Niger J Paed 2014; 41 (4): 302 - 306

REVIEW

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

DOI:http://dx.doi.org/10.4314/njp.v41i4,2
Accepted: 17th June 2014

Jaja T (✉)
Yarhere IE
Department of Paediatrics,
University of Port Harcourt Teaching Hospital
Port Harcourt, Nigeria.
Email: tamunopriyej@yahoo.com.

Abstract *Background*Thyroid disorders constitute a large proportion of endocrine diseases in children and adolescents. Diseases of the thyroid have profound effect on metabolism, cognition, growth and development in children. The pattern of thyroid disorders in children in our region is still under reported.
Objectives: To describe the clinical characteristics of children and adolescents with thyroid diseases seen over a 5 year period in a tertiary centre in Port Harcourt
Methods: A retrospective review of all cases of thyroid disorders seen in the Paediatric endocrinology clinic of the University of Port Harcourt Teaching Hospital from January 2009 to December 2013.The information obtained from endocrine registers and case files were patients' biodata, clinical features, diagnosis, management, challenges and outcome. Diagnosis of each disorder was based on clinical features, relevant laboratory investigations and imaging studies.
Result: Eighteen (29.3%) out of 62 children with various endocrine disorders had thyroid diseases, accounting for 0.1% of all children seen in the specialist outpatient clinics. Age range at presentation of children reported was 5days to 13 years with male to female ratio 1.7:1. Of the 18 children, 5(27.8%) had hyperthyroidism with a case of neonatal thyrotoxicosis, 10(55.6%) hypothyroidism and 3(16.7%) euthyroidism. eight (44.4%) had goiter. Nine (90.0%) of the children with hypothyroidism had congenital hypothyroidism with two cases of transient hypothyroidism. Mean age at diagnosis of children with congenital hypothyroidism was 9.81months. Only 2(22.2%) with congenital hypothyroidism presented before the age of 3weeks, the mean duration of neck swelling before presentation of children with goitre was 19.6months. One (5.6%) child had thyroid cancer. Initial wrong referrals and lost to follow up in 22.2% of cases each were common challenges encountered in management.
Conclusion: Congenital hypothyroidism was the commonest thyroid disorder in this report, delayed diagnosis and its consequences were noted, emphasizing the need for routine new-born screening in Nigeria.

Keywords: Thyroid disorders, children, endocrine diseases, antithyroid treatment

Introduction

Thyroid disorders constitute a large proportion of endocrine disorders in childhood. It is the second commonest endocrine disorder after diabetes mellitus in children worldwide[1]. The importance of thyroid disorders in children is due to the profound effect of thyroxine on metabolism, cognition, growth and development[2]. Disorders of thyroid function in children as in adults manifest as hypothyroidism, hyperthyroidism and varying degree of thyroid gland swelling (goitre) or a combination of these[3]. The frequency of thyroid disorders varies from region to region with higher frequency in Iran, India and Bangladesh and lower frequency in Lativa however, this condition is recorded worldwide[4]. In Nigeria, most studies on thyroid disorders were done in

adults. There are only few but old reports mentioning thyroid diseases in children[5,6]. The prevalence of thyroid disorders in children range from 0.07 -1.7% and frequency appears to be increasing[3]. In the report by Laditan et al in 1979, in the University College Hospital Ibadan, the prevalence of thyroid diseases in children was 0.07% and three decades later, a higher prevalence of 0.12% was recorded in Benin City by Onyeruika and colleagues[3,5]. In an earlier report on pattern of endocrine diseases in Port Harcourt by Anochie etal colleagues , thyroid diseases accounted for 13.3 % of all endocrine diseases[7]. In Africa, iodine deficiency is the commonest cause of thyroid disorders in both adults and children[8]. The UNICEF, estimates that 8% of newborn from Sub Saharan Africa are unprotected from learning disabilities resulting from iodine deficiency related disorders[8].

Presentation of thyroid diseases in children depends on the age and geographic region. In infancy, congenital hypothyroidism caused mainly by thyroid dysgenesis is a common presentation diagnosed from new-born screening or due to presentation with mental retardation and short stature during childhood. In later childhood and adolescence, asymptomatic goitre with autoimmune disorders is commonest with a female preponderance[9]. In most developing countries, iodine deficiency account for the commonest cause of thyroid disorders ranging from congenital hypothyroidism to goitre in older children[10]. The purpose of this study is therefore to describe the clinical characteristics of children and adolescents with thyroid disorders seen in the Paediatric endocrinology clinic of the University of Port Harcourt Teaching Hospital over a five year period.

