

**Dr.NTR University of Health Sciences**

**Vijayawada**

**SYLLABUS**

**“POST DOCTORAL FELLOWSHIP**

**COURSE IN NEONATOLOGY”**

**for the academic year 2018-19**



## ***FELLOWSHIP COURSE IN NEONATOLOGY***

**1. Proper name of the course:** Fellowship course in Neonatology

**2. Duration of the course:** One year

**3. I. Eligibility criteria for admission:** M.D / D.N.B.(Pediatrics) recognized by the Medical Council of India / National Board of Examinations.

**II. Intake capacity:** 2 per year

**4. Complete curriculum of the course:**

**I. Statement of Goals & Specification of Objectives:**

**A. Goal**

The goal of fellowship in Neonatology program is to provide specialized training in Neonatology to produce competent and skilled specialists. These specialists will be capable of providing care to the newborn infants in the community as well as clinical tertiary care centers. They would subsequently serve as teachers, trainers, researchers in the field of Neonatology.

**B. Objectives**

After completing the fellowship in Neonatology the trainee will be able to recognize the importance of Neonatology in the context of health needs of the community & the national priorities in the health sector. Thus the trainee will be able to

- Provide primary, secondary, and tertiary care to all newborn infants including intensive care to the critically sick neonates and very low birth weight infants using advanced therapeutic and supportive modalities and skills.
- Implement a comprehensive follow up and early intervention program for the "At risk" newborn infants, and plan, counsel and advise rehabilitation of the neurodevelopmentally and physically challenged infants.
- Use and maintain the essential neonatal equipment and keep abreast with advances in neonatal care technology.
- Teach newborn care to medical and nursing students as well as grass root health functionaries and develop learning resource materials for them.

- Plan and carry out research in neonatal health in clinical and community settings. Seek & analyze new literature and information on Neonatology, update the concepts, and practice evidence based Neonatology. Demonstrate adequate managerial skills.
- Have the ability to set up level II and level III Neonatal units independently.

## **II. Course Content:**

Since the fellows are trained with the aim of practicing as independent specialists, this course content will be mainly a guideline. They have to manage all types of cases and situations and seek and provide consultation. The emphasis shall therefore be on the practical management of the problem of the individual cases and the community within the available resources.

### **A. Basic Sciences:**

- Applied anatomy, embryology, physiology
- Feto-placental physiology
- Fetal growth
- Neonatal adaptation
- Metabolic pathways pertaining to glucose, calcium and magnesium
- Biochemical basis of inborn errors of metabolism
- Electrolyte balance
- Development pharmacology
- Mechanism of diseases

### **B. General Topics:**

- Research methodology
- Teaching methodology

### **C. Perinatology:**

- High risk pregnancy & impact on the fetus
- Birth injury and birth asphyxia
- Perinatal and neonatal mortality
- Fetal monitoring
- Intrapartum monitoring and procedures
- Genetic counseling
- Diagnosis and management of fetal diseases

### **D. General Neonatology:**

- Neonatal resuscitation
- Management of normal newborn

- Management of LBW, VLBW, ELBW infants
- Management of sick neonate
- Emergency neonatal care
- Thermoregulation and kangaroo mother care
- Neonatal transport
- Fluid & electrolyte management
- Neonatal ventilation
- Blood gas and acid base disorders
- Neonatal assessment
- Assessment of gestation, neonatal behavior, neonatal reflexes
- Developmental assessment, stimulation techniques
- Immunisation including immunization of a preterm neonate
- Communicating neonatal death
- Organisation of neonatal care
- Adoption
- Recent advances
- Neonatal procedures
- Neonatal biomedical equipment, use and maintenance.

