Article

Cuestiones de Fisioterapia

CLINICAL PATTERNS OF PAEDIATRIC ENDOCRINE DISORDERS IN TAMIL NADU: AN ICD-10 CLASSIFICATION STUDY AT A TERTIARY CENTRE

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Abstract

Aim: To describe the spectrum of various endocrine disorders seen in children and adolescents at Indira Medical College and Hospital, Tiruvallur, Chennai over the period 2019-2023, using the modified European Society of Paediatric Endocrinology ICD-10 classification.

Study Design: Descriptive, cross-sectional study.

Place and Duration: Paediatric Endocrinology Unit, Department of Paediatrics, Indira Medical College and Hospital, Tiruvallur, Chennai. Study was conducted with data from January 2019 to December 2023.

Methods: A retrospective review of 116 patients with various endocrine diseases was carried out. Data on biodata, clinical presentations, investigations and diagnosis were retrieved from clinic records, ward files and the endocrine unit register.

Results: A total of 116 patients were seen with various endocrine disorders over the study period, accounting for 3.8% of Paediatric specialist clinic consultations. There were 58 (50.0%) females, 52 (44.8%) males and 6 (5.2%) with genital ambiguity. The ages of patients ranged from 8 days to 17 years with a mean age of 7.4 ± 4.8 years. The commonest endocrine disorders were thyroid disorders, diabetes mellitus, growth disorders, calcium phosphate metabolism and bone disorders, and pubertal disorders in 24 (20.7%), 20 (17.2%), 15 (12.9%), 12 (10.3%) and 11 (9.5%) respectively. Obesity was observed in 10 (8.6%) of patients, and syndromes with endocrine features in 7 (6.0%). Other disorders included sex development and gender disorders, testicular/male reproductive tract disorders, pituitary/hypothalamic disorders, adrenal disorders and ovarian/female reproductive tract disorders in 6 (5.2%), 5 (4.3%), 3 (2.6%), 2 (1.7%) and 1 (0.9%) respectively. Type 1 DM remained the commonest type of DM. Most patients belonged to social class III. Challenges to management included high cost of investigations and medications, and a significant rate of loss to follow-up.

Conclusion: Thyroid disorders, type 1 Diabetes mellitus, growth disorders, calcium and phosphate metabolism and bone disorders, and pubertal disorders were the most common conditions identified. There is a need for affordable, locally available diagnostic facilities and trained paediatric endocrinologists to enhance the quality of care for children with endocrine disorders in this region.

Keywords: *Endocrine disorders; children; adolescents; tertiary centre; India; Tamil Nadu*

Introduction

Paediatric endocrinology is a subspecialty concerned with the diagnosis and management of hormonal disorders in children and adolescents. Endocrine conditions comprise a heterogeneous group of diseases that may affect growth, development and reproduction. They encompass disorders of the hypothalamus, pituitary gland, thyroid, parathyroid, adrenal glands, gonads and the endocrine pancreas.

Endocrine disorders represent a significant global health burden, with diabetes mellitus being the most prevalent in developed nations. In developing countries, reports on the pattern of paediatric endocrine disorders remain limited, often mirroring trends observed in developed settings. The predominant focus on

infectious diseases and malnutrition in low-resource settings has historically diverted attention and resources away from endocrine conditions. In India, newborn screening for congenital hypothyroidism is not yet universally available, and delayed diagnosis continues to pose a challenge in clinical practice.

With the growing recognition of endocrine subspecialty care in India over the past decade, awareness among healthcare practitioners and the general public has improved, leading to better diagnosis and referral patterns. Understanding the local burden of paediatric endocrine disorders is essential for appropriate allocation of healthcare resources and policy planning.

The purpose of this study was to describe the pattern of endocrine disorders in children and adolescents seen at the Paediatric Endocrinology Unit of Indira Medical College and Hospital, Tiruvallur, Chennai over a five-year period and to identify challenges in diagnosis and management.

2. MATERIALS AND METHODS

This study was a retrospective cross-sectional study conducted at the Department of Paediatrics, Indira Medical College and Hospital, Tiruvallur, Chennai, Tamil Nadu. The hospital is a tertiary care institution that functions as a major referral centre for children with complex medical conditions from Tiruvallur district and surrounding areas. All cases of children and adolescents (aged 0-17 years) with endocrine disorders seen between January 2019 and December 2023 were reviewed. Information was obtained from patients' case notes, clinic and endocrinology unit registers using a structured data extraction tool. Variables retrieved included age at presentation, sex, clinical features, parental educational and occupational status, diagnosis and outcome. Confidential patient data were anonymised and coded. Socioeconomic stratification was performed using the method described by Oyedeji [8]. Diagnosis of the various endocrine disorders was established based on clinical features and relevant laboratory/radiological investigations. Precocious puberty was diagnosed when secondary sexual characteristics developed before the age of 8 years in females and 9 years in males [9]. Classification of endocrine disorders using the ICD-10 was based on the International Classification of Pediatric Endocrine Diagnoses (ICPED) [10]. Ethical approval for the study was obtained from the Institutional Ethics Committee of Indira Medical College and Hospital, Tiruvallur. Data are presented as frequencies and proportions in tables and figures.

