

DM – Nephrology Syllabus

Goals

- To train doctors in the subject of the specialty of Nephrology.
- To empower them to practice the specialty of Nephrology with competence, care, delivering the highest standard of Nephrology care to the community.
- To empower the trainee in academic and research aspects of Nephrology, to empower the trainee to become an effective teacher and communicator in Nephrology

Statement of Objectives

1. To provide the candidate with the latest, scientific and evidence- based Knowledge pertaining to the above-mentioned areas in Nephrology.
2. To impart the Skills to practice independently in the above areas of Nephrology and to to the practice of these skills in a graded manner and under suitable supervision to a point where the candidate is capable of practicing these skills independently.
3. To inculcate in the candidate an Attitude of responsibility, accountability and caring; to empower the candidate with a good and sound foundation of Ethical Values in the practice of Urology; and to develop in the candidate the ability to effectively Communicate with patients, peers, superiors, and the community in the discharge of his/her clinical role.
4. To plan and carry out research in this specialty.

Course Content - DM Nephrology

1. Training full time in-service basis on the residency pattern.
2. To impart a sound training in the diagnosis and management of patients.
3. During residency, the candidate shall take part in all the activities of the department including inpatient, outpatient care, laboratory and investigative works up, lectures, seminars, presenting scientific views in conferences, group discussions and various other clinical and teaching assignments under supervision of qualified nephrologist.
4. Didactic teaching activities will include lectures, seminars, clinical presentations, journal clubs and topic discussions.

5. Practical teaching and learning activities will involve case presentations, demonstrations, imaging, diagnostic and therapeutic procedures and such other related activities.
6. Additional teaching and learning activities will include:
 - a. Visits to other institution of excellence as and when needed
 - b. Visit to laboratories, diagnostic facilities, affiliated clinical units and other areas, as may be deemed necessary from time to time.
 - c. Attending continuing Education programs, Seminars, Conferences, and Workshop in furtherance of course objectives.
 - d. Presenting papers, topics, lectures, posters and similar activities to peer groups in furtherance of the learning and objectives of the course.
 - e. lectures covering the recent advances in all aspects of renal diseases would be delivered by faculty. In addition to these teaching from external faculty will be facilitated.
 - f. Bio ethics, ethical issues in transplantation including "Human Organ Transplant Act 1994 and revised law".

Interventional Procedures

A candidate will be required to have achieved proficiency in performing and supervising:

- Hemodialysis (HD machine disinfection, dialyzer reuse, priming, starting and closing dialysis),
- Peritoneal dialysis (catheter insertion, CAPD training, PET test, Mechanical complications, peritonitis management and catheter removal).
- Renal biopsies. He would be expected to have performed a minimum of 50 renal biopsies.
- SLED, CVVHD, CRRT, Plasmapheresis.
- Intermittent peritoneal dialysis.
- Vascular Access. The candidate would also be expected to have insert at least 50 internal jugular, 10 subclavian, 50 femoral vascular access catheters including perm - cath insertion.

Investigative work-up

The candidate is expected to perform routine urine examination and ultrasonography. In addition, he / she must familiarize himself /herself with the following investigations:

Laboratory:

- Electrolyte and acid base analysis.
- Renal function tests.

- Auto analyzer functioning.
- Renal pathology interpretation including immune-fluorescence and electron microscopy.

Radiological:

- Intravenous urography.
- Micturating cystourethrography.
- Digital subtraction angiography.
- Selective renal angiography and interventional angioplasty and stenting.
- Selective renal venography.
- Doppler studies.
- Antegrade and retrograde pyelography.
- CT imaging.
- Magnetic resonance imaging.

Nuclear Medicine:

- Various renal isotope imaging and functional techniques

Urodynamic studies

Microbiology:

- Viral, bacterial and fungal cultures, serological and PCR techniques.

Immunological test:

ANCA, ANA, anti ds DNA, complement, anti GBM antibody, Cryoglobulin, immune electrophoresis. HBV DNA, HCV RNA and HIV viral load, BK Virus PCR, Free light chain assays.

Tissue typing:

- Cross match, serological typing, molecular HLA typing, PRA.

Research

Each candidate will be required to undertake research under the guidance of the faculty. They will be required to submit a research plan within 6 months after joining the course and submit a Project Report not later than 2 years after joining the course. In addition, the candidate will participate in all the departmental research activities.

Project

Every candidate shall carry work on an assigned research project under the guidance of a recognized post graduate teacher, the result of which shall be written up and submitted in the form of a Project report. The Project work is aimed at contributing to the development of a spirit of enquiry, besides acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. The Project topic shall be chosen before the end of eight months from the date of joining the course.

a) Guide-As per MCI Instructions

b) Co-guide- As per MCI Instructions

Teaching /learning methods:

- a) Learning will essentially be self-learning.
- b) Following teaching – learning methods shall be followed.
 - Group teaching sessions
 - Journal review
 - Submit seminar presentation
 - Group discussion
 - Clinical case presentations pertaining to the speciality
 - Presentation of the findings of an exercise on any of the sub-specialities.
 - Participation in CME programs and conferences.

