



Curriculum

FNB Fellowship

2025



Paediatric Endocrinology

- ◆ Introduction
- ◆ Objectives of the Programme
- ◆ Teaching and Training Activities
- ◆ Syllabus
- ◆ Log Book
- ◆ Recommended Textbooks and Journals



This page has been intentionally kept blank.



INDEX

S. No	Contents	Page No.
1.	Introduction	5
2.	Objectives of the Programme	5
3.	Teaching & Training Activities	5
4.	Syllabus	6
5.	Log Book	10
6.	Recommended Textbooks And Journals	10



This page has been intentionally kept blank.



1. INTRODUCTION

National Board of Examinations in Medical Sciences is offering a 2-year Fellowship in field of Paediatric Endocrinology.

2. OBJECTIVES OF THE PROGRAMME

- Provide a comprehensive knowledge base to prepare the trainee to care for newborns, children, and adolescents with endocrine disorders.
- Provide clinical exposure to children and adolescents with various endocrine problems.
- To provide diverse experience in areas related to diagnostic procedures, laboratory, and imaging modalities relevant to pediatric endocrinology.
- Prepare the trainee in the art of interacting and counseling children/adolescents with endocrine disorders and their families.
- Prepare the trainee to continue lifelong education by training in evaluating the medical literature, understanding medical informatics, health economics, research, and statistics, and justifying clinical practice decisions derived from evidence-based medicine.
- Introduce trainees to clinical research principles, and prepare them to analyze data, write investigative protocols and collect data in a scientific, organized manner.
- To develop and maintain a network of experienced clinical teachers and provide opportunities to develop leadership, team-working, communication, evaluation, and creativity to solve problems and communicate important concepts and decisions.



3. TEACHING AND TRAINING ACTIVITIES

The fundamental components of the teaching programme should include:

Once a week

- a. Case presentations and discussions
- b. Seminars and Journal clubs
- c. Grand rounds presentation (By rotation all departments and subspecialties)
- d. Faculty lecture teaching

Once in 3 months - Clinical Audit

At least once in the training period to make presentation in a state or National conference.

The training program would focus on acquiring knowledge, skills and attitudes which are essential components of education and delivery of high quality patient care.

The training can be theoretical, clinical and practical in all aspects of the delivery of rehabilitative care, including methodology of research and teaching.

4. SYLLABUS

1) Principles of hormone measurement:

- a. Molecular concepts and techniques in endocrinology
- b. Principles of RIA/IRMA/ICMA/IFMA/ELISA/GCMS.
- c. Understand the pre-analytical, analytical, and post-analytical issues relevant to Pediatric & Adolescent Endocrinology.
- d. Understand the critical aspects of quality control in an endocrine lab.
- e. Definition of sensitivity, specificity, inter and intra-assay CV.



2. Principles of hormone action:

- a. Categories (and examples) of hormones, type of receptors, and second messengers -broad categories with some examples relevant to disease.
- b. Understand endocrine pathophysiology.

3. Genetics in pediatric endocrinology:

- a. Fundamental knowledge about genetics with the mode of inheritance.
- c. Mendelian and non-mendelian inheritance.
- a. Tools relevant for genetic diagnosis (DNA extraction, Southern, Northern and Western blots, RFLP, PCR, FISH, karyotyping, Next Generation Sequencing).
- d. Genetic Disorders/syndromes in pediatric endocrinology.

4. Perinatal endocrinology

- a. Perinatal physiology and endocrinology
- b. Neonatal hypoglycemia and diabetes
- e. Neonatal hypo and hypercalcemia and magnesemia
- f. Neonatal thyrotoxicosis and hypothyroidism
- g. Disorders of sexual development
- h. Adrenalin sufficiency
- i. Special health issues in children born SGA
- j. Developmental Origins of Health and Adulthood Diseases.

5. Growth

- a. Normal growth – patterns, control of (including details of hormonal control of growth), measurement, bone age, and growth charts
- b. Short stature- causes, diagnosis, and management
- c. Tall stature- differential diagnosis, treatment, Marfan, Sotos, GH excess.
- d. Dysmorphic syndromes – Details of Turner, Noonan, Prader Willi, Klinefelter, others - (Down, Russell Silver, Laurence Moon Biedl)

6. Skeletal dysplasias



- a. Differential diagnosis of disproportionate short stature
- b. Achondroplasia: clinical and radiological features.

7. Hypothalamus and Pituitary:

- a. Molecular genetics of hypothalamic-pituitary axis development
- b. Consequences of mutations in Pituitary Transcription Factor genes
- b. Disorders of posterior pituitary: Diabetes insipidus and SIADH, cerebral salt wasting, differentiation of central/nephrogenic/primary polydipsia, and treatment.
- c. Craniopharyngioma-detailed knowledge of presentation imaging and management
- d. Physiology of the Growth Hormone-Insulin-Like-Growth Factor Axis
 - a. Biologic and clinical aspects of molecular defects in Growth Hormone-Insulin-Like-Growth Factor Axis
 - b. The etiology of Growth hormone deficiency includes genetic causes, cranial irradiation (GHD) and tumors, and clinical features.
 - c. Endocrinopathies in infants who are small for gestational age
 - d. Hyperprolactinemia
 - e. Sellar mass and surgery.

