

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR DM IN PEDIATRIC HEPATOLOGY

Preamble

Children in India constitute nearly 45% of population. Hepatobiliary disorders are a major cause of morbidity and mortality among Indian infants and children. Such patients need specialized diagnostic skills, laboratory evaluation and management. These disorders have genetic, familial, metabolic, infective, neoplastic and immune-mediated origin. Subgroups of these cases have intra-uterine origin that has intimate relationship with intra-uterine events cum manifestations in the mother. Liver disorders in infants and children are entirely different from adults as the spectrum, manifestations and outcome are different. Moreover, there is a specialized need of nutritional intervention for treatment and for sustenance of growing and developmental requirements inherent as a potential in children. Therefore Pediatric Hepatology assumes importance as a dedicated specialty to generate skilled manpower to widen application for betterment of child care in India. Some of the important highlights are:

- 1) An in-depth understanding of the dynamic events occurring during hepatobiliary development and the importance of these physiologic variables that occur during liver maturation.
- 2) Recognition of the unique nature of inherited and acquired liver diseases that affect infants and children.
- 3) Pediatric liver transplantation has become a standard modality of management with excellent outcome. Training of pediatricians in specialized Pediatric Hepatology care would improve preoperative, operative, postoperative and long-term care of Pediatric liver transplantation and also timely referrals.
- 4) Application of technology has taken a big leap in terms of endoscopic and radiologic interventions across all age groups in children; usage of molecular and metabolic investigations benefit diagnosis and therapy.
- 5) Trained manpower in this superspecialty will pave a way of dedicated research that can be applied for understanding pathophysiological aspects, treatment and development of innovations matching global levels to alleviate illness in children. There is growing

evidence in world literature that a number of hepatobiliary disorders which manifest during adulthood originate from childhood. Thus to unravel linkages development of trained pediatric hepatologists is the need of present time.

- 6) Trained manpower of this specialty will set up solutions to multiple interventions at population level in India.
- 7) A number of unique disorders like extrahepatic portal venous obstruction, Budd-Chari syndrome, and unidentified causes of cirrhosis and also increasing evidence of obesity affecting liver are prevalent in developing countries like ours. Super-specialty development will make a dent to explore new pathways of solutions.

SUBJECT SPECIFIC OBJECTIVES

Theoretical Knowledge: The primary goal of the program is to train academically oriented pediatric hepatologists. Academic hepatologists should be excellent clinicians encompassing highest levels of skills in evaluation, diagnosis and management of primary and secondary disorders of the hepatobiliary system in infants and children. They should be active in advancing the field by participating in research and capable enough to impart training/ education.

Practical and Clinical skills: The program is devoted principally to clinical training, with both inpatient and outpatient activities and participation in an active consultation service including emergency management. Postgraduates should obtain excellence in clinical, intensive care, transplant hepatology, diagnostic and therapeutic endoscopy, various procedures and laboratory evaluation-cum interpretation in infants and children.

Writing thesis/Research articles: The student should complete two research projects duly cleared by ethics committee. Both the papers should either be published in indexed journals or should be publishable as certified by two external reviewers before appearing for final theory exit examination.

Attitudes including communication skills: With round the year presentations in the teaching programs the trainee should develop communicative and research skills. Trainees should be encouraged to review pediatric liver disease data and present at various conferences.

Training in Research Methodology: In-house research methodology training should be provided for the trainees from time to time. They should also be encouraged to attend workshops/ courses outside the working institution. Importantly courses in biostatistics and ethics should be mandatory.

SUBJECT SPECIFIC COMPETENCIES

At the end of the course the student should be able to acquire the following competencies under the three domains viz., , cognitive, affective and psychomotor domains :

A. Cognitive domain (Knowledge domain)

By the end of the course, the DM student,

- Should be encompassing skills in broad aspects of evaluation, diagnosis and management of primary and secondary diseases of the pediatric hepatobiliary system
- Should develop ability in advancing the field by participating in research
- Should be competent enough to impart training and education.

