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)
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
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.
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<thead>
<tr>
<th>No</th>
<th>Name of the Book</th>
<th>Author</th>
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<tr>
<td>1</td>
<td>Neonatal –Perinatal Medicine; Diseases of the fetus and infant</td>
<td>Avroy A Fanaroff, Richard J Martin</td>
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<td>2</td>
<td>Neonatology - Pathophysiology &amp; Management of the Newborn</td>
<td>Gordon Avery, Mary Ann Fletcher, M.G. MacDonald</td>
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<td>3</td>
<td>Avery Diseases of Newborn</td>
<td>S. Avery, Tausch, Ballard</td>
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<td>4</td>
<td>Polin &amp; Fox - Fetal and Neonatal Physiology</td>
<td>Richard A Polin; William W Fox</td>
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<td>5</td>
<td>Roberton’s Textbook of Neonatology</td>
<td>Janet M Rennie, N.R.C Roberton</td>
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<td>6</td>
<td>Neonatology - Principles and Practice</td>
<td>Dipak K. Guha</td>
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<td>7</td>
<td>Manual of Neonatal Care</td>
<td>John P. Cloherty</td>
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<td>8</td>
<td>Neonatology - Management, Procedures, On call problems; Diseases And Drugs</td>
<td>Tricia Lacy Gomella</td>
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<td>9</td>
<td>Breastfeeding- A Guide to the Medical Profession</td>
<td>Ruth A. Lawrence; Robert M. Lawrence</td>
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<td>10</td>
<td>Physical Diagnosis in Neonatology</td>
<td>Mary Ann Fletcher</td>
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<td>Nelson’s Textbook of Neonatology</td>
<td>Behrman, Kleigman, Arvin</td>
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<td>12</td>
<td>Assisted Ventilation of the Neonate</td>
<td>Jay P. Goldsmith, Edward H. Karotkin</td>
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<td>13</td>
<td>Infectious Diseases of the Fetus &amp; Newborn Infant</td>
<td>Remington &amp; Klein</td>
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<td>Neurology of Newborn</td>
<td>Joseph J. Volpe</td>
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<td>15</td>
<td>Smith’s Recognizable Patterns of Human Malformations</td>
<td>Kenneth Lyons Jones</td>
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<td>Moss and Adams Heart Disease in Infants, Children, &amp; Adolescents Including the Fetus &amp; Young Adult</td>
<td>Emmanouilides, Riemenschneider Allen &amp; Gutgesell</td>
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<td>17</td>
<td>The Clinical Recognition of Congenital Heart Disease</td>
<td>Joseph K. Perloff</td>
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<td>18</td>
<td>Pediatric Cardiology</td>
<td>Myung Park</td>
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<td>Pediatric Hematology</td>
<td>Nathan , Oski</td>
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<td>20</td>
<td>Medical disorders In Obstetric Practice</td>
<td>Michel Deswite</td>
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<td>21</td>
<td>Neonatal drug formulary</td>
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<tr>
<td>22</td>
<td>Textbook of Preventive &amp; Social Medicine</td>
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### List of Journals (Previous three years)

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<tr>
<td>1</td>
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<td>Archives of Pediatrics and Adolescent Medicine</td>
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<td>Pediatric Clinics of North America</td>
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<td>Seminars in Neonatology</td>
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<td>The Year Book of Pediatrics</td>
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<td>Acta Paediatrica: an international journal of Pediatrics</td>
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### Websites

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