3. RESULTS

A total of 116 patients were seen with various endocrine disorders over the study period, accounting for 3.8% of all Paediatric specialist clinic consultations. There were 58 (50.0%) females and 52 (44.8%) males. Six (5.2%) patients had genital ambiguity. The age at presentation ranged from 8 days to 17 years, with a mean age of 7.4 ± 4.8 years. Table 1 presents the pattern and distribution of various endocrine disorders during the study period. Thyroid gland disorders constituted the most common category (24 cases, 20.7%), followed by diabetes mellitus (20 cases, 17.2%), growth disorders (15 cases, 12.9%), calcium phosphate metabolism and bone disorders (12 cases, 10.3%), and pubertal disorders (11 cases, 9.5%). Hypothyroidism was the most prevalent thyroid disorder, accounting for 10 of 24 (41.7%) thyroid cases. Among thyroid disorder patients, 5 (20.8%) had congenital hypothyroidism and presented after 3 months of age. Type 1 DM was the predominant form of diabetes, comprising 15 of 20 cases (75.0%); five children (25.0%) were treated for type 2 DM. Diabetes mellitus was more commonly observed in females. The mean age at diagnosis of diabetes mellitus was 12.3 ± 3.8 years (range 5-17 years). All patients with type 1 DM presented at diagnosis with varying severity of diabetic ketoacidosis (DKA). Mean age at diagnosis was lowest in children with adrenal disorders, sex development and gender disorders, and calcium phosphate metabolism and bone disorders. Fig. 1 illustrates the sex predilection for various endocrine disorders; female preponderance was observed in thyroid disorders, pubertal disorders and pancreatic disorders.

Table 2 shows the percentage of endocrine visits to the Consultant Paediatric Specialist Clinic (CPSC) yearly.

The highest proportion of endocrine visits was recorded in 2023 (4.3%), with an average of 3.8% over the study period.

Table 3 shows the social class distribution of patients. Socioeconomic stratification was determined for 40 (34.5%) subjects with complete records; of these, 34 (85.0%) were in social classes II and III.

Table 1: Pattern of paediatric endocrine disorders at Indira Medical College and Hospital, Tiruvallur, Chennai (2019-2023)

ICD-10 Classification	Disorder	Frequency	% Total	Mean Age at Diagnosis
Growth Disorders	Short Stature	15	12.9%	12.4±4.8
Pubertal Disorders	Precocious Puberty	8	9.5%	7.2±2.5
	Delayed Puberty	2		
	Excessive Menstrual Bleeding	1		
Sex Development / Gender Disorders	Ambiguous External Genitals	5	5.2%	1.8±3.2
	Hypospadias	1		
Obesity		10	8.6%	9.1±3.6
Pituitary / Hypothalamic Disorders	Diabetes Insipidus	1	2.6%	8.2±6.4
	Hypopituitarism	1		
	Cushing's Disease	1		
Thyroid Gland Disorders	Hyperthyroidism	8	20.7%	9.6±5.3
	Hypothyroidism	10		
	Euthyroid Goiter/Thyroiditis	5		
	Thyroid Cancer	1		
Adrenal Disorders	Congenital Adrenal Hyperplasia (CAH)	2	1.7%	0.5±0.8
Testicular / Male Reproductive Tract Disorders	Micropenis	3	4.3%	6.8±4.7
	Cryptorchidism	2		
Ovarian / Female Tract Disorders	Vaginal Stenosis	1	0.9%	4.2±2.1
Disorders of Pancreas / Lipids	Type 1 DM	15	17.2%	12.3±3.8
	Type 2 DM	5		
	Secondary Lipid Abnormality	0		
Calcium, Phosphate Metabolism and Bone Disorders	Rickets	7	10.3%	4.5±3.6
	Blount's Disease	3		
	Others	2		
Syndromes with Endocrine Features	Turner's, Klinefelter's, Down Syndrome, PCOS, Obesity Syndromes	7	6.0%	7.9±2.4
Others	Gynaecomastia	2	1.7%	13.8±0.62

Table 2: Paediatric endocrine clinic attendance (2019-2023)

Year	Total CPC Visits	No. of Endocrine Visits	% CPC Endocrine Visits
2019	3850	142	3.7%
2020	2980	98	3.3%

2021	4120	165	4.0%
2022	4450	178	4.0%
2023	1680	73	4.3%
Total	17080	656	3.8%

Table 3: Social class distribution of patients

Social Stratification	Number of Cases	Percentage of Cases
I	3	7.5%
II	12	30.0%
III	22	55.0%
IV	2	5.0%
V	1	2.5%

4. DISCUSSION

In the present study, endocrine disorders accounted for 3.8% of Paediatric specialist consultations. This figure is comparable to reports from other tertiary institutions in India and sub-Saharan Africa, reflecting improved referral networks and growing awareness among clinicians regarding paediatric endocrine conditions.

