Original Research Article

Prevalence and Pattern of Paediatric Endocrine Disorders in Rivers State University Teaching Hospital- a pilot study

ABSTRACT

Background: Paediatric endocrine disorders (PEDs) are on the rise and is assumed to be due to changing lifestyles, environmental pollutants, growing awareness, and improved diagnostic tools. The need to generate data with regards to PEDs warrants attention, especially in settings where it has not been previously reported and so given less attention.
Aims: To describe the burden and pattern of paediatric endocrine disorders over two years among children and adolescents attending the paediatric endocrine clinic of the Rivers State University Teaching Hospital.

Study design: Cross-sectional study

Place and Duration of Study: Department of Paediatrics (Endocrine Unit), Rivers State University Teaching Hospital (RSUTH), Port Harcourt, Nigeria between 1st February 2021 and 1st February 2023.

Methodology: Retrospective review of case records of patients seen at the paediatric endocrine outpatient clinic. Data on age, sex, diagnosis, and outcome were extracted and analysed using SPSS vs 25.

Results: A total of 119 children were seen with PEDs, giving a prevalence of 0.9%. There were 73 (61.3%) females and 2 (1.7%) presented with disorders of sexual differentiation. The median age was 108 months and ranged between 17 days to 16 years. The top five PEDs according to International Classification of Paediatric Endocrine Diagnoses (ICPED) classification were thyroid disorders (26 ;21.8%), disorders of pancreas/lipids (23;19.3%), calcium, phosphate metabolism and bone disorders (14;11.8%), Testicular/ male reproductive tract disorders (13;10.9%) and pubertal disorders (12;10.1%). Outcomes revealed most (56;47.1%) were referred, (16;13.4%) were lost-to-follow-up and (2;1.7%) died.

Conclusion: Thyroid disorders, type 1 diabetes mellitus, obesity and nutritional rickets ranked highest among the PEDs in our setting. There is a need to raise awareness of PEDs among healthcare professionals and the general population to improve early presentation to the clinic.

Keywords: *Diabetes, Endocrine disorders, paediatrics, Nigeria, Rickets, Thyroid disorders, Precocious Puberty*

1. INTRODUCTION

[Paediatric Endocrine disorders (PEDs) are described as hormonal disorders of childhood and adolescence; consist of a wide range of disorders which manifest as a result of under or over-activity of specific hormones or reduced sensitivity of tissues to their effect [1]. These include diabetes, disorders of growth and puberty, disorders of thyroid function and sexual development, disorders of the adrenals, calcium/bone metabolism and obesity [1]. Globally the burden of PEDs has been

on the increase as a result of changing lifestyles, environmental pollution and improved diagnostic capabilities [1–3]. They account for more than 8% of the global disease burden [3]. Whereas the prevalence of PEDs has been well documented in developed countries, relatively fewer studies have been reported from developing countries [1,4–7].

Some studies in Nigeria have reported a prevalence of PEDs from 0-45-4.5% of patients seen in paediatric specialist clinics [1,6,7]. PEDs reported as most common in several studies include disorders of pancreas/lipids-diabetes, disorders of sexual disorders, thyroid disorders and calcium phosphate metabolism and bone disorders [1,6,7]. Short stature, pituitary/hypothalamic and adrenal disorders are reported as being rare [6,7].

Nonetheless, with a constantly changing lifestyle, environmental conditions, increasing awareness, improved access to better diagnostic facilities, increasing prevalence of paediatric endocrine disorders, and standardization of disease definitions, it is plausible that disease epidemiology continues to change. This is even more pertinent in a setting where the burden and pattern of PEDs have not yet been documented. Generating epidemiologic data is justified to enable policymakers and stakeholders in planning and prioritizing healthcare in our setting.

This study, therefore, aimed to determine the prevalence and pattern of Paediatric Endocrine disorders seen in the endocrine paediatric clinic of the Rivers State University Teaching Hospital, as none has been previously conducted in this facility.

2. MATERIAL AND METHODS

Study design: Study design: Retrospective review of clinical case records

Site and duration: Paediatric Endocrine Clinic, Department of Paediatrics, Rivers State University Teaching Hospital, Port Harcourt, Rivers State (1st February 2021 and 1st February 2023). All paediatric cases (0-17 years) seen at the endocrine clinic were included in this review.

