Asian Journal of Pediatric Research

2(2): 1-7, 2019; Article no.AJPR.47781

Pattern of *Paediatric* Endocrine Disorders According to ICD-10 Classification in a Tertiary Centre in Southern Nigeria

Jaja Tamunopriye[1,2*], Yarhere Iroro[1,2] and Uchenwa-Onyenegecha Tochi[2]

[1]Department of Paediatrics and Child Health, Faculty of Clinical Sciences, College of Health Sciences, University of Port Harcourt, Rivers State, Nigeria.
[2]Department of Paediatrics, University of Port Harcourt Teaching Hospital, Rivers State, Nigeria.

Authors' contributions

This work was carried out in collaboration among all authors. Author JT designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors YI and UOT managed the analyses of the study. Author JT managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJPR/2019/v2i230103
Editor(s):
(1) Dr. Kanwal Preet Kaur Gill, Department of Community Medicine, Sri Guru Ram Das Institute of Medical Sciences & Research, India.
Reviewers:
(1) E. Siva Rami Reddy, Tantia University, India.
(2) Dennis Amaechi, Veritas University, Abuja, Nigeria.
(3) Giuseppe Gregori, Pediatric Primary Care Department-Local Health Unit-Piacenza, Italy.
Complete Peer review History: http://www.sdiarticle3.com/review-history/47781

Original Research Article

Received 06 January 2019
Accepted 23 March 2019
Published 04 April 2019

ABSTRACT

Aim: To describe the spectrum of various endocrine disorders seen in children and adolescents in Port Harcourt over the period 2013-2017 using modified European Society of *Paediatric endocrinology* ICD -10 classification.
Study Design: Descriptive, Cross sectional study.
Place and Duration: *Paediatric endocrinology* Unit, Department of *Paediatric*s, University of Port Harcourt Teaching Hospital. Study was done with data from January 2013 to August 2017.
Methods: A retrospective review of 178 patients with various endocrine diseases was reported. Data on biodata, clinical presentations and investigations with diagnosis were retrieved from the clinic and ward records and endocrine unit registers.
Results: A total of 178 patients were seen with various endocrine disorders over the study period accounting for 4.5% of *Paediatric* specialist clinic consultations. There were 89(50.0%) females

**Corresponding author: Email: Tamunopriyej@yahoo.com;*

and 80(44.9%) males. Nine (5.1%) had genital ambiguity. The ages of patients ranged from 12days to 17years with a mean age of 6.9 ± 5.1years. The commonest endocrine disorders were pubertal disorders, diabetes mellitus, thyroid disorders and calcium phosphate metabolism and bone disorders in 34(17%), 27(14%) 23(12%), 22(11%) and 22(11%) respectively. Twenty two (11%) of the patients had obesity and 10(5%) had syndromes with endocrine features. Other disorders seen were sex development and gender disorders, testicular/male reproductive tract disorders, growth disorders (short stature) ovarian/female reproductive tract disorders, pituitary/ hypothalamic disorders and adrenal disorders in 17(9%), 17(9%) 10(5%),7(4%), 5(2.5%) and 3(1.5%) respectively. Type 1 DM remained the commonest type of DM. Most of the patients were of the middle social class (social class III). Challenges to management included high cost of investigations and drugs, high rate of loss to follow up.

Conclusion: Pubertal disorders, type 1 Diabetes mellitus, thyroid disorders, calcium and phosphate metabolism and bone disorders and obesity were the commonest cases in our review. Most investigations were available in private laboratories with high cost of investigation leading to loss to follow up and continuation of care.

Keywords: Endocrine disorders; children; adolescents; tertiary centre; Nigeria.

1. INTRODUCTION

Paediatric endocrinology is a subspecialty that deals with the diagnosis and treatment of diseases of the hormonal system in children and adolescents. [1] Endocrine disorders include a varied group of disorders which may affect growth, development and reproduction. They include disorders of the hypothalamus and pituitary gland, thyroid gland, parathyroid gland, adrenal gland, gonads and endocrine pancreas. [1,2]

