

PAEDIATRIC ENDOCRINE DISORDERS AT THE UNIVERSITY COLLEGE HOSPITAL, IBADAN: 2002 – 2009

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ABSTRACT

Background: Until recently, most published research focus more on infectious diseases and malnutrition giving the impression that endocrine disorders are uncommon. Reports on endocrine disorders in children in developing countries are few compared to developed countries reflecting the different level of prevalence in the different geographical locations and or level of awareness and availability of facilities for proper diagnosis.

Objective: This study aims at defining the burden of paediatric endocrine disorders in Ibadan.

Subjects/Methods: A review of records of children who presented at University College Hospital, Ibadan with paediatric endocrine disorders from 2002 to 2009 was carried out.

Results: During the eight-year period, a total of 110 children presented with various endocrine disorders but only 94 had complete data for this study. There were 47(50%) males and 37(39.4%) females, and in 10(10.6%) of them, had genital ambiguity at presentation. Patients' ages ranged from 2 weeks to 15 years with a median of 3 years. Many (35%) patients were malnourished with weight less than 80% of the expected weight for age and only 9% were overweight. Yearly distribution of cases showed a steady increase in number of cases from 2005. Rickets and metabolic disorders constituted 56.4% of patients; Diabetes mellitus was diagnosed in 12.8%, adrenal disorders in 10.6%, pubertal disorders in 5.3% and growth disorders in 4.3% of the patients. Thyroid disorders were present in 6.4%, obesity in 3.2% while the least common disorder was Diabetes insipidus (1%). About 58% of the children had parents in the low socioeconomic status and the management of the cases were severely hampered by lack of funds. About 60.6% of these patients were lost to follow up, during the period.

Conclusions: Paediatric endocrine disorders are associated with a high incidence of malnutrition. Most patients presented with rickets which is a preventable condition.

Keywords: Endocrine disorders, Awareness, Rickets, Malnutrition, Financial constraints.

INTRODUCTION

Endocrine disorders are a varied group of conditions that affect growth, development and reproduction.¹ In developing countries like Nigeria there is high prevalence of childhood infectious diseases, and much emphasis, concern and resources have been channelled towards combating them while not much attention has been paid to non-communicable disorders in the paediatric age group.¹ In spite of the high burden of infectious diseases, childhood endocrine disorders constitute a significant cause of morbidity and mortality.²

In developed countries, paediatric endocrinology is an established specialty and medical literature is replete with various clinical and research studies and the burden of endocrine disorders are fairly well ascertained.^{1,2} Furthermore, a lot of progress has been made in the area of scientific investigations, treatment and research into paediatric endocrine disorders.³⁻⁷ With such tremendous advancement in the developed world, the deficiencies in the standard of clinical care and research in the developing world has become more obvious.

In many African countries, there is paucity of literature on paediatric endocrine disorders, a low level of awareness and diagnostic challenges occasioned by the relative lack, and where available high cost of the various laboratory tests needed for diagnosis.⁸ These lead to late presentation and/or diagnosis of many endocrine disorders and sometimes, missed diagnosis. Therefore, this study is an effort aimed at describing the burden of common childhood endocrine disorders in Nigeria. It would provide baseline data and increase awareness among health care providers.

PATIENTS AND METHODS

This study was carried out at the Paediatrics Department of the University College Hospital (UCH), Ibadan in south west of Nigeria. It is a tertiary referral centre for many hospitals in Ibadan and other parts of Nigeria. There are six wards with one hundred and fifty-eight beds.

The clinic and ward case records of patients presenting from 2002 to 2009 were examined retrospectively. The information extracted from the records included age at presentation, gender, socioeconomic status of parents, anthropometric indices, clinical features and duration, investigations, diagnosis and outcome. The data were collected using a structured proforma and analyzed using the SPSS 14 software for windows package. Frequencies and cross tabulations were carried out. Socioeconomic index scores were allocated to each child based on occupations and educational attainment of both parents on scales I to V, as previously done by Oyediji *et al* in a similar community.⁹ The mean of the scores to the nearest whole number was the social class assigned to the children's parents.