The Paediatric Endocrine Clinic of the hospital runs every Monday together with the Paediatric Nephrology Clinic. The unit is run by one consultant paediatrician with one resident doctor and occasionally one or two interns rotating through the unit. The patients were mainly those who were seen either from the emergency room and discharged and were on follow-up or referred from other outpatient clinics for clinical suspicion of an endocrine disorder.

The diagnoses were made using a combination of clinical features and laboratory investigations. Facilities for radiological and most chemical investigations were available at the hospital laboratory. However, where the facilities to carry out confirmatory investigations were unavailable private reference laboratories were utilized.

Patients' diagnoses were made following standardised definitions and classification of endocrine disorders using the International Classification of Paediatric Endocrine Diagnoses-ICPED [8]. Also, where a patient was documented to have more than one of the endocrine disorders, the diagnosis was based on the primary condition used to classify the case; for example, Type 1 diabetes with diabetic ketoacidosis had Type 1 Diabetes Mellitus.

Data extracted from case records included age, sex, initial diagnosis, final diagnosis, outcome – Death, referred, transferred out or lost to follow up and analysed using Software Package for Social Science (SPSS) version 25.0 for Windows (IBM Software, USA). Continuous variables were analysed and expressed as means and standard deviations and categorical variables were presented in frequencies and tables. The chi-square test was for proportions and Student's t-test was used for the comparison of means and the level of significance was taken as p-value < 0.05 Results were presented in tables and charts.

Ethical approval was obtained from the hospital ethics review committee.

3. RESULTS AND DISCUSSION

A total of 13,122 children were seen in the Paediatric outpatient clinic during the study period with 119 of them having endocrine disorders, giving a prevalence of 0.9% (9 cases per 1000). There were 73 (61.3%) females and 44 (37.0%) males, and 2 (1.7%) were indeterminate with a male-to-female ratio of 1.65:1. The median age of the children was 108 months and ranged between 17 days to 16 years.

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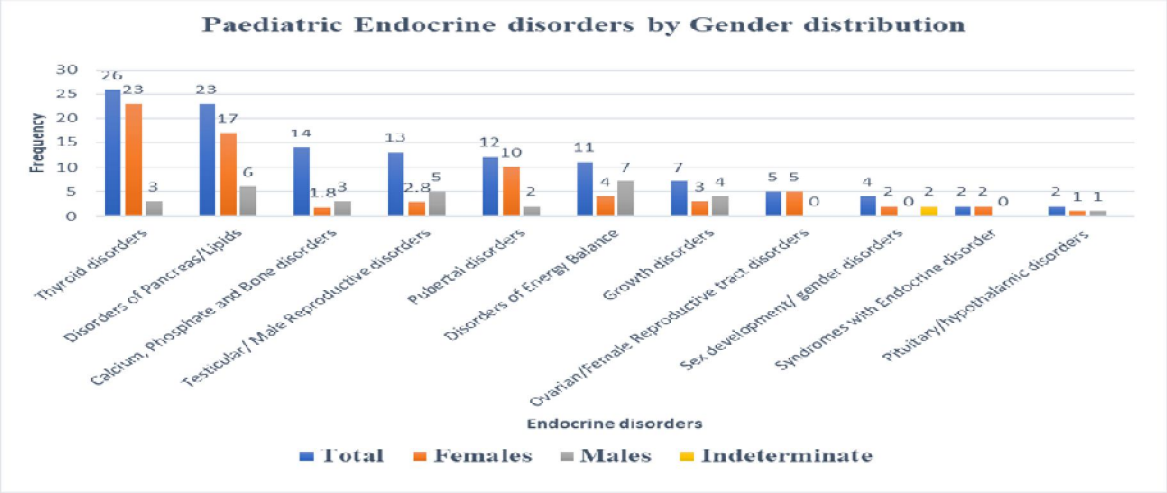
As shown in Table 1, the top five most common PEDs in our series according to the ICPED Classification were Thyroid disorders 26 (21.8%), disorders of pancreas/lipids 23 (19.3%), Calcium, phosphate metabolism and bone disorders 14 (11.8%), Testicular/ male reproductive tract disorders 13 (10.9%) and pubertal disorders 12 (10.1%) respectively.