Endocrine disorders constitute a major health problem globally with diabetes mellitus seen as the commonest in developed countries. [1,3] In most developing countries, reports of pattern of endocrine disorders are few and have also reflected similar patterns as in developed countries. [1,4,5] There has also been more focus on infectious diseases and malnutrition which constitute the major cause of mortality in developing countries thereby limiting the attention on *paediatric* endocrine disorders. [6] In most countries in Africa , newborn screening for the diagnosis of congenital hypothyroidism is not available and delayed diagnosis has remained a challenge even till date. Most endocrine disorders in children are treatable, with the increasing development of the *paediatric* endocrine sub- specialty in Africa and in Nigeria in the last few years, care and treatment of children with endocrine diseases has improved with greater awareness in the populace. [7] It is however important for specialists in *paediatric endocrinology* and policy makers to be aware of prevalent *paediatric* endocrine conditions in our environment to channel resources appropriately.

The purpose of this study was to describe the pattern of endocrine disorders in children and adolescents seen in the *Paediatric endocrinology* unit of a tertiary health care facility in Southern Nigeria and to highlight existing challenges in diagnosis and treatment.

2. MATERIALS AND METHODS

This study was a retrospective study carried out at the department of *paediatric*s of the University of Port Harcourt Teaching Hospital, Rivers State, Southern Nigeria. The hospital is a tertiary institution that serves as a major *Paediatric* referral center for other hospitals and clinics in Rivers State and neighboring states with no *paediatric endocrinologist.*

All cases of children and adolescents with endocrine disorders seen between January 2013 and August 2017 were reviewed. Information on patients was obtained from patient's case notes, clinic and *endocrinology* unit register using a structured instrument. Information retrieved includes age at presentation, gender, clinical features, educational status and occupation of parents, diagnosis and outcome. Data was extracted by authors with confidential data of patients coded. The socioeconomic stratification was done based on that described by Oyedeji. [8] Diagnosis of the various endocrine disorders was from clinical features, relevant laboratory/radiological investigations. Diagnosis of precocious puberty was made if there is development of secondary sexual characteristics 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].

Approval for the study was obtained from the ethics Committee of the University of Port Harcourt Teaching Hospital.

Data was presented using simple frequencies and in tables and figure.

3. RESULTS

A total of 178 patients were seen with various endocrine disorders over the study period accounting for 4.5% of *Paediatric* specialist clinic consultations. There were 89(50.0%) females and 80(44.9%) males. Nine (5.1%) had genital ambiguity. The ages of patients ranged from 12days to 17years with a mean age of 6.9 ± 5.1years

Table 1 shows the pattern of the various endocrine disorders seen during the study period. Pubertal disorders, diabetes mellitus, thyroid disorders and calcium phosphate metabolism and bone disorders were the leading endocrine disorders in our review accounting for 34(17%), 27(14%) 23(12%), 22(11%) and 22(11%) respectively. The commonest pubertal disorder was precocious puberty in 30 (88.2%) of the 34 cases seen.

Of the 22 patients with thyroid disorders, 7 (31.8%) had congenital hypothyroidism and presented after 3months of age.

Type 1 DM was the commonest type of diabetes accounting for 24(88.9%) of cases. Three (11.1%) children were treated for type 2 DM. DM was reported more in females. The age group of children with diabetes mellitus ranged from 4 years to 16 years with a mean age at diagnosis of 11.07± 4.11years. All patients with type 1 DM presented at diagnosis with various severity of Diabetic Ketoacidosis (DKA).

Mean age at diagnosis was lowest in children with sex development and gender disorders, adrenal disorders and ovarian/female genital tract disorders.

Fig. 1 shows the sex predilection for various endocrine disorders with female preponderance seen in pubertal disorders, pancreatic disorders, growth disorders and adrenal disorders.

Table 2 shows the percentage of endocrine visits to the Consultant *Paediatric* Specialist Clinic (CPSC) yearly. Visit was highest (5.7%) in 2017 and an average rate of 4.5% over the study period.

Table 3 shows the social class of the patients. Socioeconomic stratification could be determined for only 40(32.7%) subjects who had complete records. 34(85%) of those with complete records were in social class II and III.

4. DISCUSSION

In our review, endocrine disorders accounted for 4.5% of *Paediatric* specialist consultations which is higher than that observed by Laditan and Johnson [11] in University College Hospital Ibadan, Nigeria between 1972 -1976, Onyiriuka and Kouyate [12] in University of Benin Teaching Hospital (UBTH), Nigeria, between 2004-2013. This differences may be attributed to improved awareness of health practitioners about endocrine disorders in children recently and hence improved referral.

