

Pattern of Thyroid Disorders at a Tertiary Hospital in Jos, Nigeria

Edah JO^{1,2}, Odoh G¹, Lawal B¹, Dayom PS¹, Ismaila BO³, Ramyil AV⁴, Puepet FH^{1,2}

¹ Department of Internal Medicine, Jos University Teaching Hospital, Jos, Plateau State, Nigeria.

² Department of Medicine, Faculty of Clinical Sciences, College of Health Sciences, University of Jos, Plateau State, Nigeria.

³ Department of Surgery, Jos University Teaching Hospital, Jos/ University of Jos Plateau State, Nigeria.

⁴ Department of Ophthalmology, Jos University Teaching Hospital, Jos/ University of Jos Plateau State, Nigeria.

Corresponding author: Dr. Jemimah O. Edah E-mail ombilijem2005@yahoo.com

Department of Internal Medicine, Jos University Teaching Hospital/Department of Medicine, University of Jos Jos, Plateau State, Nigeria

Abstract

Background: Disorders of the thyroid gland may be structural or functional with the functional abnormalities resulting from hypersecretion and hyosecretion of thyroid hormones. Subclinical forms which are mild forms of thyroid disorders can also occur, with euthyroid goitre and thyroid cancers being encountered often. Abnormalities of the thyroid gland are associated with clinical consequences and their pattern and prevalence in a particular area depends on the presence or absence of iodine in the diet.

Methods: This was a cross-sectional descriptive study carried out among patients presenting for the first time with any form of thyroid disorder to the medical and surgical out-patient departments of the Jos University Teaching Hospital. Patients were recruited consecutively using a structured questionnaire after consent was obtained.

Results: The study had more females (81; 95.3%) with the female to male ratio of 20:1. The age range of the study population was 18-78 years (mean \pm SD = 42 \pm 13 years). Thyroid disorders seen in this study included euthyroid goitre in 45 (52.9%) persons, hyperthyroidism in 36 (42.4%) persons, hypothyroidism in 2 (2.4%) persons, subclinical hyperthyroidism in 1 (1.2%) person and thyroid cancer in 1 (1.2%) person. The common clinical presentations among persons with hyperthyroidism were palpable goitre in 32 (88.9%) persons and palpitation in 30 (83.3%) persons.

Conclusion- Euthyroid goitre is the most common thyroid disorder in this study which may be an indication of iodine deficiency in our environment. We suggest that the populace be educated on the importance of eating iodine fortified food.

Key words- Thyroid disorders, hyperthyroidism, hypothyroidism, euthyroid goitre, pattern

Introduction

Disorders of the thyroid gland may be functional or structural. Functional disorders are related to hypersecretion (hyperthyroidism) and hyosecretion (hypothyroidism) of the thyroid hormones; triiodothyronine (T3) and thyroxine

(T4) which regulate metabolic rate, growth and development. Subclinical hypothyroidism and subclinical hyperthyroidism are mild forms of thyroid disorders that can occur. Thyroid cancers and euthyroid goitre are also often encountered. Dysfunction and abnormalities of the thyroid gland

are among the most common disease of the endocrine system and are associated with clinical consequences.^{1,2}

The pattern and prevalence of thyroid disorders in a particular area depends on the presence or absence of iodine in the diet. In areas with iodine deficiency, goitre is endemic with the prevalence being as high as 80%.³ In iodine replete areas however, autoimmune disorders such as Hashimoto thyroiditis and atrophic hypothyroidism and hyperthyroidism from Graves' disease are responsible for the thyroid disorders seen.³

Clinical manifestations of thyroid dysfunction vary considerably among patients in their character and severity and occur commonly in women.^{2,4,5,6} Goitre is a feature seen in both disorders of hypo and hypersecretion.⁷ It is said to be the most common thyroid disease in the community especially the diffuse simple type.³ The prevalence declines with age being more common in premenopausal women with a female to male ratio of at least 4:1.⁸ Other clinical features which include palpitations, nervousness, easy fatigability, tachycardia, eyes signs, hyperkinesia, weight loss without loss of appetite, diarrhea, proximal myopathy, excessive sweating, intolerance to heat, and preference for cold are seen in hyperthyroidism which is another common thyroid disorder.¹

The prevalence of thyroid disorders varies from place to place. In the United States of America (USA), the prevalence of hypothyroidism was found to be 4.6% (0.3% clinical and 4.3% subclinical) while that of hyperthyroidism was 1.3% (0.5% clinical and 0.7% subclinical).⁹ In another study conducted in Netherlands, overt thyrotoxicosis was reported in 0.4% and subclinical thyrotoxicosis in 0.8% with overt and subclinical hypothyroidism reported in 0.4% and 4.0% respectively.¹⁰ In India, a study in eight cities found a prevalence of hypothyroidism to be 10.95%.¹¹ In a hospital-based study in Nigeria,⁴ hypothyroidism was found in 6.4% and hyperthyroidism in 80.8% of patients.

