP IN NEONATOLOGY**

**D Y PATIL UNIVERSITY, KOLHAPUR**

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**DEPARTMENT OF PEDIATRICS  
D Y PATIL MEDICAL COLLEGE, KOLHAPUR**

## **Title: FELLOWSHIP PROGRAM IN NEONATOLOGY**

### **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 and only one centre in Karnataka is providing such training in the field of neonatology

### **Infrastructure**

NICU facility available in D.Y. Patil Hospital, Kolhapur can be used with up gradation if needed for imparting the training.

### **AIM**

The aim of the fellowship programme is to provide basic and advanced training in neonatology to produce competent doctors, who are able to provide clinical care of the highest order to the newborn infants.

## **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

## **3. Eligibility for Admission**

M.C.I recognized Post-graduation in Pediatrics or Diploma in child health

#### **4. Duration of Course**

Total 12 months/ 2 semesters

#### **5. Medium of Instruction**

English

#### **6. 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

#### **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
- Diarrhoea
- 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 catheterisation
- 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



- 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

### **SKILLS**

PI	– Perform independently
PA	– Perform with Assistance
O	– Observed
O PA PI	
Newborn resuscitation	5 20
Meconium suction	5 10
Lactation management and counselling	20
Peritoneal dialysis*	2 2 -
Exchange transfusion*	3 5
Umbilical / peripheral arterial cannulation	2 3
Parenteral nutrition*	2 3
Neurosonography	5
ECHO	5
Counselling parents	20
Ventilation	5 15
Peripheral exchange transfusion*	2 2
Gestational assessment	50

Developmental evaluation	20
Chest tube placement*	2 2 2
Feeding tube insertion	10
BAER / OAE	3
ROP Screening	3
Surfacant administration	2 2 2

\* Subject to number of procedures performed in the unit

## **Elective Subjects:**

### **1. 2D ECHO**

1. PHYSICS & PRINCIPLES OF ECHOCARDIOGRAPHY.
2. ROLE OF ECHO IN NICU.
3. FUNCTIONAL ECHOCARDIOGRAPHY.
4. CHD-1.
5. CHD-2.
6. CHD-3.
7. ACQUIRED HEART DISEASE-1.
8. ACQUIRED HEART DISEASE-2.
9. COLOUR DOPPLER.
10. ROLE OF ECHO IN PICU.

### **2. USG**

1. PHYSICS OF USG.
2. NORMAL USG ORIENTATION.
3. NEUROSONOGRAPHY.
4. ABDOMINAL LUMP.
5. RENAL DOPPLER.
6. SOFT TISSUE SWELLING & CDH.
7. USG GUIDED PROCEDURES –PLEURAL EFFUSION, VENTRICULAR TAP.
8. FNAC, BIOPSY.
9. ACUTE ABDOMEN ROLE.
10. USG IN SPECIAL CONDITION.

FOUR LECTURES ON EACH TOPIC.

TOTAL 40 LECTURES ON ECHO & 40 LECTURES ON USG.

## **7. Teaching Hours**

### **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 1 per month 4
  - d. Clinical case conference 1 per month 5
  - e. Bedside presentation 1 per month 5
  - f. Interdepartmental meeting with Radiology / Pediatric surgery 1 per month and others
  - g. Grand rounds 1 per week
  - 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/ 2 semesters

#### **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



8. Remington JS, Klein JO. Infectious diseases of the fetus and newborn infant
9. Goldsmith JP, Karotkin EH. Assisted ventilation of the neonate
- 10 Jones KL. Smith's recognizable patterns of human malformation

#### 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

**Note :** Books and Journals mentioned above are suggestive. Students can refer to any other books and Journals. Refer to the most recent edition of the books and Journals

### **10. Declaration of Results**

#### **Passing Criteria**

- Candidate should obtain 50% of Marks in both Theory and Practical Examination Separately to be declared as pass.

### **11. Examiners**

- 2 Examiners – One Internal and One External

### **12. Eligibility to become an examiner**

Professor / PG Teacher

Qualification: DM Neonatology / DNB Neonatology / Fellowship in Neonatology

Affiliated to MCI / UGC recognized University / Recognized

Autonomous Institution

**TITLE OF PROGRAM: Fellowship course in Neonatology**

**Duration of Program:** One year

**Number of Semesters:** 2

**Number of Papers:** 4

**Core Papers: (60% weightage of marks) [List syllabus for each paper]**

1. Basic sciences, fetal medicine, General Neonatology, infections, perinatology, community neonatology.
2. Clinical neonatology, systemic neonatology, (RS, CVS, GH, HB, Renal, Endocrine, Metabolic, Hematology, Neurology, Ophthalmology, Dermatology), Nutrition, counseling.

**Elective Papers: (25% weightage of marks)**

Discipline-related: (Allied specialty, Diagnostic modalities, Sub-specialty)

1. Ultra sonography
2. 2 D-Echo-Cardiography & Color Doppler

**Foundation Papers: (15% weightage of marks – only compulsory)**

- Compulsory:
1. Research Methodology
  2. Medical Ethics

- Value-based (any1):
1. ATCOM
  2. Computer skill
  3. Marathi language

**Semester wise Paper distribution** (Core, Elective & foundations as may be applicable):

1. Semester 1:

Core: Basic sciences, fetal medicine, infections, perinatology, community neonatology.

Foundation (compulsory 1): Research Methodology/Medical Ethics

2. Semester 2:

Core: Clinical neonatology, systemic neonatology, Nutrition, counseling.

Elective: Ultra sonography/2 D Echo color doppler

**1 Semester = 450 Hours / 90 Days / minimum 15-18 weeks**

	SEMESTER 1			SEMESTER 2		
	Hours	Per Week	Credits	Hours	Per Week	Credits
Core	45	2	3	45	2	3
Elective- Discipline	-	-	-	30	2	2
Elective- Generic	-	-	-	-	-	-
Foundation – Compulsory	45	2	3	-	-	-
Foundation – Value Based	10	1	-	10	1	-
Practicals	350	16	11	365	17	12

Assessment for credit courses (Absolute grading method):

Marks	93%	84%	77%	70%	63%	56%	49%
Letter grade	A+	A	B+	B	C+	C	F
Grade point	10	09	08	07	06	05	00