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THYROID DISORDERS IN CHILDHOOD AND ADOLESCENCE: RETROSPECTIVE ASSESSMENT OF CLINICAL DATA IN A NIGERIAN TEACHING HOSPITAL.

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ABSTACT:

In Nigeria, thyroid disorders in childhood and adolescence have not been sufficiently studied. Where studies are available, they were either conducted decades ago or they involved only adults. The objectives are to describe the pattern of thyroid disorders among children and adolescents seen in a Nigerian teaching hospital and highlight the management challenges encountered. In this retrospective study, the case notes of all the children and adolescents with thyroid disorders seen in the Paediatric Endocrine-Metabolic Clinic and of those admitted into the wards of the University of Benin Teaching Hospital (UBTH) from 2005 to 2011 were audited. The total number of cases seen at the paediatric clinics of the Department of Child Health, UBTH was derived from the clinic attendance register of the department. Of the 8,350 cases seen during the period, 9(0.11%) had thyroid disorders, representing one per 930 cases. Of the 9 patients with thyroid disorders, 6(66.7%) had hyperthyroidism, 2(22.2%) had nongoitrous hypothyroidism and one (11.1%) had euthyroid goiter. The overall mean age at presentation for thyroid disorders was 11.2±4.3 years (95% Confidence Interval, CI = 8.4-14.0) and female-to-male ratio was 4:1. For the patients with hyperthyroidism, the mean age of presentation was 12.8±3.1 years (95% CI= 10.3-15.3) and female-to-male ratio was 5:1. The two children (a boy and a girl) with nongoitrous hypothyroidism were aged 3.5 and 6.0 years respectively. The mean duration of symptoms before presentation was thyroid disorders 1.72±1.2 years (95% CI=0.94-2.50), hyperthyroidism 8.5±1.5 months (95% CI=7.3-9.7). The only case of euthyroid goiter (female) presented at the age of 14 years. The two children with nongoitrous hypothyroidism had florid signs of hypothyroidism, such as growth retardation, mental retardation and delayed developmental milestones at presentation. A high clinic default rate was observed. Hyperthyroidism was the most common form of thyroid disorder observed and patients with thyroid disorders tended to present late.

Key words: adolescence, childhood, pattern, thyroid disorders.

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INTRODUCTION:

Thyroid disorders is one of the endocrine disorders commonly encountered in childhood and adolescence and they manifest with qualitative or quantitative alterations in thyroid hormone secretion, goiter or both [1,2]. Insufficient hormone secretion results in hypothyroidism and excessive secretion cause hyperthyroidism or thyrotoxicosis. Sometimes goiter exists with normal thyroid function. Although thyroid dysfunction causes disturbances of metabolic function in both children and adults, the effect on cognitive function, growth and development are unique to children [1]. Despite this well recognized profound effect of thyroid dysfunction in children, there are very few studies that have examined childhood and adolescent thyroid disorders in Nigeria and other developing countries [3]. Majority of the available data either involved only adults or were conducted decades ago [3-6]. The aetiology, prevalence, clinical presentation, and clinical course of thyroid disorders in children and adolescents substantially differ from that of adults [7]. The incidence of thyroid disorders in children and adolescents appears to be increasing [8,9]. For instance, in the TennCare cohort of children without Down syndrome, an increase of 26% in rate of medically treated thyroid disease was observed when 2002-2003 was compared to 1995-1997 [9]. The study was based on prescription database. Laditan et al, [3] reported that 37.0% of children with endocrine disorders seen at the University College Hospital (UCH), Ibadan, Nigeria over a five-year period had thyroid disorders. In that report, late presentation was emphasized. In most parts of Africa and other resource-poor countries, the diagnosis of thyroid disorders depends largely on clinical acumen supported by laboratory tests [3]. Some studies have separately concluded that the pattern of thyroid disorders in a given population was dependent on its iodine-intake status [10-13]. Given that iodine-intake status varies between populations, one may surmise that the pattern of thyroid disorders may differ; justifying the study of pattern of thyroid disorders among children and adolescents in Nigeria.

The purpose of this study was to describe the clinical pattern of thyroid disorders in children and adolescents seen in the Department of Child Health, University of Benin Teaching Hospital (UBTH), Benin City Nigeria, between 2005 and 2011 and highlight some of the management challenges encountered.