In this review of 178 patients with endocrine disorders we found that pubertal disorder was the commonest. This contrasts with the reports from other authors in Nigeria [4,12,13]. This may have been as a result of missed diagnosis and underreporting in the past and possibly increasing prevalence of the disorder as a result of better awareness of the disease condition and improved access to specialist care [14,15].

A large percentage of children in our series were obese which may be attributed to affluence and lifestyle in this sub- region. Nutrition has been documented to play an important role in the aetiology of endocrine and metabolic disease and with the rise in the incidence of obesity globally, the incidence of conditions like Type 2 diabetes mellitus is increasing. [16,17] Although only three cases of Type 2 DM were reported in our study, there is probability that the incidence of Type 2 DM and other obesity related disorders may increase in the next decade.

DM was one of the common endocrine disorders noted in this study which is in keeping with other studies [4,12]. Although reported as the commonest endocrine disorder in the previous study by Anochie et al [4] in Port Harcourt and Onyiriuka et al [12] in Benin, in our study it was ranked the second in frequency. Diabetes mellitus being a common endocrine disorder which has been reported in several studies shows the need for increased attention on this condition in terms of care, awareness and improvement in knowledge especially amongst

Table 1. Pattern of *paediatric* endocrine disorders in university of port harcourt teaching hospital 2013-2017

ICD- 10 Classification	Disorder	Frequency	Percentage of total	Mean age at Diagnosis
Growth disorders	1. Short stature	10	5%	11.27±5.3
Pubertal disorders	Precocious puberty	30	17%	6.15±2.2
	2. Delayed puberty			
	3. Excessive Menstrual bleeding	3 1		
Sex development /gender disorders	1. Ambiguous external genitals	14	9%	2.65±4.4
	2. Hypospadias	3		
Obesity		22	11%	7.3±4.4
Pituitary/hypothalamic disorders	1. Diabetes insipidus	2	2.5%	6.7±8.3
	2.hypopituitarism	2		
	3. Cushing's disease	1		
Thyroid gland disorders	1. Hyperthyroidism	9	11%	8.35±6.1
	2. Hypothyroidism	7		
	3. Euthyroid goiter/thyroiditis	5		
	4. Thyroid cancer	1		
Adrenal disorder	1. Congenital adrenal hyperplasia (cah)	3	1.5%	0.7±1.1
Testicular/male reproductive tract disorders	1. Micropenis	13	9%	7.59±5.0
	2. Cryptochidism	4		
Ovarian/female tract disorder	1. Vaginal stenosis	2	4%	3.63±2.5
Disorders of pancreas, lipids	1. Type 1 dm	24	14%	11.07±4.11
	2. Type 2 dm	3		
	3. Primary lipid abnormality	0		
	4. Secondary lipid abnormality	1		
	5. Others	1		
Calcium, phosphate metabolism and bone disorders	1. Rickets	12	12%	3.78±3.18
	2. Blount's disease	6		
	3. Others	5		
Syndromes with endocrone features	Turner's, klinefelters, down, osteogenesis imperfecta, obesity syndromes, pcos	10	5%	8.86±1.15
Others	Gynaecomatia	3	2%	13.3±0.86

health care givers. This is to reduce chronic complications which could lay a huge burden on the family, health system and the government. In most developing countries, children with Type 1 DM are faced with challenges of availability of insulin and lack of structured care leading to reduced life expectancy.

In this study, calcium phosphate metabolism and bone disorders reported as the fifth commonest disorder with rickets made up mainly of varus and valgus deformities of the knee being the commonest presentation however only 35.7% had radiological confirmation of rickets. A considerable number of children with limb

Table 2. *Paediatric* endocrine clinic attendance

Year	Total cpc visits	Number of endocrine visits	%cpc visit to endocrine visit
2013	4579	236	5.2%
2014	2008	105	5.2%
2015	4727	213	4.5%
2016	4524	141	3.1%
2017	1347	77	5.7%
Total	17185	772	4.5%