TABLE 1: Pattern of Paediatric Endocrine Disorders seen in RSUTH

Disorder	Frequency	Per cent
Thyroid disorders	26	21.8
Disorders of Pancreas/ Lipids	23	19.3
Calcium, phosphate metabolism and bone disorders	14	11.8
Testicular/ male reproductive tract disorders	13	10.9
Pubertal disorders	12	10.1
Disorders of Energy Balance	11	9.2
Growth disorders	7	5.9
Ovarian/female reproductive tract disorders	5	4.2
Sex development/ gender disorders	4	3.4
Syndromes with Endocrine disorder	2	1.7
Pituitary/ hypothalamic disorders	2	1.7
TOTAL	119	100

Figure 1 displays the Paediatric Endocrine Disorders by ICPED Classification and Gender distribution. It shows that females were statistically significantly (p=<0.0001) more affected by endocrine disorders compared to their male counterparts.

Figure 1: Paediatric Endocrine Disorders by ICPED Classification and Gender distribution



Chi-square (X^2) = 105.08; p = <0.0001*

Table 2 displays the distribution of endocrine disorders according to the ICPED sub-classifications. It revealed that 11 out of the 14 Sub-classifications were seen at the Endocrine clinic. Among the thyroid disorders, hypothyroidism (19.2%) and post-infectious thyroiditis (11.5%) were the most prevalent, whereas, among disorders of pancreas/lipids, type 1 DM (78.3%) was the most prevalent. Vitamin D/ nutritional rickets (71.4%), micropenis (76.9%) and precocious puberty (33.3%) were the most prevalent disorders in the Calcium, phosphate and bone, Testicular/male reproductive tract and Pubertal groups of endocrine disorders. Others are shown below. As regards age at presentation, children with Sexual development/gender disorders and Calcium, phosphate and bone disorders were the youngest age groups seen with mean ages of 31±34.5 months and 59.9±42.4 months respectively. Overall, there was a female preponderance of endocrine disorders compared to males.

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TABLE 2: Distribution of Paediatric Endocrine Disorders according to the ICPED sub-classifications

Disorder	Frequency	Sex (F: M)	Age range	Mean age
Thyroid disorders	26	7.7:1	17days to 168mo	123.3±56
a. Hyperthyroidism	2(7.7%)			
b. Graves' disease	4(15.4%)			
c. Thyroiditis (Post-infectious)	3(11.5%)			
d. Hypothyroidism	5(19.2%)			
e. Congenital hypothyroidism	2 (7.7%)			
f. Multinodular /Euthyroid/ Single Nodule goitres	9(34.6%)			
g. Thyroglossal cyst	1(3.8%)			
Disorders of Pancreas/ Lipids	23	2.8:1	31-192 mo	126.7±44
a. Type 1 Diabetes	18(78.3%)			
b. Type 2 Diabetes	2(8.7%)			
c. Prediabetes	2(8.7%)			
d. MODY- type 5 (Renal cyst diabetes syndrome)	1(4.3%)			
Calcium, phosphate metabolism and bone disorders	14	0.6:1	22-144 mo	59.9±42.4
a. Vitamin D / Nutritional Rickets	10(71.4%)			
b. Hypocalcaemia	2(14.3%)			
c. Blount's disease	2(14.3%)			
Testicular/ male reproductive tract disorders	13	Males	6-156 mo	88.3±42
a. Micropenis	10(76.9%)			
b. Male primary hypogonadism	2(15.4%)			
c. Trisomy 21 with micropenis	1(7.7%)			
Pubertal disorders	12	5:1	12-144 mo	70±50.3
a. Precocious puberty	4(33.3%)			
b. Premature thelarche	3(25%)			
c. Gynaecomastia	3(25%)			
d. Premature pubarche	2(16.7%)			
Disorders of Energy Balance	11	1:1.75	60-156 mo	110.6±32.6
a. Obesity	11(100%)			
Growth disorders	6	1:1.3	2-168 mo	100±57.4
a. Acromegaly	1(16.7%)			
b. Short Stature	1(16.7%)			
c. Achondroplasia	2(33.3%)			
d. Growth Hormone Deficiency	2 (33.3%)			
Ovarian/female reproductive tract disorders	5	Females	144-168 mo	157.2±8.9
a. Galactorrhoea	4(80%)			
b. Fibroadenoma	1(20%)			
Sex development/ gender disorders	4		1.5-72 mo	31±34.5
a. Disorder of Sexual Differentiation (Ambiguous genitalia)	3(75%)			
b. Clitoral hypertrophy	1(25%)			
Syndromes with Endocrine disorder	3	Females	120-156 mo	138±18
a. Turner Syndrome	3(100%)			
Pituitary/ hypothalamic disorders	2	1:1	108-168 mo	138±42
a. Panhypopituitarism	1(50%)			
b. Cushing syndrome	1(50%)			
TOTAL	119			