SUBJECTS AND METHODS:

The study was conducted in the Department of Child Health, UBTH, Benin City, Nigeria and it involved patients seen between 2005 and 2011

which came mainly from Edo state and the neighbouring states of Delta, Ondo and Kogi. The Paediatric Endocrine-Metabolic Clinic (PEMC) of UBTH receives referrals from both within and outside the hospital (UBTH). The study was approved by the hospital authority.

In this retrospective study, the cases were identified by examining the relevant hospital attendance and admission registers and auditing the case notes of children seen at the PEMC and of those admitted into the paediatric wards (UBTH). The diagnosis of thyroid disorders was based on clinical features and thyroid function tests which included determination of serum levels of thyroxine (T4), triiodothyronine (T3) and thyroid-stimulating hormone (TSH). Information extracted included age, gender, clinical features, duration of symptoms before presentation, laboratory tests results, management challenges, and outcome of admission. The total number of cases seen in the paediatric clinics of the Department of Child Health, UBTH was noted. Data analysis involved calculation of percentages, means, ratios and confidence intervals.

RESULTS:

During the 7-year period under review, a total of 8,350 cases were seen at the Paediatric Consulting Clinic of the Department of Child Health, UBTH. Of these number, 9(0.11%) had thyroid disorders, representing about 1 per 930 cases. Forty nine (0.6%) patients with endocrine disorders was seen during this period and 9(18.4%) had thyroid disorders. Of the 9 patients with thyroid disorders, 6(66.7%) had hyperthyroidism, 2(22.2%) had nongoitrous hypothyroidism and one (11.1%) had euthyroid goiter. The mean age at presentation of thyroid disorders was 11.2±4.3 years (95% Confidence Interval, CI=8.4-14.0) and female-to-male ratio was 4:1. For patients with hyperthyroidism, the mean age at presentation was 12.8±3.1years (95% CI=10.3-15.3) and female-to-male ratio was 5:1. The mean duration of symptoms before presentation for all the thyroid disorders combined was 1.72±1.2 years (95% CI= 0.94-2.50) while for hyperthyroidism it was 8.5±1.5 months (95% CI= 7.3-9.7). The mean duration of symptoms before presentation in the two children with nongoitrous hypothyroidism was 4.75±2.18 years (95%CI=1.74-7.76). The 6-year old boy with hypothyroidism had globally delayed developmental milestones: crawled after age of 12 months, walked at about age of 3 years but unable to run at 6 years of age. Started talking at the age of 4 years but words are not clearly pronounced. The patient was in KG 1 at the age of 7 years; can say “2” and “A” but can neither count nor recite alphabets. Height was 101cm at 6 years of age. He was the only male child out of four children in the family. The mother admitted she did not notice the child’s problems on time and that when she eventually did, she had hoped the child will

overcome the developmental challenges with time. The 14-year-old girl who presented with goiter was found to be euthyroid and physical examination did not reveal any abnormality. She achieved menarche at the age of 13 years. There was no positive family history of thyroid disorders in any of the patients. The presenting complaint in both patients with hypothyroidism was "Does not play/dull/sluggish." Physical examination revealed that both patients had growth retardation, facial puffiness, mental retardation and delayed language development (Table 1). No history of use of oral contraceptive. Examination of the goiter revealed a diffuse, enlarged, soft gland with smooth skin and a bruit. As shown in Figure 1, goiter, lid retraction/stare, weight loss and tachycardia were present in all the six patients with hyperthyroidism. The 7-year old boy with nongoitrous hypothyroidism had short stature (height 101 cm). The two patients with hypothyroidism had low serum levels of T4 and T3 with elevated TSH whereas the patients with hyperthyroidism had elevated serum levels of T4 and T3 with either low or normal TSH levels (Table 2). Clinic attendance was generally poor except for one of the children with hypothyroidism. Of the six patients with hyperthyroidism, only one still attends follow up clinic. The mother of one of the adolescents with hyperthyroidism refused to come and pick up her daughter from the hospital for over 2 months after discharge, necessitating employing the services of law enforcement agents to repatriate the child to the parents.

