IBOM MEDICAL JOURNAL
Vol.18 No.3 | July - September 2025 | Pages 432-439
www.ibommedicaljournal.org

# Spectrum of Paediatric Endocrine Disorders in a Newly Established Endocrinology Unit in Southern Nigeria: A Decade Review

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## Abstract

**Context:** As global health has improved due to improving living standards, the nature and burden of endocrine disorders is also expanding with significant impact on public health. An Endocrine subspecialty was created at the University of Calabar Teaching Hospital, Nigeria to cater for these supposed rare disorders that are on the increase but are beginning to contribute to morbidity and mortality among children and adolescents.

**Objective:** To retrospectively evaluate the epidemiological and clinical spectrum of endocrine disorders in a Nigerian tertiary hospital, with a view to delineating disease patterns, identifying gaps in diagnosis and management, and providing data to guide policy, resource allocation and clinical decision-making in a resource-limited setting.

**Materials and Methods:** A retrospective, descriptive cross sectional study was carried out by reviewing medical records of patients diagnosed with endocrine disorders at the University of Calabar Teaching Hospital, Calabar, Nigeria over a 13years period. Data on demographic characteristics, diagnosis, management modalities and outcomes were extracted and analyzed.

Endocrine disorders were classified using the International Classification of Paediatric Endocrine Diseases (ICPED) and statistical analysis was performed using SPSS version 20 to identify patterns and associations using Chi-square test, with a significance level set at $p < 0.05$.

**Results:** A total of 232 (0.2%) patients had endocrine disorders among the 139,932 cases seen within the period in review. More females than males had endocrine disorders (females 124 [53.4%] and males 106 [45.8%]). Majority of the children with endocrine disorders were between the ages of 1-5 years (31.9%), followed by the age bracket of 6-10 years (28%). The median age of the children with endocrine disorders was 7.00 years (IQR 9.0) with age ranging from 5 days to 19 years. The four most common endocrine disorders seen in this review were disorders of energy balance (obesity) 47 (20.3%), calcium and phosphate metabolism (rickets) 43 (18.5%), pubertal disorders 42 (18.1%) and Glucose/lipids metabolism 32 (13.7%).

**Conclusion:** Pediatric endocrine disorders accounted for 0.2% of hospital visits in this resource-limited setting, with higher prevalence in females and children aged 1–5 years. The most common conditions were obesity, rickets, pubertal disorders, and glucose/lipid metabolism abnormalities. Improved diagnostic capacity, early identification, and targeted public health interventions are advocated to address the burden of endocrine disorders in low-resource settings.

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**DOI:** 10.61386/imj.v18i3.701

Keywords: Endocrine disorders, Children, Endocrinology clinic, Tertiary hospital, Nigeria.
**Competing interests:** The authors declare no competing interest

## Introduction

Endocrine disorders in children refer to conditions that affect the endocrine system, a network of glands that release the hormones essential for regulating important body function, including growth, puberty, water, and blood glucose control.[1,2] Paediatric Endocrine Disorder (PED) span a vast range of conditions including, short stature, pubertal disorders, obesity, thyroid gland disorders, disorders of sex development and others.[3]

The burden of PED is on the increase globally with a considerable impact on public health, because they may cause alteration in quality of life, psychosocial and long-term disability with attendant economic burden.[1,4] Endocrine disorders also contribute significantly to morbidity and mortality especially diabetes and obesity.[1,5] In sub-Saharan Africa, including Nigeria, the true burden of PEDs is likely underestimated due to under-diagnosis, limited specialist availability, and inadequate healthcare infrastructure.[6]

Nigeria, with a projected pediatric population of 87 million in 2017, had a ratio of approximately one board-certified Pediatric Endocrinologist per 1.65 million children, highlighting a significant gap in specialist care.[7] This shortage contributes to delayed diagnosis, suboptimal management, and increased morbidity and mortality associated with endocrine disorders in children.[7]

In response to these challenges, the University of Calabar Teaching Hospital (UCTH), Nigeria sent out one Paediatrician to the Paediatrics Endocrine Training Center for Africa (PETCA) in Nairobi, Kenya. Upon return fourteen years ago, the hospital established its Pediatric Endocrinology Unit, aiming to enhance the diagnosis and management of endocrine diseases in South-south geopolitical Nigeria. The UCTH often receives referrals from some towns in the Southern Cameroon and Equatorial Guinea. Since its inception, the unit has gradually expanded its diagnostic and clinical capabilities.