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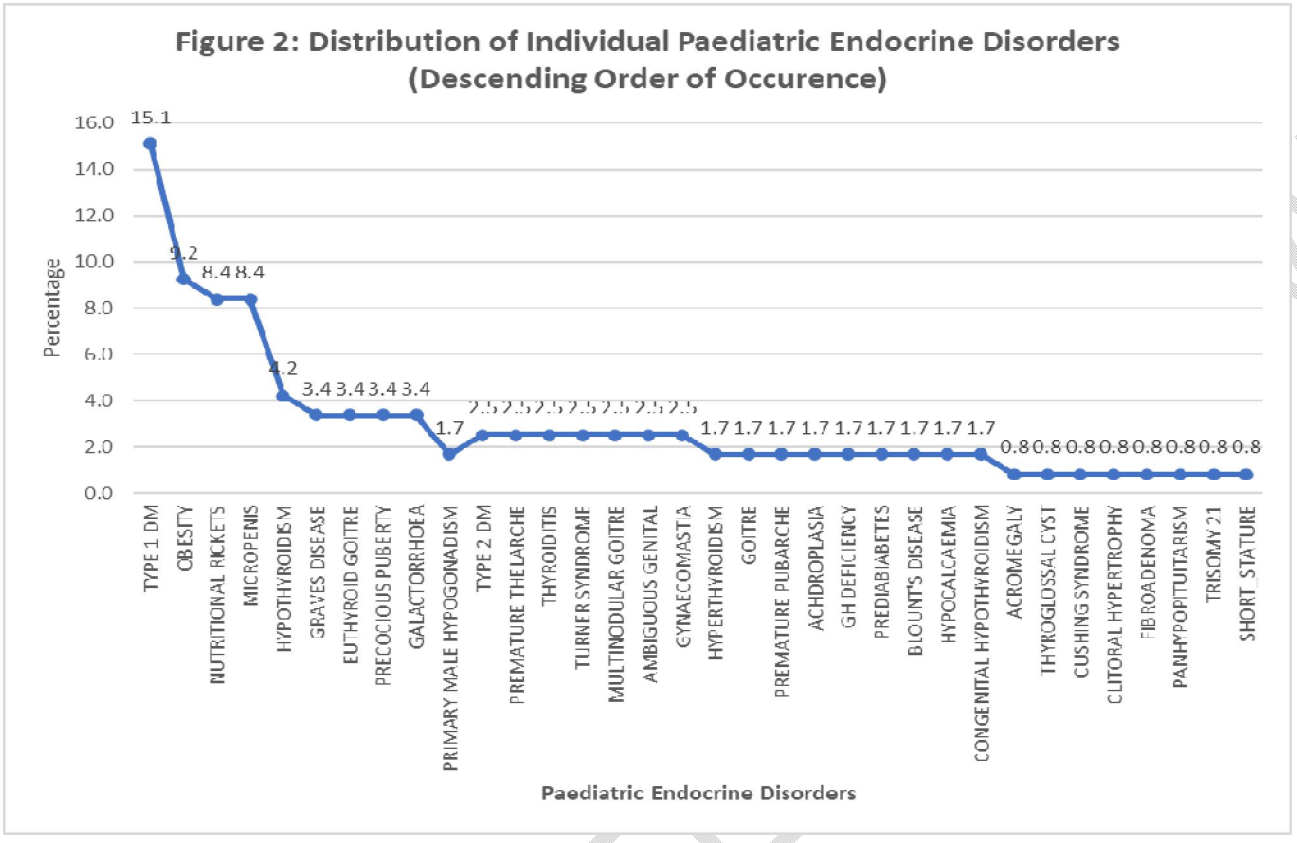
Figure 2 demonstrates that of all paediatric endocrine disorders individually seen in this clinic, Type 1 diabetes mellitus (15.1%), obesity (9.2%), nutritional rickets (8.4%) and micropenis (8.4%) were the most prevalent PEDs (in descending order).