RESULTS

During the eight-year period, a total of 110 children presented with endocrine disorders out of which 16 were excluded from analysis due to incomplete data.

There were 47(50%) males and 37(39.4%) females, and in 10(10.6%) of them, gender could not be determined because of genital ambiguity at presentation. Patients' ages ranged from 2 weeks to 15 years with a median age of 3 years. Most patients (79%) were children older than one year of age (Table 1).

Figure 1 shows the yearly distribution of endocrine disorders. It shows a gradual decline in the number of patients attending the clinic from 2003 with a subsequent steady rise in attendance from 2006.

Table 1: Age group and sex distribution of endocrine disorders

Age	Male		Female		Undetermined	
	n	%	n	%	n	%
0 – 28 days	-	-	-	-	4	40
29 days- 1year	4	8.5	3	8.1	1	10
>1-5 years	29	61.7	21	56.8	2	20
> 5yrs	14	29.8	13	35.1	3	30
Total	47	100	37	100	10	100

In many of the conditions, the parents of the children were from low socio-economic status however, all the patients with obesity were from high socio-economic status. 64% of the children were of normal weight for age, a quarter of the patients (26.7%) were undernourished with weight less than 80% of the expected weight for age, while 9.3% were overweight out of which 3.2% were obese. (Figure 2)

The children presented with a variety of paediatric endocrine conditions as shown in Table 2. Rickets and metabolic disorders had the highest prevalence, constituting 56.4% of patients. Diabetes mellitus (DM) was diagnosed in 12.8%, ambiguous genitalia occurred in 10.6% and growth and pubertal disorders in 9.6%

Table 2: Endocrine disorders among different age groups

Endocrine disorder	0-28 days		29 days to 1 year		1-5 years		> 5 years		Total	
	n	%	n	%	n	%	n	%	n	%
Rickets & other bone disorders	-	-	5	5.3	45	47.9	3	3.2	53	56.4
Diabetes Mellitus	-	-	-	-	1	1.1	11	11.7	12	12.8
Ambiguous genitalia	4	4.3	1	1.1	2	2.1	3	3.2	10	10.6
Thyroid disorders	-	-	1	1.1	1	1.1	4	4.3	6	6.4
Pubertal disorders	-	-	-	-	2	2.1	3	3.2	5	5.3
Growth disorders	-	-	1	1.1	1	1.1	2	2.1	4	4.3
Obesity	-	-	-	-	-	-	3	3.2	3	3.2
Diabetes Insipidus	-	-	-	-	-	-	1	1.1	1	1.1
Total	4	4.3	8	8.6	52	55.3	30	55.6	94	100

Table 3: Outcome among patients with endocrine disorders

	Follow up n (%)	Lost to follow up n (%)	Dead n (%)
Rickets & other bone Disorders	15(28.3)	38(71.7)	0
Diabetes mellitus	7(58.3)	3(25.0)	2(16.7)
Thyroid disorders	5(50.0)	4(40.0)	1(10.0)
Ambiguous genitalia	3(50.0)	3(50.0)	0
Pubertal disorders	1(20.0)	4(80.0)	0
Growth disorders	1(25.0)	3(75.0)	0
Obesity	2(66.7)	1(33.3)	0
Diabetes insipidus	0	1(100.0)	0
Total	34(36.1)	57(60.6)	3(3.1)

of the patients. Thyroid disorders were present in 6.4%, obesity in 3.2% while the least common disorder was diabetes insipidus in 1% of patients.

All the cases of DM were type 1, no child had type 2 DM. All the children with DM had been seen by physicians in secondary health facilities but still presented

There were differences in the endocrine disorders at different age groups as shown in Table 2. The only endocrine disorder that presented in the neonatal period was ambiguous genitalia. Most of the infants beyond the neonatal group had rickets. Among the age group 1- 5 years rickets, ambiguous genitalia and pubertal disorders were leading conditions. While diabetes