Given the lack of region-specific data from our region, this study aims to retrospectively analyze the profile of pediatric endocrine disorders managed over thirteen years of establishment of the clinic. The findings will contribute to a better understanding of disease patterns in South-South geo-political Nigeria and support efforts to improve pediatric endocrine healthcare delivery in the region.

## Materials and Methods

### Study Setting

The study was conducted in the Paediatric Endocrinology Unit, Department of Paediatrics, University of Calabar Teaching Hospital (UCTH), Calabar, Cross River State, South-south Nigeria. This is the only tertiary hospital in the State and serves as a referral center to the General Hospitals, primary health care facilities and private hospitals across the State and beyond. It is a 550-bed facility located in Calabar, the capital city of the state with the inhabitants mainly Efiks, Ibibios, Ejaghams and other ethnic groups. The common occupation of the dwellers includes civil service, farming, fishing, trading, and artisans.

### Study Design

This was a retrospective descriptive cross sectional study.

### Study Population

Study population included all children seen and managed for paediatric endocrine disorders at the Paediatric Endocrinology Clinic of the University of Calabar Teaching Hospital from 2009 to 2022 (13-years period). The Clinic and Ward case record of patients diagnosed for paediatric endocrine disorders from 2009 to 2022 were examined retrospectively.

### Data Collection

The information extracted from the record included: year of visit, age at presentation, sex, clinical features, duration of illness, diagnosis, outcomes, and socio-economic status of participants as described by Ibadin et al.[8] The investigations requested were categorized into complete, incomplete and not done at all, while the diagnosis was further classified according to the International Classification of Paediatric Endocrine Diseases (ICPED) into 13 codes.[3]

**Data analysis**

Data was collected in a structured proforma and analyzed using SPSS version 20. The quantitative variables were not normally distributed and were summarized as median and interquartile range while qualitative variables were expressed as frequency and percentages.

**Ethical issues:** As the study is a retrospective one and did not review patients' clinical features (but only the diagnoses), and no interventional procedures were performed, ethics committee approval and informed patient consent were not required.

**Results:**

A thirteen year review of endocrine disorders among children that presented in the children out-patient clinic of Paediatrics Department of University of Calabar Teaching Hospital showed that out of a total of 139,932 cases reviewed, 232 (0.2%) had endocrine disorders.

**Socio-demographics**

The median age of the children with endocrine disorders was 7.00 years (IQR 9.0) with age ranging from 5 days to 19 years. As shown in Table 1, 53.4% of the patients were females. The majority of the patients were in the age groups 1 – 5 years (31.9%), 6 – 10 years (28.0%) and 11 – 15 years (23.3%). Also, most of the patients (78.4%) were from the middle class family background.

**Trend of endocrine disorders**

The yearly occurrence of newly diagnosed endocrine disorders is described in Figure 1. Overall, the number of endocrine disorders seen in the

Table 1: Socio-demographic characteristics of children diagnosed with endocrine diseases in the CHOP clinic of Paediatrics Department of UCTH from 2009 to 2022

| Variables | Frequency | Percentages |
|---|---|---|
| **Age group (years)** | | |
| < 1 | 18 | 7.8 |
| 1 – 5 | 74 | 31.9 |
| 6 – 10 | 65 | 28.0 |
| 11 – 15 | 54 | 23.3 |
| > 15 | 21 | 9.1 |
| **Sex** | | |
| Male | 106 | 45.8 |
| Female | 124 | 53.4 |
| Indeterminate | 2 | 0.8 |
| **Social class** | | |
| Upper | 22 | 9.5 |
| Middle | 182 | 78.4 |
| Low | 28 | 12.1 |