B. Affective domain (Attitudes including Communication and Professionalism)

The DM student

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain

By the end of the course the DM student

- Should be able to take independent management decisions
- Should carry out the endoscopic procedures, liver biopsy procedures, paracentesis, handle emergencies with utmost confidence.
- Interpretation of laboratory tests
- Analyses and evaluation of findings of various procedures

Syllabus

Course contents

The student should acquire knowledge in the following areas:

- Development of hepatobiliary system
- Feto-maternal liver system: structural, functional and pathophysiological aspects
- Liver in health and disease: metabolic, molecular and structural effects
- Neonatal and infantile liver failure
- Neonatal cholestasis
- Congenital structural defects
- Neonatal hepatitis: Intrauterine infections
- Inborn error of metabolism with liver as clinical entity: metabolic liver disease
- Pediatric acute liver failure
- Childhood chronic liver disease
- Cholestatic liver disease
- Acute and Chronic viral hepatitis
- Liver infections
- Vascular diseases of liver
- Non- alcoholic fatty liver disease
- Hepatobiliary tumors
- Hepatobiliary disorders and systemic disease
- Hepatobiliary disorders and other organ- specific manifestations and vice versa.
- Liver and drug metabolism in normal and disease states.
- Gall bladder disorders

- Liver transplantation: medical and surgical aspects
- Gut and liver in health and disease.
- Biliary tract and pancreas in various disease states.

The student should be able to perform independently the following procedures

1. UGI and lower GI Endoscopy, both diagnostic and therapeutic
 - Endoscopic sclerotherapy
 - Endoscopic variceal band ligation
 - Other haemostatic procedures
 - Percutaneous liver biopsies
 - Basic hepatobiliary ultrasound

The student should be familiar with the following procedures

1. Side viewing Endoscopy (ERCP)
 - Biliary stenting or NBD drainage
 - Stone extraction
2. Doppler Ultrasound of liver and biliary tract
3. Invasive hemodynamics
4. Liver biopsies
 - transjugular liver biopsy procedure
5. Intensive care management of liver patients
 - Subclavian and transjugular catheterization
 - Ventilatory care
6. Pre and post Liver transplantation along with long-term follow-up

TEACHING AND LEARNING METHODS

Formal Teaching

- a) **Journal Club/Journal Scan:** 1 hour duration - Paper presentation/discussion - once per week.
- b) **Seminar:** One seminar every week of one hour duration

- c) **Lecture/discussion:** Lectures on newer topics by faculty, in place of seminar as per need.
- d) **Case presentation:** Once every week. Post graduate students will present a clinical case for discussion wherein all trainees and departmental faculty will interact.
- e) **Case conference:** Ward rounds would constitute case conference with faculty.
- f) **Hepato-biliary imaging classes:** once weekly in which the radiological features of various problems are discussed.
- g) **Hepato-pathological Conference:** Once/ twice a month with Pathology department. Special emphasis should be made on histopathology, standard staining, molecular methods and differential diagnosis.
- h) **Combined Round/Grand Round:** Once or twice a month at the hospital level. This should constitute presentation of unusual or difficult cases, clinical series/research data.
- i) **Emergency situation:** Casualty duty by rotation among the PGs with faculty cover.
- j) **Ward rounds:** Inpatients admitted to wards should be allotted to post graduate students. The post graduate students should take history, conduct examination, clinically evaluate and manage. Ward rounds should be conducted by faculty for appropriate patient care and teaching. This should also cover calls from other specialties and emergency.
- k) **Clinical teaching:** In outpatient, ward rounds, emergency and ICU. The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- l) A post graduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
- m) Department should encourage e-learning activities.

Clinical postings: Recommended schedule for three years training:

The post graduate student is required to work full time in the department, participate in the patient care and academic and research activities as described below.

Responsibilities of students during proposed training:

Training should be styled on residency system for 3 years. The post graduate students will be primarily responsible for the care of patients which include clinical, investigative and therapeutic aspects. In addition they shall pursue research and academic activities in Pediatric Hepatology with nutrition as an integral part during this period. Training of a DM resident will thus include:

- I. Clinical
- II. Investigative
- III. Research activities
- IV. Nutrition

(I) Clinical training:

Under the guidance of the consultants, the post graduate student will look after:

- a) Patients in Pediatric Hepatology outpatient.
- b) Inpatients: each post graduate student will be entirely responsible for management of cases and keeping clinical records of allotted patients. This activity should be done under supervision of consultants.
- c) Night duties and emergency calls by rotation as per exigencies of departmental work.
- d) Clinical training by extensive use of clinical rounds and clinical case discussions. Clinical teaching will be imparted by supervision and guidance of the student during day to day patient management in outpatient and wards. In addition clinical case discussions and rounds will be conducted by the senior staff.
- e) The post graduate students should be posted in adult hepatology - for a period of 6 weeks. During the training program students must be also posted in Pediatric Gastroenterology (luminal aspect) either in- house or as external posting (outside) that should be mandatory for a minimum period of 2-3 months out of a total of 3 years training program. In case of outside posting in adult hepatology and pediatric Gastroenterology (luminal), training should be in departments running recognized DM courses in respective fields. This is important as the gut and hepatobiliary and

pancreatic disorders are intimately linked. Understanding, learning and procedures on GI tract will make the training meaningful and complete.