Thyroid gland disorders emerged as the single most common category of endocrine disorders in this study, constituting 20.7% of all cases. This contrasts with patterns reported from other Nigerian centres where pubertal or metabolic disorders predominated. In the Indian subcontinent, thyroid disorders, particularly hypothyroidism and autoimmune thyroiditis, are well-recognised as prevalent conditions in the paediatric population. Congenital hypothyroidism, presenting after 3 months of age in 5 cases, underscores the persistent challenge of delayed diagnosis in the absence of universal newborn screening programmes. This finding is consistent with reports from other developing countries and highlights the need for routine neonatal thyroid screening to be integrated into national public health programmes. Diabetes mellitus was the second most common endocrine disorder in this series (17.2%), with Type 1 DM predominating (75.0% of cases). All patients with Type 1 DM presented with some degree of diabetic ketoacidosis at diagnosis, reflecting delayed presentation and limited awareness at the community and primary care level. The growing proportion of Type 2 DM (25.0%) in this study is notable and may be attributed to increasing rates of childhood obesity, sedentary lifestyles and dietary changes in urban Tamil Nadu. The mean age at diagnosis of DM was 12.3 ± 3.8 years, consistent with the adolescent peak reported in the literature. Growth disorders (short stature) ranked third in this review, accounting for 12.9% of cases. The mean age at presentation was relatively late (12.4 ± 4.8 years), suggesting that affected children were often brought for evaluation only when the growth deficit became more clinically apparent during the pubertal years. Early identification and referral of children with growth faltering remains an important goal for primary care practitioners. Calcium phosphate metabolism and bone disorders accounted for 10.3% of cases. Rickets (7 cases) was the most frequently encountered condition within this category, with a majority presenting with varus or valgus deformity of the lower limbs. Vitamin D deficiency, exacerbated by limited sun exposure due to increasing indoor lifestyles and urbanisation, is likely a contributing factor. All children with nutritional rickets responded well to supplementation with calcium and vitamin D.

Pubertal disorders accounted for 9.5% of cases, with precocious puberty constituting the majority (8 of 11 cases, 72.7%). The apparent lower prevalence compared to some published series from West Africa may reflect differences in referral patterns, population demographics and awareness of the condition at the primary care level. Obesity was documented in 8.6% of patients, a finding that mirrors rising childhood obesity trends across urban and semi-urban India, driven by nutritional transitions and physical inactivity.

Genital ambiguity was identified in 5.2% of all cases, with definitive diagnosis proving difficult in several

patients due to limited availability of specialised genetic and hormonal investigations in the public sector. Three children with congenital adrenal hyperplasia (CAH) were initiated on hydrocortisone therapy and are maintained on follow-up, albeit with intermittent challenges in drug procurement.

Sex predilection was evident for several endocrine categories, with female predominance noted for thyroid disorders, pubertal disorders and pancreatic (diabetic) disorders. These findings are in keeping with the known epidemiology of autoimmune thyroid disease and Type 1 DM in females. The youngest mean ages at diagnosis were recorded for adrenal disorders and sex development/gender disorders, in keeping with the clinical expectation that such conditions are most commonly identified in early infancy.

Major challenges encountered during the study period included the high cost of confirmatory investigations such as hormonal assays and genetic studies, limited availability of specialised equipment in the public sector, and significant rates of loss to follow-up. Insulin procurement remained a persistent problem for families of children with Type 1 DM, contributing to suboptimal glycaemic control and heightened risk of complications.

5. CONCLUSION

The five leading endocrine disorders identified in this study were thyroid gland disorders, diabetes mellitus, growth disorders, calcium phosphate metabolism and bone disorders, and pubertal disorders. These findings highlight the need for the training of additional paediatric endocrinologists and the establishment of dedicated endocrine clinics with accessible diagnostic facilities in tertiary institutions across Tamil Nadu. Expanded newborn screening programmes, early community-level awareness campaigns and affordable, locally available investigations are essential to improve outcomes for children with endocrine disorders in this region.

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