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Paediatric endocrine disorders as seen at the University of Benin Teaching Hospital over a ten-year period

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Abstract *Background:* In most developing countries, data on the prevalence and distribution of paediatric endocrine disorders is lacking.
Objective: To describe the pattern of endocrine disorders seen in the Department of Child Health, University of Benin Teaching Hospital (UBTH), Benin City, Nigeria between 2004 to 2013.
Methods: In this retrospective study, the case files of children seen in the paediatric endocrine-metabolic clinic and those admitted into the wards at the UBTH, Benin City from January, 2004 to December, 2013 were audited. Information obtained included age at presentation, gender, principal complaints, and final diagnosis. For those who were admitted, the outcome was noted. The hospital's paediatric clinic register was examined to obtain the total number of new cases seen during the period under review.
Results: A total of 13,735 new cases were seen in the Department of Child Health, UBTH during the ten-year period under review and 99 (0.72%) of these had endocrine disorders. The frequencies of the four leading groups of endocrine disorders seen were as follows: diabetes mellitus 17.2%; disorders of sex development 13.8%; disorders of the thyroid gland 12.1%; and disorders of energy balance 11.2%. Short stature was a rare presenting complaint.
Conclusion: Diabetes mellitus and disorders involving sex development, thyroid gland, energy balance and pubertal development were the five leading groups of childhood endocrine disorders encountered in our clinical practice in UBTH.

Key words: endocrine disorders, clinical pattern, children, hospital, Nigeria.

Introduction

In the paediatric age group, endocrine disorders occur both in developed and developing countries. However, there are fewer reports concerning the pattern of paediatric endocrine disorders from developing compared with developed countries[1]. In most tropical developing countries of Africa, endocrine disorders are ranked low in terms of priority by healthcare planners and administrators, resulting in merger allocation of resources to that area within the health sub-sector[2]. Factors believed to be responsible for this situation include the heavy burden imposed by infectious diseases and nutritional disorders, historical bias suggesting that endocrine disorders are rare in tropical Africa, scarcity of trained paediatric endocrinologists and inadequate facility for accurate diagnosis in our region[1,2]. In addition, an endocrine problem such as short stature is perceived by the larger society as having only social or cosmetic implication. As a consequence, it is not usually brought to the attention of a physician[2].

As a group, developing countries of the world experience 90% of the world's disease burden but have only 10% of global healthcare funds at their disposal[3]. The implication is that strategies for improving healthcare should be selective and based on a rational setting of priorities for health. In this regard, knowledge of morbidity profile will assist policymakers, healthcare planners and administrators to reach informed decisions on allocation of resources to the various areas within the health sub-sector. Although hospital-based data are inevitably referral- and access-biased, they provide substantial insight into the types of diseases, the age of presentation and their burden on in-patient service. In addition, they, to some extent, reflect the morbidity pattern in the communities[4].

There is paucity of information in the literature concerning the pattern of childhood endocrine disorders in Edo State, Nigeria. The same is true when other parts of our country are considered. Although childhood endocrine disorders are relatively uncommon, they tend to run a

chronic course, resulting in long-term morbidity and, sometimes, mortality, if not diagnosed and treated promptly. However, some endocrine-metabolic disorders like acute adrenal failure, hypoglycaemia and diabetic ketoacidosis present as medical emergencies.

It has been documented that the most common endocrine disorder in childhood and adolescence is diabetes mellitus. For instance, Rosenbloom et al[5], stated that in paediatric endocrinology practice, diabetes mellitus accounted for 50% to 60% of the workload. The report of a recent hospital-based study in Port Harcourt, Nigeria, indicated that diabetes mellitus was the most common endocrine disorder in the paediatric age group[6]. Reports from African countries suggest an upward trend in the incidence of diabetes mellitus as well as obesity[7-10].

The purpose of present study was to describe the pattern of paediatric endocrine disorders seen between January, 2004 and December, 2013 at the Department of Child Health, University of Benin Teaching Hospital (UBTH), Benin City, Nigeria.

Patients and methods

This retrospective study was conducted in the Department of Child Health, UBTH, Benin City, Nigeria. Patients seen in the hospital come from Edo State and the neighbouring states of Delta, Ondo and Kogi. The paediatric endocrine-metabolic clinic of UBTH receives referrals from both within and outside the hospital (UBTH). In this retrospective study, the case files of all children seen at the paediatric endocrine-metabolic clinic and those admitted into the wards at the UBTH, Benin City were retrieved and audited. Information obtained from the case files included age at presentation, gender, principal complaints and final diagnoses. Outcome measures, such as discharged home, discharged but abandoned, discharged against medical advice, and death were also noted in those who were admitted. Patients were routinely evaluated, using detailed history and physical examination. The investigations for each case were usually directed by the individual patient's history and physical examination findings. The total number of new cases seen during the period was obtained from the relevant clinic and ward registers. Descriptive statistics such as frequencies, means, ratios, standard deviations, confidence intervals, odds ratios and percentages were used to describe all the variables.