Internal assessment:

During the course of three years, the department will conduct three tests. Two of them will be annual, one at the end of first year and other at the end of second year. The third test will be a preliminary examination which may be held three months before the final examination. The test may include the written papers, practical's/clinical examination and viva-voce. Records and marks obtained in such tests will be maintained by the head of the department and will be sent to the University when called for.

Result of all evaluations should be entered into PG's diary and departmental file for documentation purposes. Main purpose of periodic examination and accountability is to ensure clinical expertise of students with practical and communication skills and balance broader concept of diagnostic and therapeutic challenges.

Log Book.

- a. The log book with details of duration of postings, skills performed with remarks of the teacher / faculty member will be maintained and periodically updated by the postgraduate student.
- b. Maintenance of Log Book:
 - i. The postgraduate shall maintain a record of skills he / she has acquired during the training period certified by the various heads of departments where he / she has undergone training including outside the institution.
 - ii. The candidate should also be required to participate in the teaching and training programme of postgraduate and paramedical students.
 - iii. In addition, the Head of the Department shall involve their postgraduate candidates in seminars, journal clubs, group discussions and participation in clinical meetings and conferences.
 - iv. Every postgraduate candidate should be encouraged to present short title papers in conferences and improve on it and submit them for publication in required medical journals.
 - v. The log book shall be submitted regularly for scrutiny.
 - vi. At the end of the course, the candidate should the contents and get the log book certified by the Head of the Department.
 - vii. The Log book should be submitted at the time of practical examination for the scrutiny of the Board of Examiners.
- c. Research work to be assessed and reviewed once in four months by the Chief Guide and the Head of the unit.
 - i. Choice of article / topic (unless specifically allotted)
 - ii. Completeness of presentation
 - iii. Clarity and cogency of presentation
 - iv. Understanding of the subject and ability to convey the same
 - v. Whether relevant references have been consulted
 - vi. Ability to convey points in favor and against the subject under discussion
 - vii. Use of audio-visual aids
 - viii. Ability to answer questions
 - ix. Time scheduling
 - x. Overall performance

Course Syllabus

Normal Renal Structure and Function:

1. Anatomy of the Kidney
2. Developmental Biology of the Kidney
3. Biology of Renal cells in culture
4. Cell-Cell and Cell-Matrix interactions
5. The Metabolic Basis of Solute Transport
6. The Molecular Basis of Solute Transport
7. The renal circulations
8. Glomerular filtration
9. Renal handling of water
10. Renal transport of various electrolytes and solutes
11. Renal acidification mechanisms
12. Cell biology of vasopressin action
13. Urine concentration and dilution
14. Renal handling of organic anions and cations
15. Vasoactive agents, peptides and the kidney
16. Arachidonic acid metabolites and the kidney
17. Control of body fluid , components and extra-cellular fluid volume, pathophysiology of fluids & electrolyte disorders, pathophysiology of edema formation
18. Pathophysiology of water metabolism

Fluid and electrolyte disorders:

1. Acid base disorders
2. Disorders of sodium, potassium-balance
3. Disorders of calcium, magnesium urate and phosphate metabolism
4. Disorders of water balance

Renal Diseases

1. Epidemiology of renal disease and approach to a patient with renal disease
2. Laboratory assessment of kidney disease: Clearance, urinalysis and kidney biopsy
3. Interpretation of urine electrolyte and acid-base parameters
4. Radiologic assessment of the kidney
5. Acute renal failure and chronic renal failure
6. Primary glomerular diseases
7. Secondary glomerular diseases
8. Tubulo interstitial diseases
9. Urinary Tract Infection, Polynephritis and reflux nephropathy
10. Disorders of the Renal Arteries and Veins

11. Micro vascular diseases of the kidney
12. Toxic Nephrology
13. The Kidney and Hypertension in pregnancy
14. Inherited disorders of the renal tubule
15. Cystic diseases of the kidney
16. Diabetic Nephropathy
17. Nephrolithiasis
18. Urinary Tract Obstruction
19. Renal Neoplasia
20. Glomerular diseases in the tropics
21. Renal diseases in children

Pathophysiology of Renal Disease

1. Renal and systemic manifestations of glomerular disease
2. Adaptation to Nephron loss
3. Vascular Wall in hypertension
4. Essential hypertension
5. Renovascular hypertension and Ischemic Nephropathy
6. Hypertension and Renal disease
7. Pathophysiology of uremia
8. Hematologic consequences of renal failure
9. Cardiovascular aspects of chronic kidney disease
10. Neurological complications of renal insufficiency
11. Renal osteodystrophy
12. Effects of ageing of renal function and disease
13. Renal function in the newborn infant and children