Table 2: ICD/specific diagnosis of endocrine disorder

| ICD/specific diagnosis of endocrine disorder | Number (%) |
|---|---|
| Code1. Short stature | 15 (6.4%) |
| A) Genetic short stature | 6 |
| B) Isolated growth hormone deficiency | 4 |
| C) Short stature due to HBss | 1 |
| D) Short stature in turner syndrome | 2 |
| E) Idiopathic SS | 1 |
| F) Short stature due to HIV/AIDs | 1 |
| CODE 2. Tall stature | 2 (0.86%) |
| CODE 3 Pubertal disorders | 42 (18.1%) |
| A) Precocious puberty | 19 |
| a1 Idiopathic central PP | 7 |
| a2 Peripheral PP | 2 |
| a3 Premature adrenarche | 6 |
| a4 Premature thelarche | 4 |
| B) Pubertal gynecomastia | 9 |
| C) Delayed Puberty | 13 |
| c1) Delayed puberty in SCD | 5 |
| c2) Idiopathic delayed Puberty | 5 |
| c3) Delayed puberty in Turner syndrome | 1 |
| c4) Delayed puberty with suspected kallman syndrome | 1 |
| c5) Delayed puberty in obesity | 1 |
| D) Menstrual irregularities | 1 |
| CODE 4 Disorders of sex development | 4 (1.7%) |
| 46XY DSD | |
| CODE 5. Obesity | 47 (20.3%) |
| All nutritional obesity | |
| CODE 6 Pituitary gland, hypothalamus and CNS | 1 |
| A) Panhypopituitarism due to post surgery (craniopharngioma) | 2 |
| B) Hypopituitarism with recurrent hypoglycemia | 0 |
| CODE 7 Thyroid gland disorders... | 10 (4.3%) |
| Congenital hypothyroidism | 2 |
| Graves disease | 3 |
| Acquired hypothyroid ism due to iodine deficiency | 2 |
| Hashimotor thyroiditis | 1 |
| Thyroid nodules | 1 |
| Simple colloid goitre | 1 |
| CODE 8. Adrenal gland disorder | 7 (3.0%) |
| A) Congenital adrenal hyperplasia | 4 |
| B) Cushing syndrome from suspected CNS tumour | 1 |
| C) Cushing syndrome from prolonged steroid use | 1 |
| D) Virilizing adenocarcinoma of ovary | 1 |
| CODE 9. Testes and Male reproductive tract disorders | 18 (7.7%) |
| Micropenis | 16 |
| Undescended left testes | 2 |
| CODE 10 Ovary and female reproductive tract disorders | 9 (3.8%) |
| Labial agglutination | 5 |
| Vaginal polyps | 1 |
| Breast asymmetry | 1 |
| Galactorrhea. | 1 |
| CODE 11 Glucose and lipid metabolism | 32 (13.7%) |
| Neonatal DM | 1 |
| Diabetes type 1 | 27 |
| Diabetes type2 associated obesity | 2 |
| Prediabetes | 2 |
| CODE 12 calcium and phosphate metabolism | 43 (18.5%) |
| Nutritional ricket | 42 |
| Vit D dependent ricket | 1 |
| CODE 13 salt and water metabolism | 0 (0%) |
| CODE 14 Syndrome and endocrinopathies | 3 (0.8%) |
| Turner's syndrome | 2 |
| Digeorge syndrome with hypocalcemia | 1 |

Table 3: Sex distribution of common endocrine disorders seen in CHOP clinic of UCTH, Calabar from 2009 to 2022

| Endocrine disorders | Sex | | | $X^2$ | p-value |
|---|---|---|---|---|---|
| | Male (%) | Female (%) | Indeterminate (%) | | |
| **Pubertal** | | | | | |
| Yes | 12(11.3) | 30(24.2) | 0 (0.0) | FET | 0.021* |
| No | 94(88.7) | 94(75.8) | 1 (100.0) | | |
| **Obesity** | | | | | |
| Yes | 20(18.9) | 27(21.8) | 0 (0.0) | FET | 0.657 |
| No | 86(81.1) | 97(78.2) | 1 (100.0) | | |
| **Glucose/Lipid metabolism** | | | | | |
| Yes | 13(12.3) | 19(15.3) | 0 (0.0) | FET | 0.576 |
| No | 93(87.7) | 105(84.7) | 1 (100.0) | | |
| **Calcium/phosphate metabolism** | | | | | |
| Yes | 29(27.4) | 14(11.3) | 0 (0.0) | FET | 0.003* |
| No | 77(72.6) | 110(8.7) | 1 (100.0) | | |