Results

During the ten-year period covered by this review, 13,735 new cases comprising 7,760 (56.5%) males and 5,975(43.5%) females were seen at the paediatric consulting Outpatients' Clinic of UBTH, Benin City, giving a male-to-female ratio of 1.3:1. Ninety nine (0.72%) of the 13,735 new cases had endocrine disorders, giving an incidence of 7 per 1,000 new cases. Of the 99 patients with endocrine disorders, 40(40.4%) were males and 59 (59.6%) were females, resulting in male-to-female ratio of 1:1.5; Odds ratio, OR = 0.52, Confidence interval, CI = 0.42-0.62. Excluding the ten infants whose mothers had endocrine disorders in pregnancy, the overall mean age was 5.4±3.3 years (95% CI = 4.8-6.0) with a range of one month to 17 years. As shown in Table 1, those patients with diabetes mellitus and thyroid disorders tended to present during adolescence while those with anomalies of the external genitalia tended to present during infancy.

Table 1: Distribution of subjects according to broad groups of endocrine disorders

Endocrine disorders	Mean age (years) at presentation	95% CI	Sex ratio M:F
Diabetes mellitus (n=20)	11.5±3.9	9.8-13.2	1:1.5
Disorders of sex development (n=16)	1.3±1.1	0.8-1.8	1:2
Disorders of thyroid gland (n=14)	12.1±3.2	10.4-13.8	1:2
Disorders of energy balance (n=13)	4.2±3.4	2.4-6.0	1:1.7
Disorders of pubertal development (n=12)	6.7±2.8	5.1-8.3	1:6
Disorders of calcium and bone metabolism (n=10)	3.3±2.5	2.0-4.6	1:1.7
Disorders of adrenal gland (n=10)	0.9±0.8	0.4-1.4	1:2.5
Infants born to mothers with endocrine disorder (n=10)	0.06±0.04	0.04-0.08	1:1
Disorders of growth (n=4)	9.3±2.2	7.1-11.5	3:1

CI = Confidence Interval

Table 2: Distribution of paediatric endocrine disorders seen over a ten-year period

Endocrine disorders	No	%
Diabetes mellitus	20	20.2*
- Type 1	15	75.0
- Type 2	2	10.0
- Drug-induced (steroid-induced)	1	5.0
- Diabetes mellitus co-existing with sickle cell anaemia	2	10.0
- Others	0	0.0
Disorders of the thyroid gland	16	16.2*
- Hyperthyroidism	8	50.0
- Hypothyroidism	3	18.7
- Euthyroid goiter	5	31.3
Disorders of energy balance	14	14.1*
- Obesity (BMI > 95th percentile)	6	42.9
- Failure to thrive	3	21.4
- Persistent hypoglycaemia	5	35.7
Disorders of pubertal development	13	13.1*
Delayed puberty	2	15.4
Precocious puberty	6	46.1
Premature thelarche	4	30.8
Gynaecomastia	1	7.7
Disorders of adrenal gland	12	12.1*
Congenital adrenal hyperplasia	6	50.0
Acute adrenal insufficiency (Associated with meningococcaemia)	3	25.0
Iatrogenic Cushing syndrome	3	25.0
Disorders of calcium and bone metabolism	10	12.1*
Rickets	7	70.0
Spondylometaphyseal dysplasia	1	10.0
Blount's disease	2	20.0
Infants born to mothers with endocrine disorders	10	12.1*
Diabetes mellitus	8	80.0
Hyperthyroidim	2	20.0
Disorders of growth	4	4.0*
Short stature	4	100.0
Tall stature	0	0.0
Total	99	100.0*

*Percentage of total number of endocrine cases

As depicted in Table 2, diabetes mellitus, disorders involving sex development, the thyroid gland, energy balance and pubertal development were the five leading groups of childhood endocrine disorders seen in our hospital during the period under review. Of the four cases of short stature, only one presented with short stature as the principal complaint (Table 2). Thirty five (35.4%) of 99 were hospitalized and majority (48.8%) were newly diagnosed cases of diabetes mellitus. The outcome of those cases that were hospitalization was as follows: discharged home 30(85.7%); discharged against medical advice 2(5.7%); discharged but abandoned 1(2.9%); and death 2(5.7%). The two deaths were one 5-week old boy with persistent hypoglycaemia and one 10-month old boy with acute adrenal failure secondary to meningococcaemia.

Discussion

Data from the present study indicate that endocrine disorders accounted for 0.72% of all new cases seen at the Paediatric Outpatient Clinic of the Department of Child Health, University of Benin Teaching Hospital (UBTH), Benin City. This confirms that endocrine disorders do occur in children in tropical countries of Africa despite the huge burden of infectious diseases and nutritional disorders plaguing the region. Lack of previous published reports on the frequency of endocrine disorders in the paediatric age group, either our hospital or any other hospital in Edo or Delta state, made comparison with the present frequency impossible. A recent report on the pattern of childhood endocrine disorders as seen at the teaching hospital in Port Harcourt, Nigeria was silent on prevalence[6]. As a consequence, comparison of the frequency being reported here with frequency in other parts of Nigeria was impossible. However, three-and-half decades ago, endocrine disorders accounted for 0.2% of all new cases seen at the Department of Paediatrics, University College Hospital (UCH), Ibadan[11]. The higher prevalence (almost a four-fold increase) observed in the present study might be a reflection of an increase in the level of awareness concerning paediatric endocrine disorders among clinicians and the larger society. For instance, since 2009, increasing number of Nigerian paediatric endocrinology Fellows have been graduating yearly from the training institutions in Kenya and more recently, from Nigeria. As a result, there are more physicians, and by extension, more health professionals with interest in paediatric endocrine disorders. This may result in an increase in the number of referrals[12].