There are clinical consequences associated with thyroid disorders especially if untreated. These disorders impact on the heart and bones with associated economic effects¹²⁻¹⁵. In a study conducted in the USA among patients with hypothyroidism, estimates of hypothyroidism-

related total medical costs ranged from \$460 to \$2,555 per patient per year and compared to euthyroid controls, they had significantly higher all-cause medical costs and medical resource utilization¹⁵.

Although thyroid disorders are common, there is paucity of information about their pattern of presentation in Jos. We set out in this study to determine the prevalence and pattern of thyroid disorders among patients seen at the Jos University Teaching Hospital (JUTH).

Methodology

Study area

This study was carried out at the Medical and Surgical Out-patient departments (MOPD and SOPD) of JUTH where cases of thyroid disorders are seen. JUTH is a 520 bed tertiary health institution situated in Plateau State, North central, Nigeria with several out-patient departments including MOPD and SOPD.

Study population and design

The study population included patients presenting for the first time to MOPD and SOPD of JUTH with any thyroid disorder. Consenting patients aged 18 years and above with features of thyroid disorders were included. All acutely ill patients, pregnant women and patients on medications for any thyroid disorder for more than one month were excluded from the study. This study used a cross-sectional descriptive design.

Sample size determination and sampling technique

The sample size was determined using the Leslie and Kish formula¹⁶ and eighty-five was gotten. A prevalence of 5.9%⁹ was used with an absolute precision of 5%. All patients who fulfilled the inclusion criteria were enrolled using the convenient sampling method over a period of twenty-nine months from October 2018 to March 2021.

Data collection

A structured interviewer administered questionnaire developed by the authors was used to obtain information from each patient. Weight, height and blood pressure were also measured and body mass index (BMI) calculated. BMI was used to assess obesity. BMI of $<18.5\text{kg/m}^2$ was defined as underweight, $18.5\text{-}24.9\text{kg/m}^2$ was normal, $25.0\text{-}29.9\text{kg/m}^2$ was overweight while 30kg/m^2 and above was obesity.¹⁷ Thyroid function test was obtained from the patients' records.

Data analysis

Hyperthyroidism was defined as the presence of clinical and biochemical features (high total or free plasma T3 and T4 with low thyroid stimulating hormone (TSH) levels).¹ Hypothyroidism was defined as findings of clinical and biochemical features (low total or free plasma T3 and T4 with high TSH levels).¹ Subclinical hyperthyroidism was defined as low TSH levels with normal total or free plasma T3 and T4 levels.¹ Subclinical hypothyroidism was defined as high TSH levels with normal total or free plasma T3 and T4 levels.¹ Euthyroid goitre was defined as the presence of goitre with normal total or free plasma T3, T4 and TSH levels.¹

Thyroid hormone levels vary from laboratory to laboratory.¹⁸ Normal total plasma T4 levels are between 60 and 150 nmol/L and T3 levels are between 1.2 and 2.7 nmol/L.¹⁸ Normal free plasma T4 levels are between 12-20 pmol/L and free T3 levels are between 3-7pmol/L.¹⁹ Normal plasma TSH values are from 0.4 to 4.0 mIU/L.²⁰

The EPI- Info version 7.2.2.6 (CDC Atlanta, Georgia USA) statistical software was used for data analysis. Quantitative variables were summarised using mean and standard deviation (SD). Categorical variables were expressed using frequencies and percentages and where the expected frequency of a cell was <5 , Fisher's exact test was used. In all cases, a p- value of <0.05 was considered statistically significant.

Ethical consideration

The study was approved by the Health Research

Ethics Committee of JUTH in October, 2018 with reference number JUTH/DCS/REC/127/XXX/696. A written consent was also obtained from every participant before enrolment into the study. All information obtained was treated with confidentiality

Results

Eighty-five persons with thyroid disorders were enrolled for the study. The age range was 18-78 years (mean \pm SD= 42 ± 13.0 years). Females were older (mean \pm SD = 42 ± 13.0 years) compared to males (35 ± 7.0 years). The study had more females (81; 95.3%) with the female to male ratio of 20:1. The thyroid disorders seen in this study included euthyroid goitre in 45 (52.9%) persons, hyperthyroidism in 36 (42.4%) persons, hypothyroidism in 2 (2.4%) persons, subclinical hyperthyroidism in 1 (1.2%) person and undifferentiated anaplastic thyroid cancer in 1 (1.2%).

Persons with euthyroid goitre were older (44 ± 12.0 years) compared with those having hyperthyroidism (38 ± 12.0 years). All persons with euthyroid goitre, hypothyroidism subclinical hyperthyroidism and cancer were females with all males in the study presenting with hyperthyroidism.