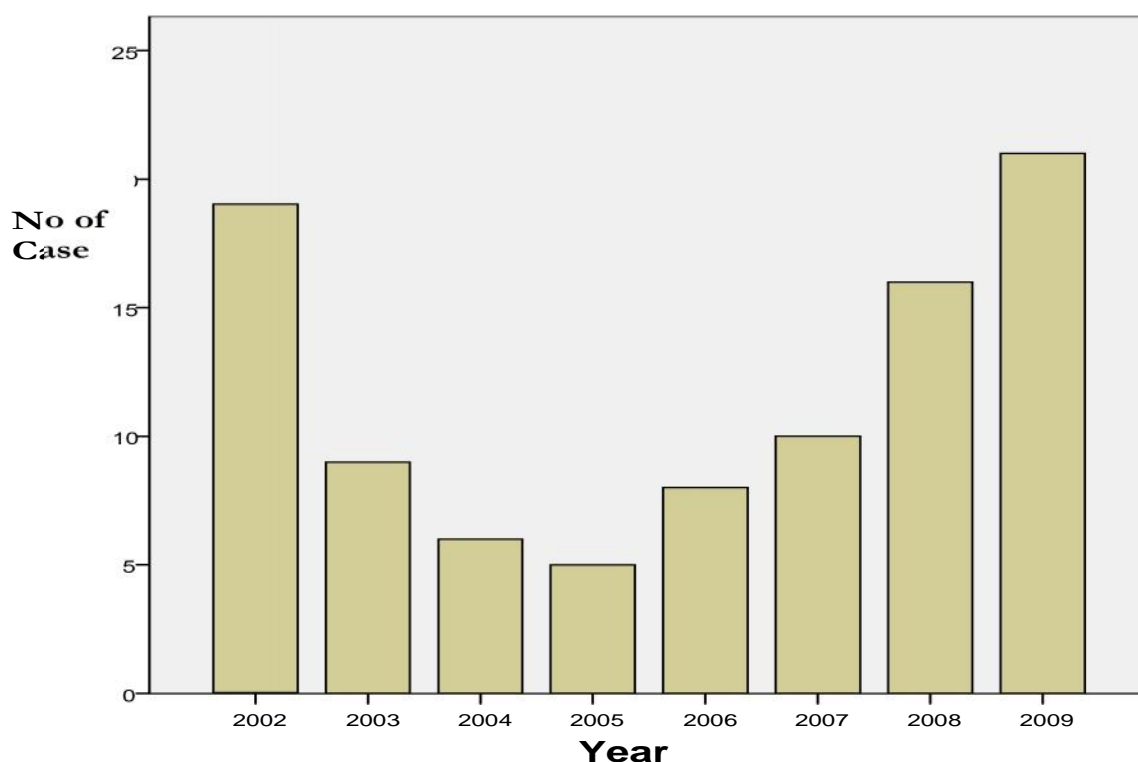
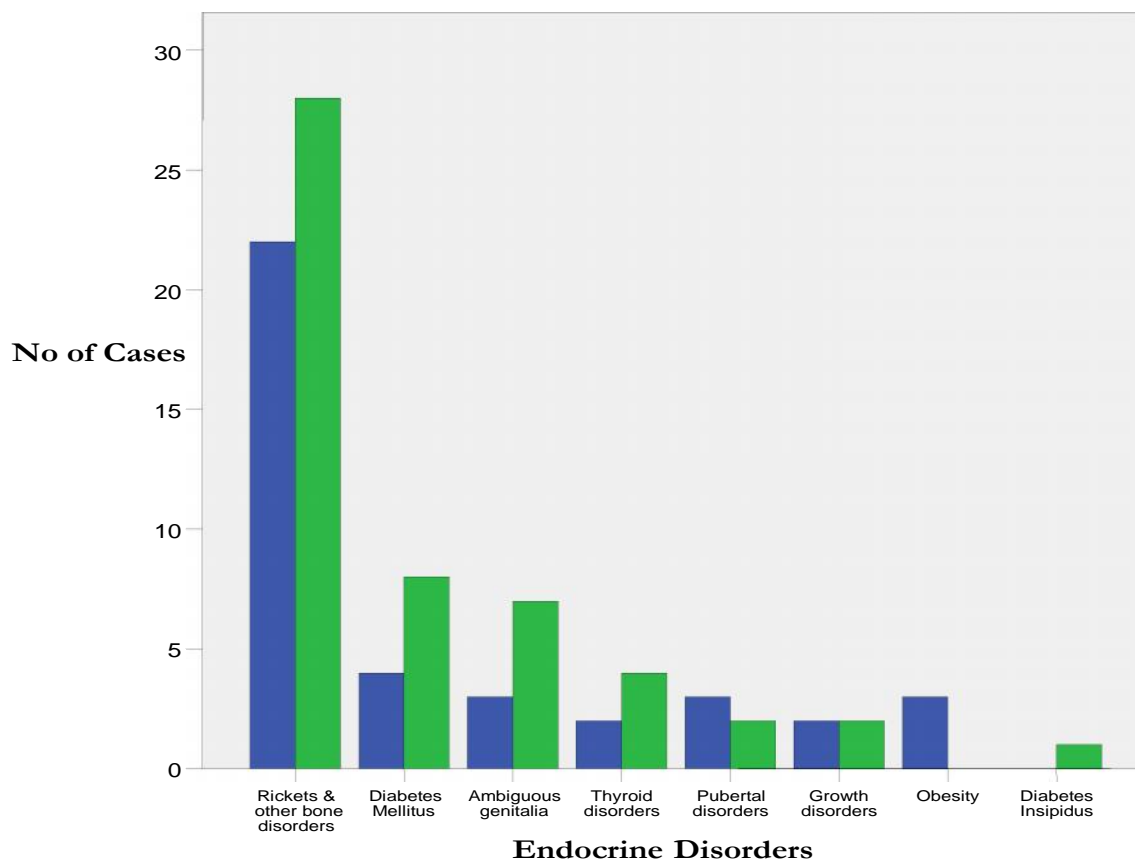