Table 1: Age and gender distribution of eight children with thyroid disorders

Patient	Thyroid disorders	Age at presentation (Years)	Gender
1	Nongoitrous hypothyroidism	3.5	F
2	Nongoitrous hypothyroidism	6	M
3	Hyperthyroidism	7	M
4	Hyperthyroidism	12	F
5	Hyperthyroidism	12	F
6	Hyperthyroidism	14	F
7	Hyperthyroidism	15	F
8	Hyperthyroidism	17	F
9	Euthyroid goiter	14	F

Table 2: Clinical features seen in two children with hypothyroidism

Clinical features	Patient 1	Patient 2
"Does not play/dull/sluggish"	Positive	Positive
Gender	Male	Female
Age at presentation	6 years	3.5 years
Facial puffiness	Positive	Positive
Growth retardation	Positive	Positive
Mental retardation	Positive	Positive
Language	Delayed	Delayed
Weight	14 kg	10.5kg
Height	101 cm	83 cm
Upper segment: Lower segment ratio	Increased	Increased
Bone age retardation	Positive	Positive
Muscle hypertrophy	Negative	Negative
Goiter	Negative	Negative

Table 3: Serum levels of thyroxine (T4), triiodothyronine (T3), and thyroid stimulating hormone (TSH) according to diagnosis in nine children with thyroid disorders.

Patient	Thyroid disorder	T4 (mcg/dl)	T3 (ng/ml)	TSH (mU/ml)
1	Non-goitrous hypothyroidism	2.6	0.5	38.5
2	Non-goitrous hypothyroidism	1.5	0.6	50.7
3	Hyperthyroidism	12.6	5.2	4.1
4	Hyperthyroidism	12.8	6.0	4.2
5	Hyperthyroidism	15.7	6.2	3.2
6	Hyperthyroidism	16.5	6.8	3.3
7	Hyperthyroidism	17.4	7.0	3.1
8	Hyperthyroidism	19.8	7.6	3.4
9	Euthyroid goiter	7.6	1.8	4.5
	Normal values in UBTH laboratory	4.8-10.8	0.7-2.0	0.4-6.2

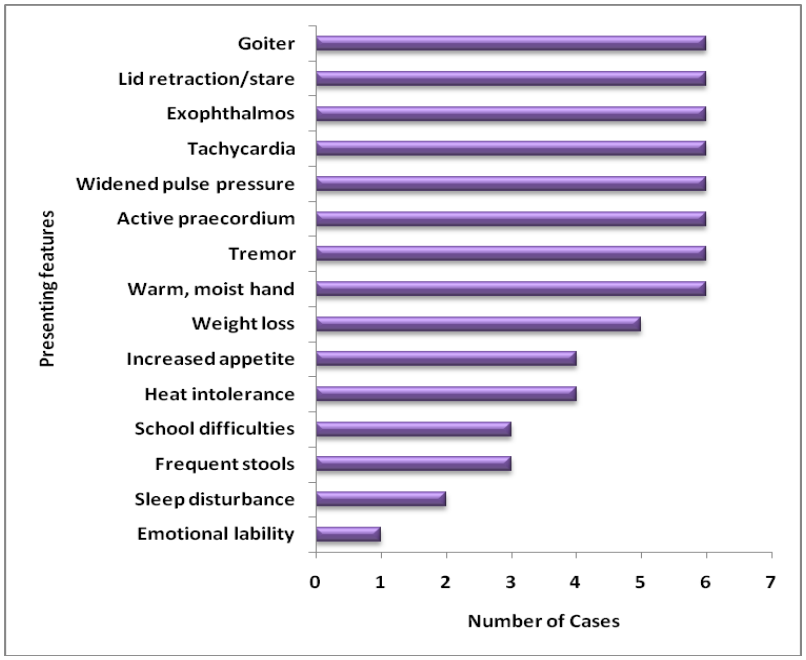

Figure 1: Presenting features seen in six patients with hyperthyroidism

DISCUSSION:

In the present study the prevalence of thyroid disorders was 1.7 fold higher than the prevalence (0.07%) reported, three decades ago, from UCH, Ibadan Nigeria [3]. There is no readily available explanation for the higher prevalence. The prevalence of thyroid disorders is higher in girls than boys with a ratio of 4:1. This is not surprising as other studies have reported a similar female preponderance [3,8,14]. In the present study, hyperthyroidism accounted for two-third of all the thyroid disorders observed among the patients. This is in sharp contrast to what was found 33 years ago in UCH, Ibadan where hyperthyroidism accounted for less than one-third of all the thyroid disorders [3]. The present study was not designed to examine the effect of iodine intake on the pattern of thyroid disorder in the population under review. However, it is possible that the universal salt iodization (USI) policy adopted by the Nigerian government might have a bearing to the relatively greater proportion of patients with hyperthyroidism in the present study compared to the study in UCH before the implementation of the USI programme [3]. This view is reinforced by the report of several recent studies which have conclusively shown that the risk of hyperthyroidism is increased in chronically iodine-deficient individuals who are

exposed to sharp increases in iodine intake [10-13]. Considering the recent successful USI implementation policy in Nigeria, [15] this scenario was possible and may partly explain the increased incidence of hyperthyroidism.

As in other reports [8,14], the present study revealed that majority of thyroid disorders presented during the period of adolescence with 11.2 years as the mean age at presentation. In contrast, the study in UCH about three decades ago, reported a much lower mean age (5.4 years) at presentation [3]. This difference might be due to the fact that 60% of the cases in their series had congenital hypothyroidism and half of them presented before the age of six months with cretinism. The age range of their patients was 4 months to 14 years compared to 3.5 to 17 years in the present study. The absence of infants with cretinism in the present study might be related to the implementation of the USI policy by the Nigerian government [15].

The unique features of the patients seen in the present study were late presentation with florid signs of either hypothyroidism or hyperthyroidism and poor clinic attendance. Similar observation has been documented in a previous study [3]. The reason for the late presentation might be due to a general lack of awareness concerning endocrine disorders in our society; a factor that has been previously emphasized by Famiyuwa in UCH, Ibadan [16]. This view is supported by the comment made by the mother of the child with hypothyroidism (probably congenital) who presented at the age of 6 years. When this mother was asked why she delayed seeking medical help she said, "I did not notice it on time." Also she had hoped the child will overcome those developmental challenges with time (the index patient is her only male child out of four children). The well known insidious onset of hypothyroidism may have contributed to the mother overlooking the presenting features of hypothyroidism in her only son until it became florid [1,2].

Our study revealed that duration of symptoms before presentation was shorter in hyperthyroidism compared to hypothyroidism, suggesting that patients with hyperthyroidism tended to present comparatively earlier than patients with hypothyroidism.

This finding may be explained by the more insidious onset of hypothyroidism compared with hyperthyroidism. In addition, the presence of goiter might have contributed to the relatively shorter duration of symptoms before presentation in the case of hyperthyroidism compared to nongoitrous hypothyroidism. This in keeping with the social and cosmetic implication of the presence of goiter, particularly for teenage girls whose parents might be considering giving them out in marriage in the near future. The high clinic default rate made it difficult to document outcome of treatment and subsequent smooth transfer to adult physicians for continuation of

care. This not surprising because Famuyiwa has emphasized that majority of their patients (adults) were also lost to follow-up making it difficult to document outcome of treatment [17].

The principal clinical features observed among patients with hypothyroidism in our study included growth retardation, mental retardation, delayed language development and absence of goiter. These clinical features are in tandem with those reported among the patients seen in UCH, Ibadan [3].

There were no cases with thyroid nodules whether solitary or multiple among the patients seen in the present study. This observation is in agreement with the report from the study at the UCH, Ibadan, suggesting that thyroid nodules are not common in childhood and adolescence [3].

The most common thyroid disorder observed among the adolescents was hyperthyroidism. This is in contrast to other reports which stated that the most common presentation of thyroid disorders in adolescence was asymptomatic goiter [18]. The reason for this difference is not clear. Inadequate laboratory facility for detailed evaluation of endocrine disorders has been previously documented as one of the major management challenges with regard to practice of endocrinology in developing countries [16]. It would have been worthwhile to investigate for Peroxidase deficiency because this is one of causes of congenital hypothyroidism with insidious onset [2].

In the only case of euthyroid goiter, it would have been useful to establish the presence or absence of thyroid antibodies but we could not do this because of lack of laboratory facility.

CONCLUSION:

Hyperthyroidism constituted the highest proportion of the thyroid disorders seen between 2005 and 2011 and most patients with thyroid disorders tended to present late. High clinic default rate was a major management challenge.

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