Liver transplantation (3 months posting in liver transplantation Centre)

The post graduate students should be familiar with pediatric liver transplantation. Pre-transplantation assessment, immunization, donor and recipient evaluation, graft volumetry, observe transplantation operation procedures to learn all technical details, peri-operative care, post-operative management, ICU care and follow-up.

(II) Investigations

a) Essential investigations as part of the clinical training will include:

- (i) Proctosigmoidoscopy
- (ii) Upper G.I Endoscopy and biopsies
- (iii) Endoscopic procedures like variceal ligation sclerotherapy
- (iv) Colonoscopy and biopsies
- (v) Interpretation of plain X-ray abdomen and other imaging
- (vi) Abdominal ultrasonography, CT scanning, MRI
- (vii) Biochemistry: Liver function tests
 - Hepatitis virus serology
 - Metabolic tests

Special investigations which DM students must familiarize may be grouped as follows:

1. Radiology: Angiography and embolization
 - Venography of inferior vena cava & hepatic veins
 - Liver abscess drainage
 - Radionuclide scanning
 - Radiology guided aspiration and stenting
2. Endoscopy: Endoscopic retrograde cholangiopancreatography
 - Endoscopic papillotomies
 - Endosonography
 - Argon Plasma Coagulation
 - Variceal Glue injection, and
 - Oesophageal dilatation

3. Pathology : Histopathology of Pediatric liver and interpretation of cytopathology
Immunohistochemistry
4. Transient Elastography of liver

GI radiology and GI Pathology sessions should will be held to enable the student to acquire good knowledge and skill in interpretation of various radiological investigations (USG, CT, MRI) and histopathological and cytopathological slides.

Procedures to be carried out independently by students during training program

<i>Procedure</i>	<i>Number</i>
Procto- Sigmoidoscopy	20
Upper GI Endoscopy	100
Obtaining endoscopic biopsies from GI tract	50
Colonoscopy	20
Liver biopsy	30
Endoscopic variceal therapy	25

(the above numbers are relaxable)

Research: Protocol submission for two research projects related to the field of Pediatric Hepatology. The students would be required to undertake two research projects with a faculty member as a guide. The students are required to submit the research protocol within first 6 months of joining the course. The research projects should be approved by the departmental research committee and ethics committee should have approved the research projects. The student would be eligible for appearing for exit examination provided the research projects are complete: either published in indexed journals or external peer review of completed manuscripts is certified by two experts as publishable articles. The student should be the first author in one manuscript and in the other he/she may be the first or second author.

First Academic Year

1. Workup of patients in OPD under supervision. DM student should become competent in rendering age-appropriate outpatient care from evaluation through long-term follow-up or discharge from clinic as indicated for each disease process. The DM student should provide care to patients with a broad range of pediatric hepatobiliary diseases and pancreatic disorders. DM student should be able to organize outpatient evaluation, diagnostic procedures and treatment, including hospital admissions as necessary. The DM student should perform history and examination, review of outside data and present cases to the attending faculty.

2. Supervised general and intensive care of admitted patients

DM student should become competent in rendering age-appropriate inpatient care from evaluation to discharge of a broad range of pediatric hepatobiliary disease. DM student should become competent in the performance of diagnostic and therapeutic invasive procedures. The DM student should learn to evaluate and ameliorate the psychosocial impact of disease, utilize available ancillary services and deliver cost efficient care.

3. Overall

The DM student will participate, with supervision from attending faculty, in all aspects of the care of patients of pediatric age. This care includes initial evaluation, formulation of differential diagnosis and evaluation, participation in diagnostic procedures, interpretation of laboratory, radiologic, pathologic and other testing, treatment and discharge planning.

3. Assist in all endoscopic procedures and start performing diagnostic endoscopic procedures in first 6 months of first year of residency under supervision.

Goals: The DM student should become increasingly proficient in the performance of various hepatobiliary procedures: patient assessment for a specific procedure, sedation, understands procedural techniques and post-procedure monitoring and management. The fellow should develop skills to become proficient in diagnostic procedures such as upper gastrointestinal endoscopy, percutaneous liver biopsy and bedside procedures etc. The DM student should observe therapeutic procedures like endoscopic sclerotherapy, banding and glue injections.

Objectives: The DM student will review charts of scheduled outpatient procedures daily, should participate in the consent process, conscious sedation, the procedure, post-procedure

management, communication with patients and families and generation of reports. The student should also attend emergency calls.

Second Academic Year

1. Care of admitted and out-patients.
As already laid out for the first year DM student
2. Perform elective diagnostic and therapeutic endoscopies
3. Academic presentation: Seminar, journal club, journal scans and clinical case presentation, monthly patient data statistics, radiology and histopathology case presentations in respective sessions.