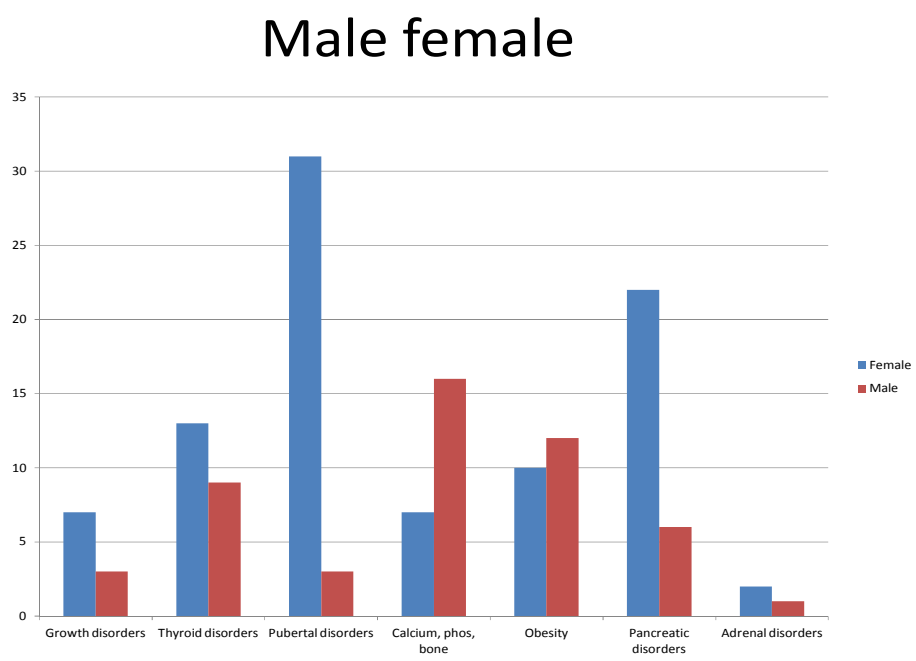

Fig. 1. Sex predilection for various endocrine disorders seen

deformities in this report who did not have classical radiologic features of rickets may however have healed rickets or other bone abnormalities. This contrasts with the findings by Nasir and Jurayyan [18] in Saudi Arabia and Jarrett et al [13] in Ibadan, Nigeria who reported rickets as the most prevalent endocrine disorder but concurs with the report by Onyiriuka and Kouyate [12] in UBTH Benin also in Nigeria who reported a low prevalence of rickets. The reason for this difference is not very clear. Onyiriuka and Kouyate [12] attributed the low prevalence of rickets in their study to underestimation of the true figure since most physicians were noted to refer children with bone abnormalities of the limbs to orthopaedic surgeons rather than *paediatric*ians. All children with rickets in this report responded well to treatment with calcium and or vitamin D.

Table 3. Social class of patients

Social stratification	Number of cases	Percentage of cases
I	4	10%
II	14	35%
III	20	50%
IV	1	2.5%
V	1	2.5

Genital ambiguity was seen in 5.1% of all endocrine disorders in this study. In the previous study by Anochie et al [4] in Port Harcourt, there was no reported case. The prevalence of this disorder in our environment is largely unknown and management is very challenging. [19] In most of the cases in our study, the definitive diagnosis could not be fully ascertained due to

unavailability of facilities for proper diagnosis and where available they were expensive. This reflects the prevailing problems in developing countries like ours. Three children who had congenital adrenal hyperplasia were started on tablet hydrocortisone and are doing well on follow up but with occasional challenge of procuring drugs.

Most endocrine disorders have an age pattern, in this report; cases reported have shown specific age and sex predilection. Pubertal, pancreatic, growth and adrenal disorders were obviously commoner in females. Age distribution also shows most cases of sex development and gender disorders, adrenal disorders and ovarian/female genital tract disorders were diagnosed early in infancy. Mean age for diagnosis of diabetes mellitus was in early adolescence. This is similar to reports from other studies [12,13,18].

No immediate factors identified to explain the thyroidal problems. Presently we have food iodization, but the peculiarity of our region concerning oil exploration, lifestyle cannot be overlooked. Rickets is presently on the rise and this may be connected to increase in Vitamin D deficiency due to more children staying indoors because of insecurity and affluence. However there is need for more focused studies to identify and explain some of the factors.

5. CONCLUSION

The five leading endocrine disorders in our study were pubertal disorders, diabetes mellitus, thyroid disorders and calcium phosphate metabolism and bone disorders. The high prevalence of these endocrine disorders reflects the need for training of more *Paediatric* endocrinologist in order to deliver expert care to children with endocrine disorders in our region.