Subjects and Methods

The study was carried out in the endocrinology unit of the department of Paediatrics, University of Port Harcourt Teaching Hospital. The endocrine unit was started in 2001 as joint Nephrology/ Endocrine unit and became an independent unit in March 2013 with paediatric endocrinologist. The unit treats children and adolescents with various endocrine diseases. Children are referred from various private and government hospitals in Rivers State and neighbouring states like Bayelsa, Imo, Abia and Akwa-ibom.

A retrospective review of all thyroid cases seen over five year period 2009 to 2013 was done. Information about the cases was retrieved from endocrine register, clinic and ward records and case notes. Information on age, sex, clinical features and duration of symptoms, diagnosis, treatment and outcome were retrieved. Diagnosis of thyroid disorders was from clinical features, confirmatory thyroid function test, antibody and histopathology test.

Definitions of Terminologies[11]

Hyperthyroidism is the production and secretion of excessive amount of thyroid hormone (Triiodothyronine T3 and/ or Thyroxine T4) from the thyroid gland with high serum hormone levels.

Thyrotoxicosis: is the hyper metabolic clinical syndrome that occurs when there is elevated serum level of T3 and/or T4 irrespective of source of thyroid hormone.

Hypothyroidism is the reduced production and secretion of T3 and/ or T4 from the thyroid gland with low serum hormone levels

Hypothyroidism: Is the reduced production and secretion of T3 and / or T4 from the thyroid gland with low serum hormone levels.

Euthyroidism: is a state of normal production and secretion of T3 and T4 from a thyroid gland with normal serum hormone levels.

Goitre: This is the presence of swelling in front of the neck due to thyroid gland enlargement with or without abnormality in T3 and/or T4 hormone production

Data was entered into an excel sheet and analysed using descriptive statistics and presented in text and tables

Result

General Description

Eighteen (29.3%) out of 62 children with various endocrine disorders had thyroid diseases and were reviewed accounting for 0.1% of total cases seen in the paediatric specialist clinics. Age range at presentation of children reported was 5days to 13 years with mean age of 72.9months. Nine (50%) of the patients were below five years. There were 11 (61.1%) males and M: F of 1.7:1. Of the 18 children with various thyroid disorders, 5 (27.8%) had hyperthyroidism with a case of neonatal thyrotoxicosis, 10(55.6%) hypothyroidism and 3(16.7%) euthyroidism as in. Table 1. Overall, eight (44.4%) patients had goitre. Table 2 shows the general characteristics of children with various categories of thyroid disorders.

Table 1: Pattern of Thyroid Disorders in Children Studied

Disorders	Male	Female	Total (%)
Euthyroidism	1	2	3 (16.7)
Hypothyroidism	8	2	10 (55.6)
Hyperthyroidism	2	3	5 (27.8)
Total	11(61.1%)	7 (38.9%)	18 (100%)

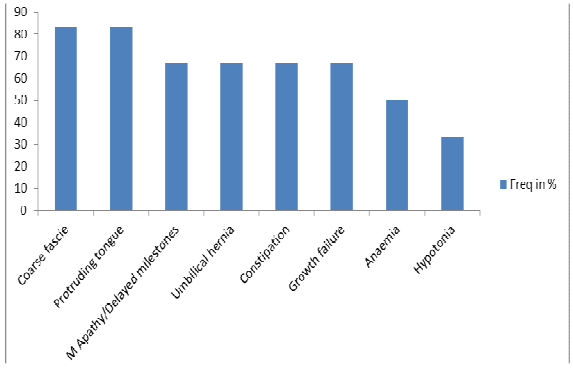
Hypothyroidism: Ten (55.6%) patients had hypothyroidism out of which 9(90%) had congenital hypothyroidism. Mean age at diagnosis of children with congenital hypothyroidism was 9.81months. Of the nine patients with congenital hypothyroidism 2(22.2%) cases had transient hypothyroidism. Two (22.2%) children with congenital hypothyroidism were diagnosed by the age of 3weeks. Only one child (10%) an 11 year old who was being investigated for short stature with cold intolerance and constipation had acquired hypothyroidism. In children with permanent congenital hypothyroid-

ism, coarse fascie, protruding tongue and mental apathy/ delayed milestone were the commonest features as shown in Fig 1.