*Significant p-value, FET – Fisher's exact test

Table 4: Association between Age distribution and common endocrine disorders seen in CHOP clinic of UCTH, Calabar from 2009 to 2022

| Endocrine disorders | Age group (years) | | | | | $X^2$ | p-value |
|---|---|---|---|---|---|---|---|
| | < 1 (%) | 1– 5 (%) | 6 – 10 (%) | 11 – 15 (%) | > 15 (%) | | |
| **Pubertal** | | | | | | | |
| Yes | 1(5.6) | 9 (12.2) | 14 (21.5) | 9 (16.7) | 9 (42.9) | 12.95 | 0.012* |
| **Obesity** | | | | | | | |
| Yes | 0(0.0) | 16 (21.6) | 21 (32.3) | 9 (16.7) | 1 (4.8) | 14.05 | 0.007* |
| No | 18(100) | 58 (78.4) | 44 (67.7) | 45 (83.3) | 20 (95.2) | | |
| **Glucose/Lipid metabolism** | | | | | | | |
| Yes | 1(5.6) | 2 (2.7) | 7 (10.8) | 16 (29.6) | 6 (28.6) | 24.43 | < 0.001* |
| No | 17(94.4) | 72 (97.3) | 58 (89.2) | 38 (70.4) | 15 (71.4) | | |
| **Calcium/phosphate metabolism** | | | | | | | |
| Yes | 2(11.1) | 35 (47.3) | 3 (4.6) | 3 (5.6) | 0 (0.0) | 60.35 | < 0.001* |
| No | 16(88.9) | 39 (52.7) | 62 (95.4) | 51 (94.4) | 21 (100) | | |

*Significant p-value

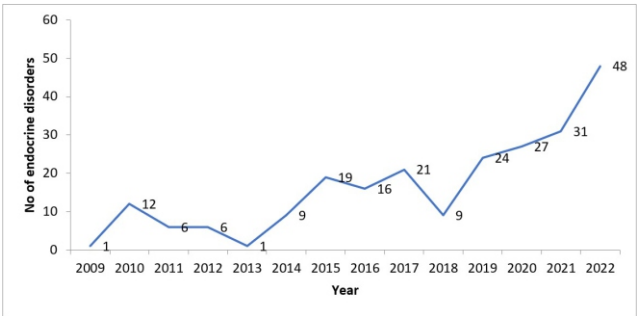


Figure 1: Yearly trend of newly diagnosed endocrine disorders seen from 2009 to 2022 in CHOP clinic of UCTH

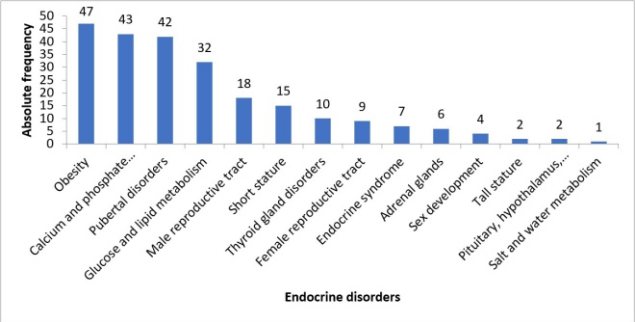


Figure 2: Pattern of endocrine disorders diagnosed in CHOP clinic of UCTH from 2009 to 2022

Children Out-Patient (CHOP) clinic in UCTH has relatively increased over the review period and increased with each year though there was a significant drop in 2013.