As regards the outcome shown in Table 3, almost half (47.1%) of the children with endocrine disorders were referred, about a third (31.9%) were not regular with follow-up visits and mortality was recorded in only 2 (1.7%) of cases.

Table 3: Outcome

	Dead	Referred	Transferred out	LTFU	Not regular with FU	Regular with FU
Males	1	27	1	5	10	0
Females	1	29	4	9	28	2
Total	2 (1.7%)	56 (47.1%)	5 (4.2%)	16 (13.4%)	38 (31.9%)	2 (1.7%)

Key: LTFU: Lost to follow up FU: Follow up

DISCUSSION

The prevalence of PED in our centre was found to be 0.9%. This was higher than the prevalence of 0.45% reported by Akinola et al [1] and 0.72 % reported by Onyiriuka et al [7]. The prevalence in this present study is lower than that reported by Tamunopriye et al [6]. This difference may be because our centre is a relatively newer teaching hospital in this sub-region with increasing recognition as a centre for referral in our sub-region. A female preponderance was seen in our study with two children whose sex was indeterminate. This is similar to that reported previously both in developing and developed countries [1–5,7,9]. The reason for this has not been elucidated. However, a contributory factor may be that certain endocrine disorders such as goitres are more common in females due to the presence of oestrogen receptors in the thyroid gland [7,9,10]. Similarly, in adolescence, autoimmune thyroid disorders such as Grave's disease and chronic lymphocytic thyroiditis are more common in girls than boys [9–12]. Age range of children seen in this study was between 17 days and 16 years with a median age of 108 months (9 years). This is similar to that reported by Tamunopriye et al [6]

in a study also done in southern Nigeria, where an age range of between 12 days -17 years with a mean age of 6.9 years was reported.

In our study, the top five PEDs were thyroid disorders, disorders of pancreas/lipids and calcium, phosphate metabolism and bone disorders, testicular/male reproductive tract disorders and pubertal disorders. Syndromes with endocrine disorders and pituitary/hypothalamic disorders were the least common. Several studies report disorders of the pancreas/lipids particularly diabetes mellitus as their most common endocrine disorder [1,7,9,13]. This is somewhat similar to that reported in this study where disorders of the pancreas/lipids were the 2nd most common PEDs. Almost four in five, of all diabetic children, seen, had Type 1 DM. This was similar to the findings by Onyiriuka et al [7] where 75% of DM cases seen among children in Edo State were Type 1 DM and 85% of DM cases seen in an earlier study by Tamunopriye et al [6] in another facility in Rivers state, were Type 1 DM, both studies were in southern Nigeria. The majority of these children in this present study presented via the emergency room with features of severe diabetic ketoacidosis and caregivers were unaware of their ward's underlying dysglycaemia. Interestingly, some of the children were referred from peripheral centres for unremitting fever, urinary tract infection or weight loss. Worthy of mention, was the case of a 15-year-old-adopted female, that presented with chronic kidney disease stage 5 requiring haemodialysis for renal disease, whose ultrasound scan revealed coexisting bilateral renal cysts. She was found to have diabetes consistent with maturity-onset diabetes of the young (MODY-type 5), which raised the possibility of a Renal cyst and diabetes syndrome (RCDS) – a rare condition arising from an alteration in the HNF1B gene [14]. This gene has a role in the development of beta cells and the kidneys and affected persons can have a form of maturity-onset diabetes of the young [14]. However, in her case genetic study could not be done due to financial constraints. Type 1 DM has been established as being the more common type of DM in children, however, unsurprisingly an increasing number of children presenting with Type 2 DM, had been observed in our setting. This upsurge was more noticeable after the COVID-19 pandemic. The finding may plausibly be due to an increasingly sedentary lifestyle with less outdoor play/exercise, an increase in consumption of refined sugars meals, inappropriate feeding timing, and an increase in gadget use/ screen time which can lead to overweight/ obesity among children and adolescents [9,15]. Globally, the number of cases of DM has been projected to increase from 382 million in 2013 to 592 by 2035 affecting mostly low and middle-income countries including Nigeria [9,15] and children and adolescents alike are not exempt.

