

# **Fellowship Program course curriculum**

## **Aims-**

The aim of the fellowship program 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 infant.

## **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

### **Eligibility for Admission-**

MD. DNB- Pediatric- Duration of Course 1 year

DCH- Duration of Course 1 and 1/2 year

### **Prerequisites-**

1. All fellows admitted to the IAP Neonatology Fellowship Programme should be members of Central IAP and IAP Neonatology Chapter. (See membership category details on [www.iapindia.org](http://www.iapindia.org))
2. All such students who are not the members of Central IAP at the time of admission shall be considered to have their admissions provisional till documents of IAP membership are submitted.
3. Fellows who are not members of Central IAP/IAP Neonatology Chapter shall not be considered eligible for examination.

### **Eligibility-**

Trainee:

Any student of Indian nationality who has completed the M.D / D.N.B / DCh course in Pediatrics from a Medical Council of India or State Medical Council recognized University in India is eligible for this fellowship program. Preference would be accorded to MD / DNB passed Candidates. If such candidates are not available then a DCh qualified candidate may be selected for the course While the course tenure would be one year for MD / DNB candidates, it would be one and half years for a DCh candidate. At the time of application the trainee would have to produce – 1) A bonafide certificate from the Head of Department of Pediatrics of his / her institution where he / she has completed the post graduate training in Pediatrics, 2) Photocopies of the certificate of the post graduate degree from the University concerned, and 3) Certificate of registration with the appropriate State Medical Council or Medical council of India.

Any foreign student or a non-resident Indian student who wishes to apply should be a degree holder in Pediatrics post-graduate training and would have to produce a bonafide certificate from the Head of Department of Pediatrics of his / her institution where he / she has completed the post graduate training in Pediatrics, along with photocopies of the certificate of post graduate degree from the University concerned. The undergraduate and postgraduate degrees should be recognized by the Medical council of India/ State medical council

All trainees joining the Neonatology fellowship program shall work as Full Time Residents during the period of training for one year (MD / DNB) or one and half years (DCh)

Since the students 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.

### **Course Contents:**

#### **A. Academic topics**

##### **Basic sciences pertaining to Neonatology:**

- Genetics
- Applied anatomy and embryology
- Fetoplacental physiology
- Fetal growth
- Neonatal adaptation

#### **B. Physiology and Development of various systems**

- Respiratory system
- Cardiovascular system

- Nervous system
- Gastrointestinal system
- Renal system
- Hematopoietic system
- Endocrinal system
- Fetal and neonatal immunology
- Fluids, electrolytes, glucose, proteins, complex carbohydrates and lipids, and vitamins, minerals and trace elements

#### **Common diseases and conditions in neonates of the:**

- Respiratory system
- Cardiovascular system
- Nervous system
- Gastrointestinal system
- Renal system
- Hematopoietic system
- Endocrinal system
- Fetal and neonatal immunology
- Inborn errors of metabolism

#### **Neonatal Therapeutics**

- Pharmacology
- Nuances of drug dosage, administration, monitoring and toxicity

#### **General Topics**

- Research methodology
- Biostatistics
- Computer & Information technology

### **C. Perinatology**

- Perinatal and neonatal mortality, morbidity, epidemiology
- High risk pregnancy & impact on the fetus
- Fetal monitoring
- Intrapartum monitoring and procedures
- Genetic counseling
- Diagnosis and management of fetal diseases

- Fetal intervention
- Fetal origin of adult disease

## **Detailed list of topics for training in fellowship:**

### **1) General Neonatology**

Neonatal resuscitation

Management of normal newborn

Management of LBW, VLBW, ELBW infants

Management of sick neonate

Emergency neonatal care

Thermoregulation

Neonatal transport

Fluid & electrolyte management

Neonatal ventilation

Blood gas and acid base disorders

Neonatal assessment

Assessment of gestation, neonatal behavior, neonatal reflexes

Developmental assessment, detection of neuromotor delay, stimulation techniques

### **2) Respiratory system**

Neonatal airways: physiology, pathology; management

Pulmonary diseases: hyaline membrane disease, transient tachypnea, aspiration Pneumonia, pulmonary air leak syndromes, pulmonary hemorrhage, developmental defects