## Pattern of endocrine disorders

The predominant endocrine disorders diagnosed were obesity 47 (20.3%) cases, calcium and phosphate disorders 43 (18.5%) cases , pubertal disorders 42 (18.1%) cases and glucose and lipid metabolism disorders 32 (13.8%) cases) as shown in Table 2 and Figure 2.

## Age and sex distribution of common endocrine disorders

The age and sex distribution of the commonest endocrine disorders is described in Tables 3 and 4. Pubertal and glucose/lipid metabolism disorders were relatively commoner in age groups greater or equal to 6 years while calcium/phosphate metabolism disorders were commoner in age groups less than 6 years. Obesity was common at all ages.

As shown in Table 3, only the distribution of pubertal and calcium/phosphate metabolism disorders were significantly different by sex ($P < 0.021$ and 0.003). Pubertal disorders were relatively commoner among females while calcium/phosphate metabolism disorders were commoner among males.

## Discussion

Paediatric Endocrine disorders in the review period constituted 0.2% of all outpatient consultations in the department of Paediatrics. This percentage of cases seen in this review is slightly lower than the 0.42% 9, 0.45%[10] and 0.72%[11] reported in Oshogbo (Osun State), Lagos (Lagos State) and Benin (Edo state) respectively which are all different cities in different geo-political zones in Nigeria. This low percentage may reflect the relative rarity of endocrine disorders in this region or the lack of awareness of the existence of such services in the hospital for parents/patients to seek for care. In Kano, Northern Nigeria, a higher percentage of 2.8% was reported over a five year review.[12] A higher percentage of 4.5%[13] of outpatient consultations was also reported in Port Harcourt (Rivers State) which is in the same geo-political zone with UCTH, Calabar. The differences seen in the Endocrine outpatient consultations in different parts of Nigeria reflect the fact that it is an evolving subspecialty with varying awareness among the clinicians and the public and therefore the referral to the Paediatric Endocrine clinic. More public enlightenment and awareness is therefore advocated so that children living with these conditions can be properly cared for. Paediatric Endocrinology subspecialty is an evolving one in Nigeria and indeed Africa. The training of paediatric endocrinologists in Africa and the availability of diagnostic equipment which were hitherto not seen

in many tertiary hospitals in Nigeria is increasing contributing a great deal in the diagnosis and management of these disorders.

The yearly trend of newly diagnosed Endocrine cases seen shows a progressive increase in the numbers with each year except for 2013 and 2018. This may be attributed to the ongoing education and intermittent awareness campaigns carried out by the authors in the local television and radio channels. Also, there is an increasing awareness among Clinicians of the existence of the endocrine clinic where referrals come from. A similar observation was made in Ibadan, southwest Nigeria, where there was a yearly increase in the number of newly diagnosed cases when a trained Endocrinologist started the clinic.[14] There is no clear reason for the drop in number of patients seen in 2013 and 2018.

There was a slight female preponderance of endocrine disorders in children although not statistically significant. Similar findings were reported in other parts of Nigeria.[12,13] There is no clear explanation for this slight difference in sex distribution. However, reports from previous studies in Africa and other parts of the world show that obesity, pubertal disorders, glucose and phosphate metabolism are commoner in females than in males.[15] These conditions were found to be among the top four common endocrine disorders seen in this review and therefore may explain the slight difference in sex ratio.

The majority of the children with endocrine disorders were between the ages of 1-5 years (31.9%), followed by the age bracket of 6-10 years (28%). This is understandable because the common disorders seen in the review tend to occur in these age brackets. Many of the Children with endocrine disorders were from middle class families and may also be due to awareness in this category of more literate public.