A positive family history of thyroid disorders was seen in 15 (17.6%) persons, among whom 8 (53.3%) had euthyroid goitre. A past history of thyroid disorder was reported in 5 (5.9%) persons among whom 3 (60.0%) had hyperthyroidism. See Figure 1 and Table 1.

The common clinical presentation among persons with hyperthyroidism (n=36) were goitre (32;88.9%) and palpitation (30;83.3%). Tachycardia, weight loss, warm/moist palms and tremors occurred in 29 (80.6%) each with proptosis occurring in 26 (72.2) persons. Fatigue was seen in 22 (61.1%) persons with hyperpigmentation and heat intolerance/excessive sweating occurring in 20 (55.6%) persons. Increased appetite and irritability occurred in less than half 16 (44.4) and 14(38.9) of the participants respectively. See Table 2

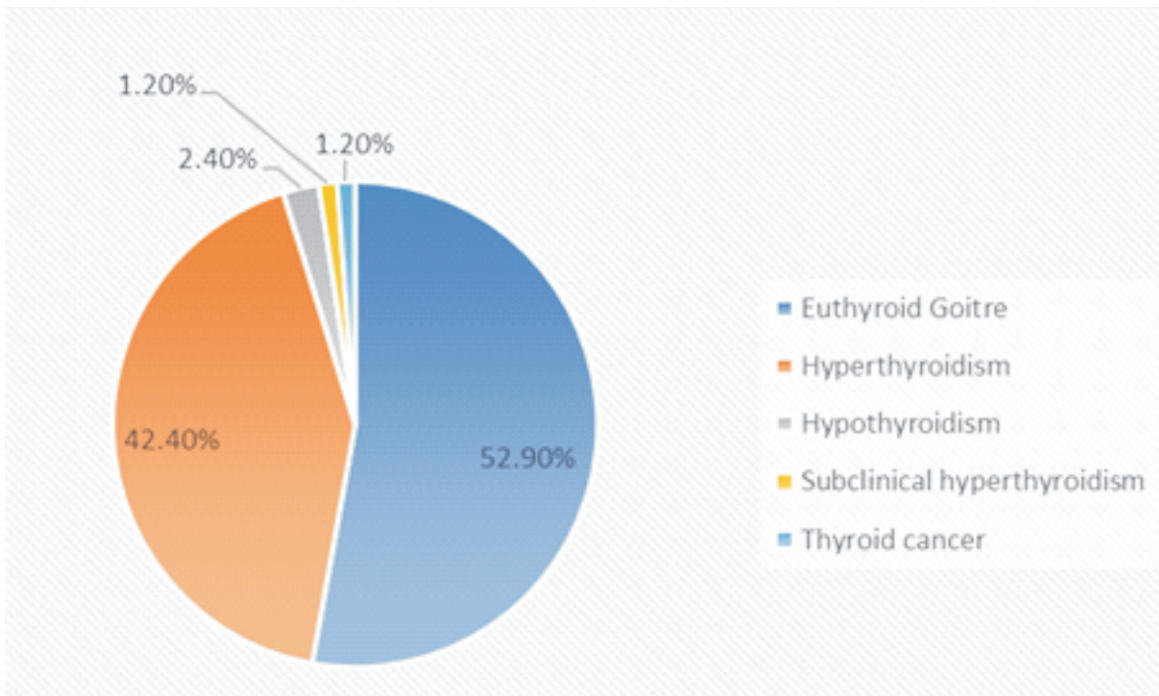


Figure 1: Pattern of thyroid disorders

Table 1: Characteristics of the study population

Variables	Total, n (%)	Hyperthyroidism, n(%)	NTG, n (%)	Hypothyroidism, n(%)	Subclinical hyperthyroidism, n(%)	Thyroid cancer, n(%)
Age years mean±SD	42±13	38±12	44±12	52±6	-	-
Age < 40	39 (45.9)	21(53.9)	17(43.6)	0	1(2.6)	0
= 40	46 (54.1)	15 (32.6)	28(60.9)	2 (4.6)	0	1(2.2)
Females	81(95.3)	32(39.5)	45(55.6)	2(2.5)	1(1.2)	1(1.2)
Males	4 (4.7)	4 (100)	0	0	0	0
Family history of thyroid disorder	15(17.6)	5(33.3)	8(53.3)	2(13.3)	0	0
Past history of thyroid disorder	5(5.9)	3(60.0)	2(40.0)	0	0	0
Presence of comorbidities	37(43.5)	13(35.1)	22(59.5)	1(2.7)	0	1(2.7)
BMI mean±SD	26.1± 5.8	22.9 ±5.0	28.6± 5.2	30.5± 5.0	-	-
BMI class,kg/m ²						
<18.5	7(8.2)	7(100)	0	0	0	0
18.5-24.9	33(38.8)	18(54.5)	13(39.4)	0	1(3.0)	1(3.0)
25-29.9	24(28.2)	8(33.3)	15(62.5)	1(4.2)	0	0
=30	21(24.7)	3(14.3)	17(81.0)	1(4.8)	0	0
Mean DBP, mmHg ±SD	81.15± 12	80.89±12.64	81.48± 12.07	79.0±14.1	-	-
DBP=90mm	24(28.2)	10(41.7)	13(54.2)	0	0	1(4.2)