Oxygen therapy and its monitoring

Pulmonary infections

Miscellaneous pulmonary disorders

### **3) Cardiovascular system**

Fetal circulation, transition from fetal to neonatal physiology

Examination and interpretation of cardiovascular signs and symptoms

Special tests and procedure (Echocardiography, angiography)

Diagnosis and management of congenital heart diseases

Rhythm disturbances

Hypertension in neonates

Shock: Pathophysiology, monitoring, management

#### **4) Gastrointestinal system**

Disorders of liver and biliary system

Bilirubin metabolism

Neonatal jaundice, Prolonged hyperbilirubinemia, Kernicterus

Congenital malformations

Necrotizing enterocolitis

#### **5) Neurology**

Clinical neurological assessment

EEG, Ultrasonography, CT scan

Neonatal seizures

Intracranial hemorrhage

Brain imaging

Hypoxic ischemic encephalopathy

Neuromuscular disorder

Degenerative diseases

CNS malformation

#### **6) Renal system**

Development disorders

Renal functions

Fluid and electrolyte management

Acute renal failure (diagnosis, monitoring, management)

## **7) Hematology**

Physiology

Anemia

Polycythemia

Bleeding and coagulation disorders

Rh hemolytic disease

Blood Component therapy

## **8) Nutrition**

Fetal nutrition

Physiology of lactation

Lactation management

Parenteral nutrition

Vitamins and micronutrients in newborn health

Human Milk Banking

## **9) Surgery and orthopedics**

Diagnosis of neonatal surgical conditions

Pre and post operative care

Neonatal anesthesia

Metabolic changes during anesthesia and surgery

Orthopedic problems

## **10) Neonatal infections**

Intrauterine infections

Superficial infections

Diarrhea

Septicemia

Meningitis

Osteomyelitis and arthritis

Pneumonias

Perinatal HIV

Miscellaneous infective disorders & fungal infections

### **11) Metabolic & Endocrine**

Glucose metabolism, hypoglycemia, hyperglycemia

Calcium disorders

Magnesium disorders

Thyroid disorders

Adrenal disorders

Ambiguous genitalia

Inborn errors of metabolism

### **12) Neonatal ophthalmology**

Development aspects

Retinopathy of prematurity

Sequelae of perinatal infections

### **13) Neonatal Hearing assessment**

### **14) Community neonatology**

Vital statistics

Health system

Neonatal care priorities

Care at primary, secondary & tertiary level of care

Role of different health functionaries

National programs

**15) Neonatal dermatology**

**16) Neonatal Imaging**

**17) Development assessment & follow up**

**18) Organization of neonatal care**

**19) Adoption**

**20) Recent Advances**

**21) Neonatal procedures**

**22) Therapeutic agents**

**23) Biomedical equipments, use & maintenance**

**List of Skills**

**Clinical**

Neonatal examination & anthropometry

Developmental assessment

Neonatal resuscitation

Neonatal ventilation: CPAP, Mechanical ventilation

Blood sampling: Capillary, venous, arterial

Insertion of peripheral venous, umbilical venous / arterial catheters

Monitoring: invasive, non-invasive

Enteral feeding (katori-spoon, gavage, breastfeeding)

Lactation management

Parenteral nutrition

Endotracheal Intubation



Lumbar puncture and ventricular tap

Placing of 'chest tube'

Exchange transfusion

Bed side tests: Hemoglucometer glucose estimation, Apt test etc.

Neonatal drug therapy

Nursery housekeeping routines

Infection control & Universal precautions

Handling, effective utilization and trouble shooting of neonatal equipment.