The four most common endocrine disorders seen in this review were disorders of energy balance (obesity), calcium and phosphate metabolism (rickets), pubertal disorders and glucose/lipids metabolism. Obesity has been documented to be on the increase in developing countries, with a rising secular trend.[16] The high number of cases seen in this review may be related to lifestyle since all the parents of the children with obesity are in the middle class income group. Also, most children in urban areas are adopting a more sedentary lifestyle with television screen time increasing while physical activity keeps reducing. Calabar is a small city yet with a high number of "fast food" restaurants where parents take their children to buy refined sugar meals. The advertisements on television of high sugar containing drinks may be contributory to the lifestyle living in the city. This finding of obesity as the leading endocrine problem is different from other similar studies in Nigeria where other endocrine conditions were seen more often than obesity.[10,11,12,13,14] However, obesity still ranked among the top five common endocrine conditions in some of those studies.[11,13] There were more females than males having obesity though not statistically significant (Table 2). The age bracket with highest percentage of obesity was 6-10 years (32.3%) and 1-5 years (21.6%). These are the ages when these children are in the Nursery and Primary schools and the lifestyle in Calabar is for parents to put sugary drinks, instead of water in their lunch bags, to take to school as snacks during the break period at school. Counseling on lifestyle changes, dietary advice and "planned exercises" was the key management strategy.

The next common endocrine disorder in this review was rickets (calcium and phosphate metabolism disorders). More males than females were affected and the age bracket of 1-5 years was mostly affected (47.3%). Similar finding was reported in Ibadan, in South West Nigeria, where rickets was found to be the commonest Paediatric endocrine disorder seen in their outpatient, constituting 56.4% of endocrine consultations for the seven years period studied.[14] It was also reported to be the third commonest endocrine disorder in other series from Port Harcourt,[13,17] a south-south Nigerian city in the same geographical location like Calabar where this review is done. The frequency of rickets reported in various cities of Nigeria (a tropical climate region with good sunlight almost all year round), shows that the prevalence of rickets is not just a matter of the climate but also the individual's exposure to sunlight in these areas. In Nairobi, Kenya, rickets was also reported to be the commonest endocrine disorder seen in the outpatient clinic in Kenyatta National Hospital after a 14 years review.[18] This suggests that rickets remains a public health concern in Africa.

In a previous report of rickets in our center,[19] it was noted that majority of those affected were children of elite and middle class who deprive their children of

sunshine by keeping them indoors most of the day while they were at work. The situation has not changed and especially now because of worsening insecurity in Nigeria.

Pubertal disorders were the third commonest category of disorders seen. Precocious puberty was the more common pubertal disorder seen constituting 45.2% of cases. Pubertal disorders were the most common finding seen in Port Harcourt (south-south Nigeria)[13] and second commonest in another series from Lagos (south west Nigeria).[10] It will appear therefore that these conditions, initially thought to be rare, are becoming common. Increase awareness and reporting among the public and health practitioners may play a part in this. The common presentation with pubertal disorders is also not surprising as a previous cross-sectional study of pubertal parameters in children in the same city as this review reported breast development in girls as young as six years and pubic hair in a small proportion of boys and girls at seven years and six years respectively.[20] The incomplete precocious puberty (variant forms), Premature adrenache, premature thelarche were all seen as well as pubertal gynaecomastia. Delayed puberty from various causes was also seen pointing to the fact that clinicians have to be aware of these conditions as they are on the increase especially in girls.

Disorders of glucose and lipid metabolisms especially diabetes mellitus, were also among the common endocrine presentation. However, unlike the report from Benin, Lagos, and Kano where diabetes was the leading cause of endocrine consultations, and the second most encountered condition in Port Harcourt, and Ibadan, it will appear the condition is not as common in this region of Nigeria. It is therefore important to note these differences as this will inform public health initiatives and programs. Most of the children had Type 1 diabetes mellitus while only two had type 2 diabetes mellitus. One case each of neonatal diabetes and pre-diabetes were seen. A greater proportion of the children were in the age bracket of 11-15 years and more than ninety percent of the children with Type 1 diabetes presented with diabetic ketoacidosis (DKA) with prior 2-3 weeks history of polyuria, polydipsia, and sometimes polyphagia. This is not surprising as it has been shown that a high percentage of children with Diabetes present first time at diagnosis with DKA.[21] This implies that more public enlightenment of the signs and symptoms of diabetes need to be carried out so that patients are diagnosed before they go into DKA. All patients with DKA were treated using an adaptation from the International Society for Paediatric and Adolescent Diabetes (ISPAD) guideline for management of DKA. One baby presented with neonatal diabetes and it was challenging giving the insulin since the doses were very small. After about six months, we lost the child to follow up.