8. Puberty

- a. Control and Onset of Puberty: Normal puberty, physical changes in normal puberty
- b. Disorders of puberty: Delayed puberty, Constitutional delay of growth and puberty, hyper and hypogonadotropic hypogonadism (details of Kallmann, Klinefelter, and Turner syndrome)
- c. Diagnosis and management of primary and secondary amenorrhea.
- d. Precocious puberty -definition, true puberty, peripheral puberty, precocious thelarche and pubarche, diagnosis and management.
- e. Gynecomastia causes and treatment.
- f. Hyperandrogenism in children and adolescents



- g. Polycystic Ovarian disease – pathogenesis, differential diagnosis, and management

9. Sexual Differentiation

- a. Molecular genetics and hormonal control of sexual differentiation
- b. Disorders of sexual differentiation- diagnosis and management
- c. Cryptorchidism
- d. Micropenis

10. Thyroid

- a. Molecular mechanisms of Normal and Abnormal Thyroid Development
- b. Thyroid Physiology
- c. Congenital hypothyroidism: etiology, newborn screening, treatment, outcome studies.
- d. Hypothyroidism and Goitre in childhood, Iodine deficiency disorders
- e. Hyperthyroidism and Graves' disease in childhood etiology, clinical features, treatment
- f. Neonatal Grave's disease – details of clinical features and treatment
- g. Goitre, Thyroid nodules and Thyroid cancer in children and adolescents.
- h. Thyroid hormone resistance

11. Adrenal

- a. Molecular development and physiology of the Adrenal gland
- b. Steroidogenic defects: steroidogenic pathways, 21 hydroxylase deficiency, details of clinical features, management, long-term outcome; prenatal diagnosis and therapy, 11 β OH, 3 β HSD, 17OH, 17 β HSD, POR – presentation, and management.
- c. Cushing syndrome-clinical features, peculiarities of different etiologies of Cushing syndrome and differences from adults; interpretation of the various screening and definitive tests, imaging. Treatment medical, surgical, radiotherapy, and outcome.
- d. Non-Cushing adenoma, carcinoma, incidentaloma



- e. Adrenal insufficiency- etiology, clinical features, and treatment, polyglandular autoimmune syndromes.
- f. Endocrine Hypertension: differential diagnosis
- g. Impaired aldosterone effect/ Hyperaldosteronism and Hyperaldosteronism
- Pheochromocytoma-clinical features, diagnosis (biochemistry, precautions, and interpretation), imaging, and treatment.

12. Obesity and Eating Disorders

- a. Adipose Tissue function and genetics of obesity
- b. Childhood and Adolescent Obesity: Definition, evaluation, and management
- c. Eating disorders: Identification, evaluation, and treatment of associated endocrine abnormalities
- d. Metabolic syndrome, prediabetes, insulin resistance, hypertension, non-alcoholic fatty liver disease
- e. Genetic obesity

13. Diabetes mellitus

- a. Pathophysiology
- b. Classification, differences between type 1, type 2, and Fibro-calcific pancreatitis
- c. Neonatal diabetes
- d. Maturity Onset Diabetes of Young: differentiating clinical features and management
- e. Type 1-Diabetes: Genetics, pathophysiology, clinical features, management, education, long-term follow-up
- f. Type 2 Diabetes- Diagnosis, treatment

14. Other metabolic and Lipiddisorders

- a. Hypoglycemia in Infants and Children: pathophysiology, biochemical aspects, congenital hyperinsulinism
- b. Pathophysiology of Lipid disorders

15. Bone and Mineral Metabolism



- a. Hypocalcemia: etiology, diagnosis, and management.
- b. Hypercalcemia: etiology, diagnosis, and management.
- c. Hereditary defects of Vitamin D metabolism
- d. Rickets: etiology, clinical features, diagnosis, and management.
- e. Phosphate metabolism disorders, hypophosphatemia
- f. Pediatric Bone disorders: Osteogenesis Imperfecta, osteoporosis, Fibrous dysplasia, and metabolic bone disease of prematurity
- g. Pediatric DEXA (bone densitometry): interpretation and use.
- h. Increased PTH effect
- i. Impaired PTH effect.

16. Systemic Endocrinology

- a. Syndromes with Multiple Endocrine Abnormalities: Multiple Endocrine Neoplasia
- b. Endocrine issues in childhood cancer survivors
- c. Immune Endocrinopathy
- d. Endocrine issues in children with cerebral palsy, such as related to puberty and bone health
- e. Growth disorders in children with chronic systemic illness such as JIA,
- f. Kidney disorders
- g. Diabetes in children with nephrotic syndrome, post-KTP

5. LOG BOOK

This log book shall be made available to the board of examiners for their perusal at the time of internal assessment and the final examination. The logbook should show evidence that the before-mentioned subjects were covered (with dates and the name of the teacher(s)).

6. RECOMMENDED TEXTBOOKS AND JOURNALS



BOOKS

- Sperling's Pediatric Endocrinology 5th Sperling MA Elsevier
- Brooks Clinical Pediatric Endocrinology 7th Dattani MT John Wiley
- Pediatric Endocrinology 5th Lifshitz F Taylor-Francis
- Pediatric Endocrine Disorders 4th Desai M, Menon P, Bhatia V, Seth A Orient Black Swan
- IAP Textbook of Pediatric Endocrinology First Khadilkar V, Bajpai A, Prasad H Jaypee
- Williams Textbook of Endocrinology 14th Melmed S Elsevier
- IAP Specialty Pediatric Endocrinology 1st Shah N, Rao S Jaypee
- Advanced Pediatric Endocrinology 1st Bajpai A MedEClasses
- IJP Practical Pediatric Endocrinology 1st Bajpai A IJP

JOURNALS

- Journal of Pediatric Endocrinology & Metabolism.
- Journal of Clinical Endocrinology & Metabolism.
- Hormone Research in Pediatrics.
- Pediatric Diabetes.
- Endocrinology Clinics of North America.
- Journal of Pediatric Endocrinology & Diabetes.



**NATIONAL BOARD OF EXAMINATIONS
IN MEDICAL SCIENCES**

**Ministry of Health & Family Welfare, Govt. of India
Medical Enclave, Ansari Nagar, New Delhi- 110029**