Decision making, clinical diagnosis, planning & interpreting investigations

Management of Neonatal problems

### **Communication**

Communication with parents, families and communities

Interdepartmental communication

### **Education / Training**

Teaching skills

Learning skills

Participatory and small group learning skills

Preparing learning resource material

### **Self-Directed Learning**

Learning needs assessment, literature search, evaluating evidence

### **Research Method**

Framing of research question

Designing and conducting study

Analyzing and interpreting data

Publication & writing a paper

Review & presentation of research findings

## **TEACHING LEARNING METHODS AND ACTIVITIES**

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

### **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

Presentations Frequency

- a. Seminars / Symposia 1 per month
- b. Journal club 4 per month
- c. Perinatal meeting 1 per month
- d. Clinical case conference 1 per month
- e. Bedside presentation 10 per month
- f. Interdepartmental meeting with 1 per month

Radiology / Pediatric surgery and others

- g. Grand rounds 1 per week
- h. Mortality meeting and audit meeting 1 per month

Teaching learning process will also take place during the daily ward rounds and during teaching rounds.

### **Clinical postings:**

Total period of fellowship course is 12 months for MD/DNB and 18 months for DCH. Minimum 85% attendance is compulsory.

Rotation(optional)

- 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/Regional Conference

Three CME Programme local/outside city of fellowship hospital

Should present a paper/poster 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 should attend and be certified in the following training programs-

1-NRP workshop- mandatory

2-Quality improvement workshop- mandatory

3- NEST workshop

4- DSC workshop

5- Developmental follow up program

6- Nutrition of preterm

7- Research methodology

8- FBNC training

### **DISSERTATION**

Preparation and presentation of a dissertation:

Every Fellow trainee will be required to carry out one research project over one year under the supervision of his guide as identified by the institution. The project should be completed within 10 months of training, and then reviewed by the guide and given its final shape by the end of eleven months, one month before the stipulated date of completion of the Fellowship course. It should be a 'Quality Improvement' project.

### **LOG BOOK**

Log book for evaluation of the following

- Medical knowledge
- Clinical Care
- Procedures
- Communication skills
- Case and seminar presentations
- Teaching
- Attendance and availability
- Conferences & CME's
- Dissertation
- Know your environment-Knowledge of equipments, Asepsis & disinfection protocol and system based approach to develop NICU
- Enthusiasm and responsiveness

There will be mandatory monthly reporting by fellowship co-ordinators to the IAP Neochap fellowship committee through e mail. Compliance to this reporting is must for continued accreditation of the fellowship center.

**Monthly reporting by fellowship co-ordinator includes-**

- 1- Attendance of all fellows
- 2- Details of activities done as per log book

Online seminars and case discussions are under consideration and if finalized, there will be online presentation on zoom or equivalent media every fortnight or as recommended by fellowship committee by designated fellowship center in succession.

## Recommended Books

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 Newborn	Gordon Avery, Mary Ann Fletcher, M.G. MacDonald
3	Avery Diseases of Newborn	S. Avery, Taeusch, Ballard
4	Polin & Fox - Fetal and Neonatal Physiology	Richard A Polin; William W Fox
5	Robertson's Textbook of Neonatology	Janet M Rennie, N.R.C Robertson
6	Neonatology - Principles and 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	IAP
22	Textbook of Preventive & Social Medicine	Park

### List of Journals (Previous three years)

S No	List of Journals
1	Archives Diseases of Childhood: Fetal & Neonatal edition
2	The Journal of Pediatrics
3	Pediatrics (English Edition)
4	Indian Journal of Pediatrics
5	Indian Pediatrics
6	Clinics in Perinatology
7	Journal of Neonatology
8	Journal of Perinatology
9	Pediatrics Today
10	Archives of Pediatrics and Adolescent Medicine
11	Pediatric Clinics of North America
12	Pediatric Clinics of India
13	Recent Advances in Pediatrics
14	Seminars in Neonatology
15	Seminars in Perinatology
16	The Year Book of Pediatrics
17	Acta Paediatrica: an international journal of Pediatrics

### Websites

S No.	Website
1	<a href="http://www.cochrane.mcmaster.ca/neonatal/">www.cochrane.mcmaster.ca/neonatal /</a>
2	<a href="http://www.nichd.nih.gov/cochrane">www.nichd.nih.gov/cochrane</a>
3	<a href="http://www.neonatology.org">www.neonatology.org</a>
4	<a href="http://www.emedicine.com/ped/neonatology.htm">www.emedicine.com/ped/neonatology.htm</a>
5	<a href="http://www.nnfi.org">www.nnfi.org</a>