Third Academic Year

1. Care of admitted and out-patients
2. Liver transplantation related patient care
3. Should perform emergency; and elective diagnostic and therapeutic endoscopies
4. Academic work as before
5. Postings in adult hepatology, radiology and Pediatric Gastroenterology (refer to 5.1 e)
6. Analysis and submission of research projects.

Teaching Schedule as enumerated under “Teaching and learning methods”

Logbook

A copy of the report of all procedures performed, interesting cases, transplanted cases, awards during the course, abstracts in various conferences should be maintained in a log book, which should be seen by the entire available faculty in the specialty. Logbook should be then submitted to the Head of the Department at least two months before the exit practical examination. The Log books shall be checked and assessed periodically by the faculty members imparting the training. The Head of the Department will certify the completion of the minimum number of procedures specified. The logbook should be then presented to external examiners at the time of practical exit examination for appraisal.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision

followed by performing independently; for this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

Quarterly assessment during the DM training should be based on:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs

The student is to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT ie., **assessment at the end of training**
The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

The summative assessment examination shall include two heads:

- A. Theory examination.
- B. Practical, Clinical examination and Viva-voce.

Theory examination and Practical/Clinical, Viva-voce shall be separate heads of passing.

Theory examination shall comprise of four papers. Passing percentage shall be cumulatively 50% with minimum of 40% marks in each theory paper.

Practical /Clinical examination consisting of at least one long case, three short cases and viva-voce. Passing percentage shall be 50%.

Passing shall be separate for each head and failing shall be common, meaning thereby that clearance at theory and failure at practical / clinical shall amount to failure at Summative examination and vice versa.

A. Theory Examination:

The Post Graduate examination shall be in two parts: -

1. Theory: There shall be four theory papers as follows:

Paper I: Basic Sciences of Pediatric Hepatology

Paper II: Clinical Pediatric Hepatology

Paper III: Transplant Hepatology

Paper IV: Advances in Pediatric Hepatology

2. Clinical/Practical and Oral examination:

Oral examination shall be comprehensive enough to test the student's overall knowledge of the subject. The clinical/practical examination shall be held as per MCI norms and as per the prevailing rules of the training institute/ University rules. A broader outline is suggested below:

- I. Case presentations: 02cases/ student
- II. Ward rounds constituting 03 worked up cases/ student
- III. Spotters: radiology, histopathology
- IV. Viva Voce/oral examination
- V. Instruments
- VI. Liver transplantation assessment

Oral examination shall be comprehensive enough to test the student's overall knowledge of the subject.

Suggested Reading material

Books (latest edition)

1. Gastrointestinal Diseases. Sleisinger & Fordtran
2. Liver Disease in Children. Frederick J.Suchy, Ronald J.Sokol, William F Balistreri. Cambridge University Press.
3. Schiff's Diseases of Liver
4. Zakim and Boyer's Hepatology
5. Sherlock's Diseases of liver and Biliary system
6. Diseases of the liver and biliary system in children ed. Deirdre Kelly
7. Pediatric Gastrointestinal Disorder. W.Allan Walker, Ranald E Klienman, Philip M. Sherman, Benjamin L, Shneider, Sanderson. BC Decker. Inc
8. Pediatric Gastrointestinal Disease: Pathophysiology, diagnosis and management. Robert Wylie & Jeffrey Hyams. Philadelphia, WD Saunders.
9. Gastroenterology Clinics of North America (series)
10. Pediatric Clinics of North America (series)
11. Clinical nutrition in Gastroenterology By Heatley (Churchill Livingstone)
12. Antioxidant status, Diet, Nutrition and Health. Ed. Andreas M Papas CRC Press.
13. Pediatric Surgery ed. Coran
14. Ashcraft's Pediatric Surgery

Journals

3-5 International and 2 national journals (indexed)

Postgraduate Student Appraisal Form

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM.....TO.....

Sr. No.	PARTICULARS	Not Satisfactory			Satisfactory			More Than Satisfactory			Remarks
		1	2	3	4	5	6	7	8	9	
1.	Journal based / recent advances learning										
2.	Patient based /Laboratory or Skill based learning										
3.	Self directed learning and teaching										
4.	Departmental and interdepartmental learning activity										
5.	External and Outreach Activities / CMEs										
6.	Thesis / Research work										
7.	Log Book Maintenance										

Publications

Yes/ No

Remarks*

*REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

SIGNATURE OF ASSESSEE

SIGNATURE OF CONSULTANT

SIGNATURE OF HOD