The need to channel attention to more common *Paediatric* endocrine disorders as shown in this report will help with provision of affordable and readily available diagnostic tools for promotion of excellence in the care of pediatric endocrine diseases in our country.

CONSENT

No consent was needed from patients as no details of patients were given.

ETHICAL APPROVAL

As per international standards or University standards, a written ethical approval has been collected and preserved by authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Zacharin M, Chanoine JP, Cassora F, Brink S, Hanas R, Fideleff HL, et al. Promoting excellence in the care of *Paediatric* endocrine diseases in the developing world. Paediatrics. 2013;131: 573-578.
2. Endocrine disorders and Children. World Health Organisation. Available:www.who.int/ceh/capacity/endocrine.pdf
3. Golden SH, Robinson KA, Saldanha I, Anton B, Ladenson PW. Clincal review: Prevalence and incidence of endocrine and metabolic disorder in the United States: A comprehensive review. J Clin Endocrinol Metab. 2009;94:1853-1878.
4. Anochie IC, Opara PI, Inimgba N. Pattern of endocrine diseases in children at the University of Port Harcourt Teaching Hospital. Port Harcourt Med J. 2009;3: 145-152.
5. Anochie IC, Azubuike JC. Endocrine and metabolic disorders. In: Azubuike JC, Nkanginieme KEO eds. *Paediatric*s and Child Health in a Tropical Region. 2nd ed. African Educational Services, Owerri. 2007;666-683.
6. Famuyiwa OO. Problems and Challenges in the practice of *endocrinology* in a developing country: An overview. Nig Med Pract. 1990;20:3-6.
7. Odundo GO, Ngwiri T, Otuoma O, Laigong P, Mukhwana R, Limbe MS, Chanzu NM. The Impact and Successes of a *Paediatric Endocrinology* Fellowship Program in Africa. Int J Endocrinol; 2016. Available:http://dx.doi.org/10.1155/2016/1560248.
8. Oyedeji GA. Socioecomic and cultural background of hospitalized children in Ilesha. Nig J Paed. 1985;12:111-117.
9. Latronico AC, Brito VN, Carel JC. Causes, diagnosis and treatment of central

precocious puberty. Lancet Diabetes Endocrinol. 2016;4:265-274.
10. Quigley CA, Ranke MB. International Classification of Pediatric Endocrine Diagnoses; 2016. Available:www.icped.org
11. Laditan AAO, Johnson AOK. Thyroid gland disorders in African Children. J Natl Med Assoc. 1979;71:139-141.
12. Onyiriuka AN, Kouyate M. *Paediatric* endocrine disorders as seen at the University of Benin Teaching Hospital over a ten year period. Niger J Paed. 2014;41: 316-320.
13. Jarrett OO, Ogunbosi BO, Ayoola OO. *Paediatric* endocrine disorders at the University College Hospital, Ibadan: 2002-2009. Ann Ib Postgrad Med. 2013;11:96-101.
14. Onyiriuka AN, Adiodun PO, Onyiriuka LC. Thyroid disorders in childhood and adolescence: Analysis of clinical data and management challenges in patients seen in a Nigerian Teaching Hospital. Greener J Med Sci. 2012;2:045-050.
15. Jaja T, Yarhere IE. Clinical characteristics of children and adolescents with thyroid disorders seen at the University of Port Harcourt Teaching Hospital: A five year review. Niger J Paed. 2014;41:302-306.
16. Gupta N, Goel K, Shah P, Misra A. Childhood Obesity in developing countries: Epidemiology, determinants and prevention. Endocrine Reviews. 2012; 33:48-70.
17. Ford ES, Li C, Zhao G, Pearson WS, Mokdad AH. Prevalence of the metabolic syndrome among US adolescents using definition from the international Diabetes Federation. Diabetes care. 2008;31:587-589.
18. Nasir AM, Jurayyan AI. Spectrum of endocrine disorders at the *Paediatric* Endocrine Clinic, King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia. J Taibah Univ Med Sci. 2012;7:99-103.
19. Sowande OA, Adejuyigbe O. Management of Ambigous genitalia in Ile Ife, Nigeria: Challenges and outcome. Afr J Paed Surg. 2009;6:14-18.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle3.com/review-history/47781