Figure 1: Yearly Distribution of Endocrine Disorders

in DKA, most were mis-diagnosed and for those who suspected DM, appropriate intervention was not instituted. There was the challenge of regular supply of insulin and strips for home blood glucose monitoring on account of financial constraints.

mellitus and thyroid disorders, were leading endocrine disorders among the children older than 5 years of age.



Socioeconomic status

■ Middle to upper status

■ Low Status

Figure 2: Endocrine disorders among the different socioeconomic classes.

Of the 94 children, 41.4% of parents were in social classes I and II (middle to high) and 58.6% were in social classes III and V (low) (Figure 2). About 60.6% of these patients were already lost to follow up (Table 3). The two deaths in this study were in a child with diabetes and a child with ambiguous genitalia.

DISCUSSION

Prevalent endocrine disorders differ between different regions of the world probably as a result of the influence of environment and the interplay of infections and malnutrition especially for conditions like Diabetes mellitus. In the developing countries, awareness of health practitioners about endocrine disorders in children would have an influence on the identification of these conditions and the relative relevance and attention placed on them.

Though a retrospective study, 110 cases over eight year period observed in this study would suggest the relative rarity of these conditions in our environment. This compares with reports from other developing countries.⁸ Prospective studies are needed to ascertain

the true prevalence of these conditions and their burden/contribution to the health of children in our environment.

There are few trained paediatric endocrinologists in Nigeria for a population of more than 140 million people. This disparity was also apparent in a prevalence study in the US.¹⁰ Majority of the children with paediatric endocrine problems are seen by non specialists this could account for poor referrals.¹⁰ The period of decline in cases seen in this study coincided with the period when there was no paediatric endocrinologist in the hospital.