Of the patients with thyroid disorders in this present study, multinodular/euthyroid/single nodule goitres were most common followed by hypothyroidism and post-infectious thyroiditis with congenital hypothyroidism (CH) accounting for less than a tenth (7.7%). This contrasted findings from another study in Lagos where congenital hypothyroidism was the most common thyroid disorder [16]. This difference may be because 45% of all children managed for CH in the study conducted in Lagos, Nigeria were patients with Down syndrome (half of whom also had congenital heart defects) [16]. It has been reported that between 7-23.5% of patients with Down syndrome have overt hypothyroidism [17,18]. In addition, it is known that CH is 28 times more common in babies with Down syndrome than in the general population [19]. One of the patients in our series with CH was born to a mother on treatment for hyperthyroidism and incidentally also had Down syndrome and congenital heart disease. Similarly, two patients with CH in the study in Lagos were born in a country where newborn screening is performed routinely and was diagnosed shortly after birth, placed on L-thyroxine and were been seen in Lagos University Teaching Hospital for follow-up. Newborn thyroid function screening is a very sensitive tool for the early identification and evaluation of babies with CH, which if done routinely will greatly reduce the impact of CH one of the most common treatable causes of mental retardation [16,20,21]. In our centre routine neonatal screening is not yet being done and this may be responsible for cases of CH being unidentified early or missed entirely. Four out of the six children in this study that presented with hyperthyroidism had Graves disease. Three of them presented with thyrotoxicosis, one of whom was in heart failure with features of cardiomyopathy. All four were adolescent females and presented with significant exophthalmos. This is similar to that reported by previous Nigerian studies [16,22,23]. Graves disease, the most documented auto-immune disorder of the thyroid gland in Africa, has a strong female predisposition and is responsible for over 95% of all cases of hyperthyroidism [16]. Three of the females are compliant with drug therapy and are responding to treatment. The 4th female, however, is uncompliant and irregular with follow-up visits due to financial and transportation constraints since she lives far from the hospital. The frequency of euthyroid goitres seen in our study cannot readily be explained as most people have access to iodized salt but might not be unconnected to the fact that oil exploration occurs in our sub-region [16] and also possibly due to lifestyle changes with increasing consumption of goitrogen containing foods such as cabbages.

Calcium, phosphate metabolism and bone disorders in the present study, were the third most common PED in this study and accounted for about one-tenth (11.8%) of the cases seen in the period under review, of which three-quarters (71.4%) were due to Vitamin D deficiency/ Nutritional Rickets. This is similar to that reported by Tamunopriye et al [6] (12%) and Onyiriuka et al [7] (12.1%) but was considerably more than was previously reported by other authors (0.5-1%) [1,9]. The higher prevalence seen in this study could be attributed to the consequences of the COVID-19 pandemic and security concerns which resulted in some children being inadequately exposed to sunlight, and also the significant increase in

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inflation and its impact on the quality of staple diets. Several authors have reported rising cases seen during and following the pandemic [24–26].