With regard to frequency of childhood endocrine disorders, there was a slight female preponderance. A similar finding has been reported in previous studies in Nigeria[6,11]. Reports from other parts of Africa and the world indicate that thyroid disorders[13-16], overweight and obesity[17], and precocious puberty[18] are all more common in girls than boys. These specific childhood and adolescence endocrine disorders were among the leading five types of endocrine disorders found in our series. Thus, together they may have contributed to the overall female preponderance observed in the present study. There is no readily available explanation for higher frequency of endocrine disorders found among females. It has been documented that all types of simple goitre are more common in females than males because of the presence of oestrogen receptors in thyroid tissues.[19] Besides, in adolescence, autoimmune thyroid disorders such as chronic lymphocytic thyroiditis and Grave's disease are more common in girls than boys.[20]

In this series, the four leading groups of endocrine disorders encountered were diabetes mellitus, disorders of sex development, disorders of the thyroid gland, and disorders of energy balance. In keeping with a recent study at the teaching hospital in Port Harcourt, Nigeria, diabetes mellitus was the most frequently encountered problem in our paediatric endocrine-metabolic clinic.[6] In sharp contrast with the report of the study in Port Harcourt,[6] disorders of sex development ranked second in frequency in the present study. Disorders of sex development was conspicuously absent in the series from Port Harcourt.[6] The reason for this difference is not clear. In the present study, thyroid disorders ranked third in frequency but ranked very low in the series reported from Port Harcourt, Nigeria[6]. The authors in that study attributed the low incidence of thyroid gland disorders to underreporting and missed diagnosis[6]. However, other Nigerian studies that have reported that thyroid gland disorders was next to diabetes mellitus in terms of frequency of occurrence involved adults[21,22].

In Nigeria, majority of the studies related to thyroid disorders involved only adults, making comparison with the present study involving the paediatric age group difficult. It is known that the pattern as well as the prevalence of thyroid disorders in adults differ from that of children and adolescents[13,23]. Other areas of difference between the present study and that in Port Harcourt were the absence of cases of rickets and congenital adrenal hyperplasia (CAH) in the latter study.[6] The reason for the differences observed is not clear, particularly as both studies were tertiary-hospital based. Considering that clinicians in other sub-specialties in UBTH, also care for children with rickets, the prevalence of rickets being reported the present study might be a gross underestimation of the true figure. For instance, Bafor et al,[24] reported that 46.0% of 78 children below the age of 17 years presenting with angular deformity of the knees in their Orthopaedic clinic in UBTH had rickets, suggesting that physicians tended to refer most children with angular deformity of the knees to the orthopaedic surgeon rather than the paediatrician. In contrast to the report of the study from PH that indicated that no case of CAH was found during the six-year period covered by that review, CAH accounted for 6.5% of all cases seen at the our endocrine-metabolic clinic, representing 70.0% of all cases of disorders of the adrenal gland. Again, the reason for this difference is not clear. However, cases of CAH have been reported from other teaching hospitals in Nigeria. For instance, Adeleke in Kano[25] and Sowande in Ile Ife[26] have separately reported

cases of CAH in their respective health institutions. Similarly, Agboola-Abu et al,[27] have also reported cases of CAH at Eko hospital, Lagos. However, it is possible that differences in methods of classification of paediatric endocrine disorders used in the two studies may have contributed to the observed differences.

In the present study, only one case was brought to the hospital with short stature as the principal complaint. Consistent with this observation is that short stature as a presenting complaint was also conspicuously absent in series reviewed by Anochie et al,[6] over a six-year period in PH, Nigeria. The same was true in a review covering a seven-year period in Ibadan.[28] This trend may be accounted for by the cultural perception in our society that short stature has only social or cosmetic significance[28]. As a result, children with short stature are erroneously perceived as not requiring medical attention. Lack of awareness of the existence of medical treatment for short stature might have contributed to the near absence of cases presenting primarily for short stature in this series. The practical implication is that in our communities, we need awareness campaign concerning the association between short stature and childhood endocrine disorders.

One limitation of the present study is its retrospective nature. Lack of ability on the part of the researcher to monitor and control data collection is a known drawback in any retrospective cohort study,[29] and this applies to the present study. A situation that may result in less accurate and complete information concerning the study subjects. Despite this limitation, the study provided an insight into the prevalence and pattern of paediatric endocrine-metabolic disorders in our hospital.

Conclusion

In conclusion, diabetes mellitus and disorders involving sex development, thyroid gland , energy balance and pubertal development were the five leading groups of childhood endocrine disorders encountered in our clinical practice in UBTH. Healthcare planning for Nigerian children should incorporate endocrine healthcare as an essential component.

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