In this review, endocrine conditions initially thought to be very rare were rather seen more often than was expected. For instance, testes and male reproductive tract disorders came as the fifth common condition seen A total of 16 children presented with micro-penis with many in their pre-pubertal years, and almost all responded very well with monthly testosterone enanthate injections just prior to puberty. Penile sizes of 2.5-4.0 cm increased to between 6.5-9.0 cm in length at the end of a four to six months therapy by which time testicular volume was 4mls and the child is then allowed to progress in puberty. It is interesting to see this high number of isolated micro-penis because it indicates an increasing awareness of the public to the fact that management is available for this condition. Psychological support, counseling of parents and children were done and as has been recommended,[22] the anxiety of the parents and the children's self-esteem and body image were evidently relieved at the end of treatment.

Thyroid gland disorders were not common in this review compared to other areas in Nigeria where they were seen to be among the top three endocrine conditions in those centers.[10-12] Hypothyroidism was seen more often than hyperthyroidism. The fact that hypothyroidism was not seen as often does not rule out the fact that it may be quite prevalent in the area but rather parents may not be presenting because the symptoms may not be understood by them to seek medical help. Therefore, there is still the need to institute neonatal screening for babies since other Nigerian studies report a high frequency in their clinics.

Other rare endocrine disorders like stature disorders were also seen. Short stature with varied aetiologies like Isolated Growth Hormone Deficiency (IGHD), idiopathic short stature, genetic syndromes (Turner Syndrome) and genetic short stature were seen. Short stature due to chronic diseases (sickle cell

anaemia) and chronic infections (HIV/AIDS) were seen as well. Growth hormone therapy was used for only one child with IGHD and one Turner syndrome patient; and because of the prohibitive cost, the parents stopped the drug few months into the treatment. There was significant height gain in the child with IGHD as he had only eight months of the drug but minimal height gain for the Turners patient who took for only five months. This is one of the challenges associated with practice of endocrinology in resource poor countries as patients pay directly from their pockets and there is no health insurance system in place to cater for the poor in the society.[6]

Ovaries and female reproductive tract disorders was also among the rarely encountered endocrine disorders. When seen, labial agglutination (fusion) was more commonly seen than vaginal polyps or atresia and others. All cases of Labial fusion were treated with oestrogen cream because all parents were anxious and wanted immediate result of seeing a patent vagina than wait until puberty when it would naturally have appeared because of the hormonal releases of puberty.

Adrenal gland disorders like congenital adrenal hyperplasia, Cushing syndrome, virilising adrenal tumour were rarely seen. The same was true with Disorders of Sexual Development (DSD) with a varied presentation of genital ambiguity. Few cases of pituitary gland and CNS disorders were seen as well as syndromes and endocrinopathies like McCune Albright syndrome, Turner syndrome, and Down syndrome.

There was no case of Salt and water metabolism disorder seen within the review period. This may indicate the extreme rarity of this condition in this region or difficulty in identifying the conditions and referring them to the clinic.

## Conclusion

Endocrine disorders constituted a small but clinically significant proportion (0.2%) of pediatric presentations in this resource-limited setting, with a higher prevalence among females and children aged 1–5 years. The spectrum was dominated by disorders of energy balance (notably obesity), calcium-phosphate metabolism (rickets), pubertal disorders, and glucose/lipid metabolism abnormalities. These findings reflect both global epidemiologic trends and context-specific factors such as nutritional deficiencies and limited access to specialized care. There is an urgent need to strengthen pediatric endocrine services, integrate early screening into primary healthcare, and promote public health initiatives addressing modifiable risk factors. Targeted capacity building in endocrinology is essential to improve outcomes and reduce the long-term morbidity associated with these disorders in low-resource settings.

**Competing interests:** The authors declare no competing interest

**Author's contributions**

ME – Conceptualized and designed the study. ME wrote up the initial and final draft of the manuscript. ME, EN, EB, CU, EE, and IE collated patients' clinical data. ME and JI proofread and edited the final manuscript. All authors reviewed the manuscript and approved the final version for submission.

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