Table 2: Characteristics of patients with various thyroid disorders

Characteristics	Euthyroidism	Hypothyroidism	Hyperthyroidism
Number of Patients	3	10	5
Mean age at presentation	10.67years	22.07months	11 years (excluding neonate with Graves Disease)
Age range at presentation	9-12 years	19 days -11 years	6weeks- 13 years
M:F	1:2	4: 1	2:3
Mean duration of symptoms at presentation	19.6	11.27months	12.8months
No with Goitre	3	1	5

Fig 1: Clinical features in children with congenital hypothyroidism



Hyperthyroidism: Table 2 shows the general characteristics of children with hyperthyroidism. All children with hyperthyroidism except one child with neonatal Graves' disease presented between the age of 9 years and 13 years. Soft goitre grade II to III, weight loss and proptosis were the commonest reasons for presentation however, the commonest clinical features of thyrotoxicosis recorded at admission were weight loss, excessive sweating and goitre seen in 100% of the cases as shown in Table 3. All children with hyperthyroidism were treated for Graves' disease.

Table 3: Frequency of symptoms at presentation in children with hyperthyroidism

Features	Frequency (%)
Weight Loss	5(100)
Excessive sweating	5(100)
Goitre	5(100)
Proptosis	4(80)
Frequent Stools	3(60)
Poor Sleep	3(60)
Palpitations	1(20)
Family History	1(20)

Euthyroidism: Three (16.7%) children were euthyroid at presentation, mean age at presentation was 10.67years. The three children with euthyroidism presented with goitre (grade III) firm to hard lobulated goitre out of which one had papillary thyroid cancer. Mean duration of neck swelling before presentation was 19.6months. Challenges and outcome in children with various thyroid disorders is as shown in Table 4. Information was retrieved from documentations on patient's case note and endocrine register during counseling sections on treatment at clinic visits. Four (22.2%) continued to express worry over the prolonged use of the drugs. Four patients which included two children with Euthyroid goitre, the child with acquired hypothyroidism and one male with congenital hypothyroidism were lost to follow up. Only one, the child with the thyroid cancer died giving a disorder -specific case fatality rate of 5.6 %.

Table 4: Challenges and outcome in management of children reported

Challenges/Outcome	Freq (%)
Initial wrong referral	4(22.2)
Difficulty doing baseline investigations	2(11.1)
Poor drug compliance	3(16.7)
Concern for prolonged drug therapy during counseling	4(22.2)
Lost to follow up in last 1 year	4(22.2)
Death	1(5.6)

Discussion

The prevalence of thyroid disorder in this study is 0.1%. It contributes to a significant proportion of paediatric endocrine disorders seen in our centre. This prevalence is similar to a report of 0.12% by Onyeruika and colleagues[3] in Benin City Edo State but it is 1.4 times higher than a report by Laditan in University College Hospital (UCH) Ibadan that was done three decades ago[5]. The higher prevalence reported in this study, compared to the report by Laditan in UCH may be due to better awareness of the disease condition compared to three decades ago when the study was done in UCH and also due to better access to specialist health care now.

In contrast to most reports on thyroid disorders in children and adults, this report found thyroid disorders was 1.7 times commoner in males. In the study by Onyeruika and colleagues[3], it is four times commoner in females; similarly, Ogbera and Kuku reported it was five times commoner in adult females[8]. The reason for a higher number of males with thyroid diseases in this report is not very clear and calls for a need to carry out a larger population study to confirm this finding.

Thyroid disorders in children can present at any age, previous studies have shown that majority present during adolescence[3,8,9]. Onyeruika in his study in Benin reported a mean age of 11.2 years. This is however in contrast to the finding in this study where the mean age at presentation of the children studied was 6.1 years (72.3months). This was similar to the report by Laditan in 1979 in UCH who noted a mean age of 5.4 years[5]. This reported younger age at presentation in this study and that by Laditan may be due to the fact that 50 to 60% of children reported in this study and that by Laditan had congenital hypothyroidism and most presented before the age of 5 years.