Rickets constitute 56.4% of the paediatric endocrine cases seen during the study period. This correlates with other reports.¹¹ All the cases of rickets had both biochemical & radiological features in keeping with rickets while all were managed with calcium supplements and/or vitamin D with marked improvement in keeping with previous studies by Thacher & Fisher *et al*, Oginni *et al* and Pettifor.¹¹⁻¹⁴

Rickets has been ranked among the five most prevalent disease among children in developing countries.¹¹ Nutritional rickets remains a public health problem in many countries despite dramatic declines in the prevalence in developed countries since the discoveries of Vitamin D and the role of ultra violet light in prevention.¹² The increased risk in dark skinned individuals is due to decreased dermal synthesis of Vitamin D as a result of the absorption of UV radiation by the increased melanin pigmentation.¹¹

Studies carried out in Nigeria have shown that calcium deficiency is the prevalent underlying cause over and above Vitamin D deficiency.¹¹⁻¹⁴ Exclusive breast feeding and prolonged breast feeding are important contributing factors.¹³ Intake of maize with a relatively high phytate content has been known to inhibit the already low calcium levels in the body further predisposing to rickets.¹⁵ Further studies are required to look into the type of rickets that is seen in this environment as hitherto it has been assumed that it is mainly nutritional, other less common causes like genetic mutations and enzyme deficiencies are usually not considered and could easily be missed.

Diabetes mellitus was the second commonest disorder in this study. Diabetes mellitus in children and adolescents which in most cases is Type 1 is one of the commonest paediatric endocrine disorders that pose a great challenge to the person suffering from the disease, the family, the community and the health system in settings where biochemical laboratory backup is scanty and the index of suspicion low, early diagnosis and appropriate management becomes a challenge. This is more profound especially in Nigeria where the structure for care of these children is not available or where available resources are limited. This lack of a structured care team has been reasoned to be due to the lack of awareness of the disease amongst the health workers and the community thereby leading to low level of diagnosis and research. The prevalence rate in the country is presently unknown. It is important to note that where a trained endocrinologist exists incidence rates have increased.

Ambiguous genitalia which was found mostly among the newborn is not unusual and the fact that definitive diagnosis could not be ascertained even among the older ones is a reflection of the prevailing problems with diagnosis.

There were a relatively high percentage of the children with overweight. These are likely to contribute to the increase of endocrine disorder in our environment especially an emergence of metabolic syndromes. The role of nutrition in the aetiology of endocrine and

metabolic disease is well documented and with the rise in the incidence of obesity globally, the incidence of conditions like Type 2 diabetes mellitus is increasing.^{10,16} All these would eventually contribute to increasing morbidity in children.

Pubertal problems and obesity were more common among the affluent in this study. Adrenal and pituitary disorders were not represented here as well as genetic syndromes. Further prospective studies are required to accurately define the incidence of these conditions in this environment as this would provide clues to risk factors and reveal areas to allocate public health and research resources.

Large proportions (58.6%) of the children studied were from a low socioeconomic background, encountered a lot of financial constraints in the course of their management and consequently most were lost to follow up. This may be due to the fact that most endocrine disorders require sophisticated diagnostic tests which often are not readily available in developing countries. In addition a number of these children would require multidisciplinary approach to their management and a long period of clinic follow up. In situations where these required specialists are few or lacking and when patients have to pay at the point of accessing health services as obtains in most developing countries like ours, adherence to prescribed management protocols and follow up is a challenge.

Therefore, in developing countries there is an urgent need for the development of human resources through training in Paediatric Endocrinology. The practice of endocrinology could only be complete in the presence of skilled personnel, appropriate investigative facilities and treatment modalities which includes medical, surgical, hormonal and radiotherapy.¹ These are grossly lacking in developing countries and has led to late presentation and diagnosis of most endocrine disorders especially in the paediatric age group.

Political will power can be improved through increase awareness through education of relevant policy makers so that efforts can be made at procurement of laboratory equipments and other infrastructure needed for management of children with these conditions.

This should improve early recognition and appropriate diagnosis of these conditions which should lead to reduced morbidity and mortality.

LIMITATIONS

It was a retrospective so the problems of poor record keeping and incomplete data were unavoidable.

CONCLUSION

Paediatric endocrine disorders are associated with a high incidence of malnutrition which may be a reflection of the general population. Most patients presented with rickets which is a preventable condition. Though not as common as infectious diseases and infestations, this study emphasizes the paucity of data on paediatric endocrine disorders and childhood diabetes, the necessity for greater awareness among doctors involved in child care of these conditions, development of manpower in this field and the need for a community based survey to ascertain the magnitude.

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