Table 2. Clinical presentation of patients with hyperthyroidism

Clinical features	Frequency (%)
Tachycardia	29(80.6)
Hyperdefaecation	13(36.1)
Hyperpigmentation	20(55.6)
Increased appetite	16(44.4)
Irritability	14(38.9)
Heat intolerance	20(55.6)
Weight loss	29 (80.6)
Fatigue	22(61.1)
Moist/warm palms	29(80.6)
Palpitations	30(83.3)
Tremors	29(80.6)
Proptosis	26(72.2)
Goitre	32(88.9)

Discussion

The pattern of thyroid disorders in this study included euthyroid goitre, hyperthyroidism, hypothyroidism, subclinical hyperthyroidism and thyroid cancer. No case of subclinical hypothyroidism was found in this study. In a study in Lagos, Nigeria, cases of hypothyroidism, hyperthyroidism and euthyroidism were reported⁴. In another study in Enugu, Nigeria, cases of hyperthyroidism, hypothyroidism and euthyroid sick syndrome were reported.²¹ In Nepal,⁵ hypothyroidism, hyperthyroidism and subclinical hypothyroidism were reported.

In this study, euthyroid goitre was the most common thyroid disorder which is different from findings in the other studies where hyperthyroidism^{4, 21} and hypothyroidism⁵ were more common. This difference may be as a result of the study participants. In this study, new patients were enrolled from the medical and surgical outpatient departments while in the other studies,

both old and new patients were recruited from the medical out-patient department only. Cases of euthyroid goitre are more likely to be referred to the surgeons. Another likely explanation for this difference is the study location. Jos in Plateau State of Nigeria is a highland and iodine deficiency which leads to endemic goitre is common in highlands where the soil becomes iodine deficient as a result of erosion and leaching.²²

Cases of overt hypothyroidism and subclinical hyperthyroidism were few in this study. Studies conducted in the USA⁹ and Netherlands¹⁰ also reported low prevalence of overt hypothyroidism and subclinical hyperthyroidism. One case of thyroid cancer which was anaplastic cancer was reported in this study. Among the four primary histological types of thyroid cancer; papillary, follicular, anaplastic, and medullary, anaplastic cancer is said to be the rarest and more aggressive, occurring in people aged 60 and above²³. The studies conducted in Lagos,⁴ Enugu²¹ and Nepal⁵ reported

no cases of thyroid cancers. Even though thyroid cancers are said to be increasing, they are still a rare disorder³.

In this study, the female gender was mostly affected by thyroid disorders. This was corroborated in other studies.^{2, 4-6, 21} The fact that women mostly present with thyroid disorders can be explained by the autoimmune nature of many thyroid disorders. Autoimmune diseases occur more frequently in women, presumably secondary to the effects of sex steroids on the immune system.²⁴ A positive family history of thyroid disorders was present in 17.6% of the participants. This was similar to a report from Nepal⁵ where 11% of the participants had a positive family history of thyroid disorders⁵. Genetics is said to play a role in thyroid disorders especially the autoimmune types²⁵.

Previous history of thyroid disorders among the participants was found in 5% of participants in this study but was higher in the Nepal study. This difference may be due to the study participants. The study in Nepal⁵ included participants of all ages while this present study recruited only adults. Recurrence of thyroid disorders especially Graves' disease has been reported.²⁶ The common features of hyperthyroidism in this study included goitre, palpitations, tachycardia, weight loss, tremors and warm/moist palms. Weight loss and goitre were also reported to be the common features in other studies.^{4, 21}

This study has its limitations. Being a hospital-based study, its findings cannot be generalized to the community. Nonetheless, it gives an idea of what obtains in the community since the patients come from the community. Additionally, thyroid antibodies were not done to determine the thyroid disorders associated with autoimmune disease.

Conclusion

The study found that more females than males presented with thyroid disorders with euthyroid goitre being the most commonly occurring followed by hyperthyroidism. Hypothyroidism, subclinical hyperthyroidism and thyroid cancer were less common with no case of subclinical hypothyroidism. The high frequency of euthyroid goitre may suggest some form of iodine deficiency in our environment. We suggest that the populace should be educated on the importance of taking

iodine fortified food to prevent the development of euthyroid goitre and more studies should be carried out to confirm the presence of iodine deficiency in our environment.

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