#### **E. 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 and 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**

### **xii) Neonatal Hearing Assessment: National programme for prevention and control of deafness in neonates (NPPCD).**

## **F. Neonatal Infections**

- Intrauterine infections
- Perinatal HIV
- Bacterial infections
- Viral infections
- Fungal infections
- Septicemia
- Meningitis
- Osteomyelitis and arthritis
- Pneumonias
- Diarrhoea
- Nosocomial infections
- Superficial infections
- Infection control measures

## **G. Community Neonatology**

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

## **H. Investigations and imaging**

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

## **I. 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
- Limb restraintment
- Bed side tests : Shake test, apt test, sepsis screen, hematocrit, urine
- Analysis
- Neonatal drug therapy
- Nursery house keeping routines and asepsis 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



- Umbilical venous cannulation
- Various central line placement techniques

**J. Communication:**

- Communication with parents, families and communities
- Interdepartmental communication
- Human behavior studies

**K. Education / Training:**

- Teaching skills
- Learning skills
- Participatory and small group learning skills
- Preparing learning resource material

**L. Self-Directed Learning:**

- Learning needs assessment, literature search, evaluating evidence

**III. Teaching scheme:**

**1. Teaching Learning Methods and Activities:**

Learning in fellowship program shall be essentially “Autonomous & Self directed”.

Trainee students are encouraged to largely carry out self learning. They are expected to seek knowledge & skill on their own initiative. Sound knowledge of Neonatology is to be acquired entirely by self study & by participating in various teaching activities of the department.

The following organized learning experiences should be provided to the students.

- Case presentation & case management in OPD & Indoor wards: The student will present cases daily on clinical rounds to the faculty members of the department. The students shall be provided with facilities to manage cases of higher and greater complexity by allowing them graded responsibility.
- PG lectures, Seminars, symposia, panel discussions of suitable topics: These will be held once a week. Topics of common interest to fellows will be covered in the program.
- Journal clubs: These will be held once a week.
- Medical audit / fatality case discussions: This will done once in 15 days.
- Interdepartmental meetings will be organized with related departments.

- Departmental clinical work: Research. The fellow will be also involved in various clinical research work being undertaken in the department by the faculty members.
- Teaching experience: The fellows will participate in all aspects of teaching specially practicals, demonstration & tutorials. During their tenure, they will be working under faculty members on rotation basis as per the allotment of the teaching schedule.
- Community services: The training of fellows will involve learning experience “Derived from” or “Targeted to” the needs of the community. It shall therefore be necessary to expose the students to community based activities.

Throughout the course of training the emphasis shall be on acquiring knowledge, skill and attitudes through first hand experiences as far as possible. The emphasis will be on self learning rather than on didactic lectures. **The entire period shall be ‘in service’ training program based on the concept of ‘learn as you work’ principle.**

## **2. Training program:**

There will be structured training program. The students are expected to learn in phased manner starting with basic care progressing to advanced care management.

First 3 months: Neonatal resuscitation protocol

Care of normal newborn, low birth weight, preterm & sick neonates

Neonatal ventilation

Communication skills

Second 3 months: All of above plus

Neonatal surgery (observation)

Research methodology

Total parenteral nutrition

Neonatal autopsy (observation)

Neonatal radiology including imaging techniques

Perinatology

Community neonatology

Teaching methodology

Analytical & managerial skills

Third 3 months: All of above plus

Recent advances

## **3. SKILLS:**

PI – Perform independently  
 PA – Perform with Assistance  
 O – Observed

	<b>O</b>	<b>PA</b>	<b>PI</b>
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

#### 4. Presentations:

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 #

#### Presentations

- a. Seminars / Symposia                      1 per month
- b. Journal club                                    1 per month
- c. Perinatal meeting                            1 per month
- d. Research conference at state level - 1
- e. Research conference at national level - 1
- f. Clinical case conference                    1 per month
- g. Bedside presentation                        1 per month
- h. Interdepartmental meeting  
     with Radiology / Pediatric

- surgery and others 1 per month
- i. Grand rounds 1 per week
- j. Mortality meeting  
and audit meeting 1 per month
- k. Record meetings Once in 2 weeks
- l. Teaching learning process will also take place during the daily ward rounds and during teaching rounds

# May be increased if required.

### 5. Log book

The fellows shall maintain a Record Book (Log Book) of the work carried out by them on day to day basis & training program undergone during the period of training including details of procedures carried out independently or assisted by the candidate. The log book will be checked by the faculty members imparting the training. Candidates will be required to produce log book duly certified by the guide at the time of practical examination.