The expanding spectrum of thyroid diseases in children and adolescents includes three important clinical categories i.e. hypothyroidism, hyperthyroidism and euthyroidism. The commonest disorder in this report was hypothyroidism accounting for half of all cases seen; which is in contrast to the report by Onyeruika[3] and colleagues in Benin Southern Nigeria where hypothyroidism accounted for 22.2% of all cases of thyroid disorders seen over a seven year period but similar to a report from Singapore, and earlier report by Laditan in UCH where hypothyroidism accounted for 40% and 60% of cases of thyroid disorders in children respectively[5,12]. In another report from Mumbai, Northern India, hypothyroidism accounted for 75% of cases reported in children in a referral centre[13]. The differences in these rates may be accounted for by genetic and environmental factors of which iodine deficiency may contribute. Iodine deficiency disorder is a common risk factor for thyroid diseases including congenital hypothyroidism. The high number of children with CH in this report although cannot directly be attributed to iodine deficiency related disorders but it is important to note that in spite of the success in salt iodization and the availability of iodine rich foods such as periwinkle, oysters and water in this region, there is a rising incidence of endemic goitre amongst the populace[14]. This rising incidence of endemic goitre have been attributed to disorders of iodine metabolism caused by food ,water and soil pollution from oil exploration as obtains in Port Harcourt[14].

The second commonest thyroid disorder in this report was hyperthyroidism, which accounted for 27.8% of all cases. This finding is much lower than the report by Onyeruika and colleagues who reported 67% of cases[3]. The difference in the rate between these studies is not immediately obvious but may be due to environmental influences such as iodine consumption, diet and prevalence of endocrine disruptors. The possible reason for the high rate of hyperthyroidism in the Benin study as speculated by Onyeruika and colleagues may be due to exposure to increased levels of iodine following the salt iodization policy by the Government. The increased risk of hyperthyroidism following exposure to iodine has been reported in some studies[15,16], although no evaluation was done to determine the part of iodine levels in children with hyperthyroidism in this study, however Madukosiri in a pilot study on aetiology of goitre in Bayelsa State cautioned that the presence of iodine deficiency should be established in iodine replete areas before salt iodization to prevent the excessive exposure of the thyroid gland to iodine and its consequences such as increased thyroxine production[14].

In this report all children with hyperthyroidism were treated for Graves' disease an autoimmune disorder of the thyroid gland that results from complex genetic traits that occur in genetically predisposed individuals, it accounts for 60 -70% of cases of hyperthyroidism in paediatric age[17]. Graves' disease as in most other reports was the commonest cause of hyperthyroidism in this report with a female preponderance. One of the children with hyperthyroidism was a neonate, an infant of Graves' disease mother who presented with weight loss despite voracious appetite. He received carbimazole tablets transiently for three months and is presently on follow up. The commonest reason for presentation of the patients with Graves' disease was goitre and proptosis. Features of thyrotoxicosis were reported in all children with hyperthyroidism similar to reports from other studies[3,18], however; in children unlike in adults cardiovascular complications such as heart failure is rare[3,18].

Two subjects presented with euthyroid goitre, accounting for 28.6% of all cases of goitre in this report. One of the cases with euthyroid goitre was suspected to have chronic lymphocytic thyroiditis (CLT) which is the commonest cause of acquired thyroid disorder in children with an initial preservation of thyroid function as was recorded in this subject.[2, 9] About 75% of cases of CLT are Thyroid peroxidase antibody positive, though this could not be done before patient was lost to follow up. The second case of goitre with normal thyroid function was the patient with thyroid cancer which was diagnosed by a fine needle aspiration biopsy. Thyroid cancer is rare in children but is the second commonest malignancy in children exposed to radiation, Hodgkin's lymphoma and leukemia survivors[9]. It also occurs in patients with existing chronic lymphocytic thyroiditis[9]. The patient with thyroid cancer did not have any family history of cancer and died in theatre during surgery.