Testicular/ male reproductive tract disorders were the fourth most common PEDs accounting for about a tenth (10.9%) of all cases seen in this present study and is similar to the 9% reported by Tamunopriye et al [6]. This may be because both studies were carried out in Rivers state Nigeria (same geographic zone) and probably involved patients of similar ethnicity and exposure to similar environmental factors. Of the 13 children in this group, 11 had Micropenis, one of whom also had Trisomy 21. One of the two patients with male primary hypogonadism, a 14-year-old being raised as a boy, had complaints of female-type behaviour which was of great concern to himself and his parents. Karyotyping confirmed an XY-karyotype, thus, was genetically male and so in addition to hormonal replacement therapy began behavioural therapy with a child psychiatrist. Nine out of 11 of the children are on therapy with depot testosterone with a fairly good response. Parents should be encouraged to seek help early as a diagnosis of micropenis is often a source of great parental anxiety and stigmatization [27].

Pubertal disorders represented the fifth most common PEDs contributing about a tenth (10.1%) of all cases seen in this present study. All four children with central precocious puberty were females and are doing well on therapy with gonadotrophin analogues This is similar to the prevalence of 11.53% of precocious puberty in girls and 1.41% in boys reported in China by Zhang et al [28] reflecting a female predilection as reported by some other authors [29–31]. Reports have shown a positive correlation between a higher pre-adolescent body mass index (BMI) and precocious puberty [28,32]. Thus, precocious puberty is seen more commonly in overweight or obese girls [28,31]. One of the four girls on treatment for precocious puberty in our study was obese. Precocious puberty affects the physical, mental and psychosocial health of children and adolescents due to changes in body shape and early menarche [30,31]. It can also cause premature fusion of the epiphyses resulting in short stature in adulthood and may also cause psychological problems in parents [30,31]. Child and parental anxiety may also result from fear of perceived early sexuality [31] and potential risk of child abuse. Thus, the need for early diagnosis and treatment of pubertal disorders cannot be overemphasized.

Disorders of Energy balance were seen in 9.2% of all PEDs in this present study and were the sixth most common disorder. This was similar but slightly less than 11% reported by Tamunopriye et al [6] and more than 11.2% reported by Onyiriuka et al [7]. This group of children in this present study were all obese, unlike in the study reported by Onyiriuka which was done in Benin and consisted of patients with obesity (4.8%), failure to thrive (2.4%) and persistent hypoglycaemia (4%). Also, the Benin study was a retrospective review of patients seen over 10 years from 2004-2013, this may account for the variance observed. During the pandemic, lifestyle changes: a decrease in outdoor play/exercise, an increase in the number of online classes, more time spent using gadgets/electronic devices, alteration in sleep patterns and the possible increase in consumption of junk food resulted in weight for many individuals-children and adults alike [31,33]. In fact, in this study, obesity was the 2nd most common individual reason for presenting to the endocrine unit, after Type 1 DM. The higher prevalence of obesity seen in this present study might be because it was done at the end of the Pandemic, unlike the Benin study which was pre-pandemic. Children with obesity are more likely to develop type 2 DM, hypertension, high cholesterol, cardiovascular disease, osteoarthritis and fatty liver [33]. They are also more likely to become obese adults. It is therefore imperative that as health workers we advocate for healthier lifestyles, diets and an increase in exercise and outdoor activities.

Growth disorders, disorders of sexual differentiation (DSD), syndromes with endocrine disorders and pituitary/hypothalamic disorders constituted the less common PEDs noted within the study period. Growth disorders were seen in 5.9% of all PED in this present study. This included two children with growth hormone deficiency, two with achondroplasia and one with acromegaly. Achondroplasia, a genetic disorder is the commonest cause of disproportionate short stature [34]. It is a very rare condition with a worldwide birth prevalence of 4.6 per 100,000 births [34]. It is caused by a variant in the fibroblast growth factor-3 (FGFR3) gene resulting in inhibition of endochondral bone development which may cause complications such as delayed motor and speech development, otolaryngeal problems, respiratory dysfunction, spinal stenosis and compression; all of which leads to significantly increased morbidity and mortality [34]. One of the two children seen in our study presented with severe respiratory difficulties and is currently being followed up.