Management of a patient with renal failure

1. Diuretics
2. Antihypertensive drugs
3. Specific pharmacological approaches to clinical renoprotection
4. Nutritional therapy in renal disease
5. Erythropoietin therapy in renal disease and renal failure
6. Hemodialysis
7. Peritoneal dialysis
8. Intensive care Nephrology
9. Extracorporeal Treatment of poisoning
10. Transplantation immunobiology
11. Donor and recipient issues in renal transplantation
12. Clinical aspects of renal transplantation
13. Prescribing drugs in renal disease

Miscellaneous

1. Bio-statistics and clinical epidemiology
2. Ethics, psychosocial, economics and management of renal diseases. Human organ transplant act and medico-legal aspects of transplantation.

Recent Advances

Apart from the topics listed above, the advances in the field of nephrology would include relevant publications of importance to the field of Nephrology including in review articles, original publications and communications at premier scientific meetings in Nephrology.

Text Books:

1. Oxford Text book of Clinical Nephrology- Davison, 3rd edition, Oxford publication
2. Diseases of the kidney and urinary tract Robert W.Schrier Seventh Edition , LWW publication
3. The Kidney ,Brenner and Rector Seventh edition,W.B. Saunders
4. Comprehensive Clinical Nephrology
Johnson and Feehally, Mosby
5. Acid-Base and Electrolytes disorders
Rose D.Burton
2nd Edn, W.B. Saunders
6. Transplant
Kidney transplantation
Peter Morris-----5th Edn
Hand book of kidney Transplantation
Danovitch 4th Edn
7. Dialysis:
1) Hand book of dialysis Daugirdas 4th edition
8. Renal replacement therapy
Drecker 2nd Edn

Journals:

- 1) Kidney International-Elsevier
- 2) American Journal of Kidney diseases -Elsevier
- 3) Journal of American Society of Nephrology-LWW
- 4) Nephrology Dialysis and Transplantation-Elsevier
- 5) Seminars in dialysis -Wiley
- 6) Clinical Transplantation-Wiley
- 7) Transplant proceedings-Elsevier
- 8) New England Journal of Medicine –Massachusetts Medical Society
- 9) Journal of Indian Society of Nephrology-Medknow publications
- 10)Journal of Association of Physicians of India.-Japi Oaye press

Various websites and CD-ROM programme which will help in keeping updated are recommended

- 1) Up to Date
- 2) HDCN. Com
- 3) Ndt.edu.org.
- 4) Kidney .org

List of Recommended Journals

- Kidney International
- American Journal of Kidney Diseases
- Nephrology, Dialysis & Transplantation
- Transplantation
- Dialysis and Transplantation
- Current opinion in Nephrology & Hypertension
- New England Journal of Medicine
- Indian Journal of Nephrology
- Indian Journal of Peritoneal Dialysis
- Indian Journal of Critical Care Medicine
- Journal of Association of Physicians of India
- Journal of American Society of Nephrology
- New England J of Medicine
- Nephrology Dialysis and Transplantation
- Lancet
- Seminars in nephrology

Schedule of training Activities

Clinical schedule of training activities include the following:

Topic Discussion (Basic Sciences related to Nephrology) | Topic Discussion (General Nephrology) /Topic Discussion (Drugs) / Topic Discussion (Dialysis) / Topic Discussion (Transplantation).

Seminar once in 2 week.

Journal Club once in 2 weeks

Dialysis/OPD meeting once a month

Nephro-Pathology meeting twice a month

Nephro - Urology seminars once a month

Nephro-Radiology meeting once a month

Mortality meeting once a month

Case presentation twice a week

Grand Rounds once in 10 days

Consultation daily

Transplantation clinic

Frequency of training activities would include all the above activities and frequency to be determined by the department based on the available time ensuring that teaching activities are conducted on all working days.

Rotations in various areas of Nephrology

Each candidate will go through the following rotations in various areas/subspecialties of nephrology during 3 years of training in Nephrology.

- | | |
|-----------------------------|-----------|
| 1. Ward posting | 15 months |
| 2. Dialysis (HD and CAPD) | 6 months |
| 3. Renal Transplantation | 6 months |
| 4. Out patients | 6 months |
| 5. Critical care Nephrology | 3 months |

(will be part of ward posting)

Intensive care nephrology including management of electrolyte and acid base problems, CRRT and dialysis of critically ill patients with multi-organ failure.

The candidate would be involved in the pre-transplant, immediate post transplant and late post - transplant medical management of renal transplant recipients and the donors including immunosuppressive therapy, immunological monitoring, diagnostic and therapeutic interventions in patients with allograft dysfunction including renal allograft biopsy and ultrasound evaluation of the graft.