Several management challenges were noted in this report. These challenges include high cost and non-availability of investigations. In most cases, individual hormone profiles are expensive and are done by only few laboratories. There is non– availabity in our centre of facilities such as thyroid scintigraphy needed to determine actual cause of thyroid disease such as in congenital hypothyroidism or to exclude a toxic thyroid nodule in children with hyperthyroidism. In this report, as in other reports low awareness both in the general populace and even amongst health workers has been demonstrated; wrong referrals by health workers was noted in children with proptosis who were wrongly treated for eye disorders and referred to the ophthalmologist. Also the parent of a child with congenital hypothyroidism who presented as early as 3rd month of life with worry over the dull disposition of the baby when compared to other babies was only reassured until the child was diagnosed at age of 11 months. The delay in diagnosis of most of the children with congenital hypothyroidism and presentation with mental retardation as was noted in this study was also reported in other studies, due to non-availability of routine newborn screening. About a quarter of the patients were lost to follow up in this report and this is not surprising as this is the pattern in our environment in most chronic illnesses as parents tend to seek alternative treatment. These challenges were also noted in other studies[3,5,19] done in other centres stressing the need for creation of awareness even amongst health workers.

Conclusion

Thyroid disorders are prevalent amongst children in Port Harcourt adequate management is still hindered by lack and high cost of diagnostic facilities. The commonest disorder in this report was congenital hypothyroidism. Delay in diagnosis of children with congenital hypothyroidism is still a major concern with a cumulative increase in children with mental retardation arising from this. There is therefore the need for commencement of routine neonatal screening for congenital hypothyroidism in our country and creation of awareness on thyroid disorders and other endocrine disorders.

Conflict of interest: None
Funding: None

References

1. Becker KL, Nylen ES, Snider RH. Endocrinology and the endocrine patient. In: Becker L, Ronald CK, Rebar RW. eds, Principles and practice of endocrinology and metabolism. 3rd ed Lippincott, Williams and Wilkins, 2002: 82-85.
2. Desai MP.2009. Disorders of thyroid gland. In: Pathasarathy A, ed. I A P Textbook of Pediatrics, 4th ed. New Delhi, Japee Brothers Medical Publishers Ltd, 931-935
3. Onyiruika AN, Abiodun PO, Onyiruika 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 (2): 045-050*
4. Rendon-Macias ME, Morales-Gracia I, Huerta- Hermandez E, Silva-Batalla A, Villasis-Keever MA. Birth Prevalence of Congenital Hypothyroidism in Mexico. *Paediatr and Perinatal Epidemiol 2008;22(5): 478-485*
5. Laditan AAO, Johnson AOK. Thyroid gland disorders in African Children. *J Natl Med Assoc. 1979; 71(2): 139-141*
6. Edino ST, Mohammed AZ, Ochicha O, Thyroid diseases in Kano. *Niger Postgrad Med J. 2004;11:103-106*
7. Anochie IC, Opara I, Inimgba N. Pattern of endocrine diseases in children in the University of Port Harcourt Teaching Hospital. *Port Har count Med J 2009;3:145-152*
8. Ogbera AO, Kuku SF. Epidemiology of thyroid diseases in Africa. *India J Endocrinology 2011;5(6): 82-88*
9. Brown RS. Disorders of thyroid gland in infancy, childhood and adolescence. Available at: www.thyroidmanager.org.
10. Fisher D. Next generation newborn screening for congenital hypothyroidism? *J Clin Endocrinol Metab 2005; 90(6):3797-9.*
11. La Frenchi S. Disorders of the thyroid gland In: Kliegman RM, Berhman RE, Jenson HB, Stanton BF eds. Nelson Textbook of Paediatrics 18th ed. Philadelphia, Saunders Elsevier, pp2316-2340
12. Siok HT, Hock BW. Review of thyroid Disorders in Singapore Children. *J Trop Pediatr1985;31 (1):54-58*
13. Desai MP. Disorders of Thyroid gland in India. *Indian J Pediatr, 1997;64(1):11-20*
14. Madukosiri CH. Delange F, de Benoist B, Alnwick D. Risks of iodine- induced hyperthyroidism after correction of iodine deficiency by iodized salt. *Thyroid 1999;9:545-556.*
15. Nte A, Idiki Ogan M, George I. Paediatric thyroid gland disorders in Port Harcourt: Has the universal salt iodization programme any role? *TNHJ 2005;5:283-286*
16. Menon PS, Singh GR. Hyperthyroidism in children: an Indian experience. *J Pediatr Endocrinol Metab 1996; 9: 441-446.*
17. Zimmerman D, Lteif AN. Thyrotoxicosis in children. *Endocrinol Metab Clin North Am 1998: 27; 109-126.*
18. Hanna CE, La Frenchi SH. Adolescent thyroid disorders. *Adolesc Med. 2002; 13(1):13-15*