Disorders of sexual differentiation are, fairly rare occurring in 1 in 4500 live births [35]. DSD is often a cause of severe social embarrassment and poses a huge emotional and financial burden to parents. The diagnosis is a social emergency because of the urgent need to assign gender for rearing early in life, especially because of cultural preferences for certain genders.[33] Of the three patients who presented with ambiguous genitalia, two were suspected to have congenital adrenal hyperplasia of the non-salt wasting type. Both of them presented late – the youngest at 6 weeks and the other at 4 months respectively. The younger of the two has been unable to complete the required diagnostic investigations such as urinary ketosteroids, enzyme assays, abdominopelvic MRI, and karyotyping due to financial constraints, as the ultrasound scan was inconclusive. Albeit, the 2nd child was able to have karyotyping done, which confirmed an XX karyotype – she is

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genetically female. She is fairly stable, has been reviewed by the plastic surgeon and is currently being worked up for reconstructive surgery. The 3rd child with a high index of suspicion as a case of 5-alpha reductase deficiency was a 12-year-old-adopted child with severe mental retardation, who up to date is being raised as a girl. It was at the instance of having developed a cracked voice and the caregiver's observation of 'her supposed clitoris' enlarging to be more phallus-like, the child brought due to parental concerns. Child was however lost to follow up as her adoptive parents decided to take her outside the country/ after a request for further investigations was made. One patient who presented with clitoral hypertrophy (?female pseudo-hermaphroditism) is awaiting investigations due to financial constraints.

Syndromes with endocrine disorders were seen in 1.7% of all PEDs in this present study (two patients with Turner syndrome). This is similar to that reported by Ale et al [9] which only reported one case of Turner syndrome (0.12% of all PED) but lower than the 5% reported by Tamunopriye et al [6]. This difference observed may be because the study by Tamunopriye et al though in the same geographical zone, Port Harcourt, used a different classification system (ICD-10) and thus included also in this group cases of Klinefelter, Down, Osteogenesis Imperfecta and Polycystic Ovary Syndrome. The two patients in this present study had Karyotyping done, one was a Mosaic while the other was classical Turner syndrome.

Pituitary/hypothalamic disorder was seen in only 1.7% of all PEDs in this present study. This is similar to those reported by several authors [6,7,9]. One patient had Cushing syndrome (9-year-old female). Cushing syndrome is very rare, and occurs more commonly in adults than children, with 2-5 new cases/million/year with 10% of these occurring in children [36]. Our patient is currently being investigated to determine the cause. Hypopituitarism is a very rare disorder occurring in possibly fewer than 3 cases/million/per year [37,38]. Its prevalence is not well documented and can be congenital or acquired [37,38]. The patient reported in our study is a 14-year-old male who presented with short stature and delayed puberty. He developed pan-hypopituitarism after surgical resection of a Craniopharyngioma at the age of 12 years. Initially, he was on Desmopressin for Syndrome of Inappropriate Anti-diuretic Hormone (SIADH) but is currently on hydrocortisone replacement, L-thyroxine, Vitamin D and calcium supplementation and is stable on follow-up.

With regards to outcome, almost half of our patients were referred. This may be because this sub-speciality is relatively new in this centre and also due to the lack of specialized diagnostics in the facility. However, the mortality rate was low (1.7%).

Poor health financing and ignorance and the fact that most patients seen at our centre pay out of pocket and have no insurance contribute to late presentation and inability to carry out the necessary diagnostic investigations leading to delayed diagnosis. Poor compliance with follow-up and often expensive drug therapy remains a daunting challenge in the management of PEDs in our environment.

The study is limited by its retrospective design, duration and being single-centred. However, it is a pilot study in a centre where such epidemiologic data had not been published. It is therefore relevant for all stakeholders to improve both administrative and patient-related quality of services.

4. CONCLUSION

Thyroid disorders, type 1 diabetes mellitus, obesity and nutritional rickets ranked highest among the PEDs in our setting. There is a need to raise awareness of PEDs among healthcare professionals and the general population to improve early presentation to the clinic. There is a need for policymakers to make health strategies that prioritise subsidizing screening tests and confirmatory diagnosis of endocrine disorders a possibility and health care centres should promptly and equitably provide services to care for children with endocrine disorders to relieve the dauting challenge of unaffordable treatment options which promote being lost-to-follow up.

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ETHICAL APPROVAL (WHERE EVER APPLICABLE)

Authors have obtained all necessary ethical approval from the Hospital Ethics Review Committee.

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