- | | |
|------------------------------------|----------|
| 6. Interventional Nephrology | 3 months |
| (will be part of ward posting) | |
| 7. Allied depts & external posting | 3 months |

Examination for the award of Degree DM Nephrology

Panel of Examiners:

Total number of examiners required	-	Four
Internal Examiners	-	Two
External Examiners	-	Two

All the external examiners should be from outside the state of Karnataka.

Internal examiners may be from within the institute or within the state. However, if the examiner who evaluated the dissertation but not in a position to attend the practical/viva examination, the institute can nominate another examiner from among the panel recommended by the concerned HOD.

Examination:

The examinations shall be organized, evaluated and certify candidates level knowledge, skill and competence at the end of the training and obtaining a minimum of 50% marks in each theory paper, practical and viva examinations shall be mandatory for passing the examination. The examinations shall be held before the end of 3 academic years.

i. Number of candidates

- i. The maximum number of candidates to be examined in Clinical/practical and oral on any day shall not exceed three for DM examinations.
- ii. *The examination for the degree shall consist of written (theory) examination, Practicals / Clinicals and Vice Voce.*
- iii. Theory
There shall be the following four theory papers:
 1. Basic Medical Sciences pertains to Nephrology
 2. Clinical Nephrology
 3. Dialysis and Transplantation
 4. Recent advances in Nephrology

The theory examination will be held at least one week before the start of the Practical Clinical and oral examination.

Practical/Clinical and Oral.

Practical/Clinical examination shall consist of carrying out special investigative techniques for Diagnosis and therapy. Oral examination shall be comprehensive to test the candidate's overall knowledge of the subject.

i) Distribution of Marks	Duration	Marks
Basic Sciences	3 Hrs.	100
Clinical Subjects I	3 Hrs.	100
Clinical Subjects II	3 Hrs.	100
Recent advances	3 Hrs.	100
	Total Marks	400

ii) Examination

Theory examination duration: 3hrs.

i) Practical Clinical examination:

DM student shall appear for practical exam on given date with

- a) Logbook duly signed by HOD.
- b) Project report duly signed by HOD.

- c) Long case - -100 marks time 1 hour
- d) 2 Short cases - 50 marks
- e) Ward rounds 4 cases - 50 marks
- f) Viva Voce - 50 marks
- g)

Histopath slides – 25marks
Radiology – 25marks

ii) Maximum marks:

- a) Theory - 400
- b) Practical's - 200
- c) Viva voce - 100
- Grand total - 700

Proformas for Internal Evaluation form for Postgraduates

Clinical Work.

(To be completed once in 6 months by respective Unit Heads)

Name:

Date:

Points to be considered:

1. Punctuality
2. Regularity of attendance
3. Quality of Ward Work
4. Maintenance of case records
5. Presentation of cases during rounds
6. Investigations work – up
7. Bedside manners
8. Rapport with Patients
9. Undergraduate teaching (if applicable)
10. Others:

Guidance for Scoring:

1	2	3	4	5
Poor	Below Avg.	Average	Above Avg.	Very Good

Score : ()

Signature :

Proformas for Internal Evaluation form for Postgraduate's Seminar

Name:

Date:

1. Presentation
2. Completeness of preparation
3. Cogency of presentation
4. Use of audiovisual aids
5. Understanding of subject
6. Ability of answer questions
7. Time scheduling
8. Consulted all relevant literature
9. Overall performances
10. Others:

Guidance for Scoring:

1	2	3	4	5
Poor	Below Avg.	Average	Above Avg.	Very
Good				

Score : ()

Signature :

Proformas for Internal Evaluation form for Postgraduate's Continuous Evaluation of Project Work

Name:

Date:

Points to be considered :

1. Interest shown in selecting a topic
2. Appropriate review
3. Discussion with guide and other faculty
4. Quality of protocol
5. Preparation of proforma
6. Regular collection of case material
7. Depth of analysis/discussion
8. Departmental presentation of findings
9. Quality of final output
10. Defence in Viva
11. Others:

Guidance for Scoring:

1	2	3	4	5
Poor	Below Avg.	Average	Above Avg.	Very
Good				

Score : ()

Signature :

Proformas for Internal Evaluation form for Postgraduate's Continuous Evaluation of Project Work

Name:

Date:

Points to be considered:

1. Choice of articles
2. Cogency of presentation
3. Whether he has understood the purpose of the article
4. How well did he defend the article
5. Whether cross references have been consulted
6. Whether other relevant publications have been consulted
7. His Overall impression of articles
If good – reasons:
If poor – reasons:
8. Audiovisual aids
9. Response to questioning
10. Overall presentation
11. Others:

Guidance for Scoring:

1	2	3	4	5
Poor	Below Avg.	Average	Above Avg.	Very
Good				

Score : ()

Signature :