### 6. Development of attitude:

It is a very important aspect of management of newborns. It would be the constant endeavor of the faculty to develop desirable attitudes in the PG trainees during the course by personal examples, interaction and group discussion. Constant watch will be maintained during their work in the wards to ensure that this objective is being met. Although there will be no formal evaluation of attitude, some aspects of this domain would be covered during the formative evaluation for continued internal assessment.

### IV. Text books and reference books:

Sl.No	Name of the Book	Author
1	Neonatal – Perinatal Medicine Diseases of the fetus and infant	Avroy A Fanaroff Richard J Martin
2	Neonatology Pathophysiology & Management of the New born	Gordon Avery Mary Ann Fletcher M.G. MacDonald
3	Avery diseases of New born	S. Avery Taeusch Ballard
4	Polin & Fox	Richard A Polin

	Fetal and Neonatal Physiology	William W Fox
5	Robertson's Textbook of Neonatology	Janet M Rennie N.R.C Robertson
6	Neonatology Principles & Practice	Dipak K. Guha
7	Manual of Neonatal care	John P. Cloherty
8	Neonatology Management, Procedures, On call problems diseases and drugs	Tricia Lacy Gomella
9	Breastfeeding A Guide to the Medical Profession	Ruth A. Lawrence Robert M. Lawrence
10	Physical Diagnosis in Neonatology	Mary Ann Fletcher
11	Nelson's Textbook of Neonatology	Behrman Kleigman Arvin
12	Assisted Ventilation of the Neonate	Jay P. Goldsmith Edward H. Karotkin
13	Infectious Diseases of the Fetus & Newborn Infant	Remington & Klein
14	Neurology of Newborn	Joseph J. Volpe
15	Smith's Recognizable Patterns of Human Malformations	Kenneth Lyons Jones
16	Moss and Adams Heart Disease in Infants, Children, & Adolescents Including the Fetus & Young Adult	Emmanouilides Riemenschneider Allen & Gutgesell
17	The Clinical Recognition of Congenital Heart Disease	Joseph K. Perloff
18	Pediatric Cardiology	Myung Park
19	Pediatric Hematology	Nathan , Oski
20	Medical disorders In Obstetric Practice	Michel Deswite
21	Neonatal drug formulary	
22	Textbook of Preventive & Social Medicine	Park
23	Care of the newborn	Singh M.
24	Care of the high risk neonate	Klaus MH, Fanaroff AA.
25	Text book of neonatology	Vidyasagar D.
26	Smith's recognizable patterns of human malformation	Jones KL.

**V. List of Journals (Previous three years):**

Sl.No	List of Journals
1.	Archives Diseases of Childhood: Fetal & Neonatal edition
2.	The Journal of Pediatrics
3.	Pediatrics (English Edition)

<b>4.</b>	Indian Journal of Pediatrics
<b>5.</b>	Indian Pediatrics
<b>6.</b>	Clinics in Perinatology
<b>7.</b>	Journal of Neonatology
<b>8.</b>	Journal of Perinatology
<b>9.</b>	Pediatrics Today
<b>10.</b>	Archives of Pediatrics and Adolescent Medicine
<b>11.</b>	Pediatric Clinics of North America
<b>12.</b>	Pediatric Clinics of India
<b>13.</b>	Recent Advances in Paediatrics
<b>14.</b>	Seminars in Neonatology
<b>15.</b>	Seminars in Perinatology
<b>16.</b>	The Year Book of Pediatrics
<b>17.</b>	Acta Paediatrica: an international journal of Paediatrics