

## Thyroid masses in Sierra Leone: a one-year retrospective clinico-pathological study

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### ABSTRACT

**INTRODUCTION:** Thyroid disorders are the second most common endocrine diseases in humans. There has been no study of thyroid masses in our setting in spite of recurrent presentations. We undertook a retrospective study of incident thyroidectomy cases in our anatomic pathology laboratory over one year to establish the frequency and clinico-pathologic features of thyroid masses.

**METHODS:** All thyroid specimens submitted to the anatomic pathology laboratory of the University of Sierra Leone Teaching Hospital Connaught, from January 1, 2021 to December 31 2021, were included in the study. Data was extracted from archived request forms, pathology reports, and patient's case notes retrieved from the records department. The data obtained was analyzed with SPSS software.

**RESULTS:** Twenty-seven thyroidectomy specimens (4.5% of all surgical pathology cases) were seen over a one-year period. Ninety-two percent were from women, while 7.4% were from men. The age range of patients was 17 to 65 years; the median age (IQR) was 40 (35-48) years. Duration of mass before presentation ranged from 3 months to 50 years. About 75% of the resected thyroid masses weighed 5 to 21 times more than a normal thyroid gland. Multinodular goiter was the most common histology (70.4%). Twenty-two percent of the resected masses were malignant.

**CONCLUSION:** Thyroid masses constitute about 4.5% of all surgical specimens in our laboratory. Most thyroid masses are borne for years with no serious consequences. Some of the resected masses were up to 20 times the size of a normal gland. The frequency of malignant diagnoses in thyroid masses was 22.5%.

**Keywords:** Endemic Goiter, Papillary Thyroid Cancer, Follicular Adenoma, Nodular Goiter, Sierra Leone

### INTRODUCTION

The thyroid gland is a 10-20g, bilobed endocrine organ positioned midline in the anterior aspect of

the neck [1]. Thyroid disorders are developmental, inflammatory, hyperplastic, and neoplastic conditions of the thyroid that can result in structural enlargement of the organ, derangement

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of function, or both. Disorders of the thyroid are among the most common endocrine diseases in humans [2].

Goiter, enlargement of the thyroid, is present in an individual if the lateral lobes of the thyroid gland are larger than the terminal phalanges of the thumb of the individual [3,4]. The prevalence of goiter in a population indicates the population's iodine status [4]. Iodine deficiency in a population with attendant thyroid dysfunction gives rise to iodine deficiency disorders (IDD), a diverse number of disorders of public health importance that includes congenital anomalies, endemic cretinism, endemic mental retardation, physical growth retardation, and goiter [3]. Thyroid hormones act on virtually every organ system in the body; hence, a wide spectrum of diseases is seen in situations of severe thyroid dysfunction [1].

Sierra Leone has legislation on salt iodization. A national cross-sectional survey indicates adequate salt iodization in 80.7% of households and adequate median urine iodine concentrations in pregnant and non-pregnant women nationally [5]. Despite this, there is anecdotal suggestion that thyroid masses may be relatively common in the country: thyroid masses present with some regularity in surgery outpatient clinics, and a number of patients report similar masses within households or close neighborhoods.

To the best of our knowledge, there has been no published work on the prevalence or spectrum of thyroid disorders in Sierra Leone. The present work sought to establish the frequency of thyroidectomies and clinicopathologic features of thyroid masses in the University of Sierra Leone Teaching Hospital Connaught over a one-year period.

## METHODS

This study was conducted at the University of Sierra Leone Teaching Hospital Connaught in Freetown,

Sierra Leone. Freetown is a coastal city with a unique landscape dotted with high ranges and ringed by swathes of sandy beaches. Connaught Hospital is a 350-bed referral hospital, which is pivotal to the country's health care system. Situated at the heart of Freetown, it has expertise in diverse surgical sub-specialties and houses the country's only histopathology laboratory. We searched our digital archive of reports and casebooks to identify all thyroidectomy tissues submitted to the histopathology laboratory between January 1, 2021 and December 31, 2021. Information was extracted from requisition forms and pathology reports. Clinical case notes of the identified cases were retrieved from the medical records department, and relevant data was searched for. Data extracted included age, sex, occupation of patients and duration of swelling. Also extracted were the type of surgery performed, the weight of excised thyroid mass, histopathological diagnoses, and length of postoperative hospital stay. Data was entered into SPSS software for statistical analysis. The median and mean with standard deviation were calculated for continuous variables. Categorical variables were presented in tables of frequencies. The study was approved by the institutional review board of the hospital.

## RESULTS

There were 27 thyroidectomy specimens in the period under review. These were seen among 600 surgical samples, giving a frequency of 4.5% for thyroidectomy specimens in our laboratory. Over 92% (25/27) were females, while 7.4% (2/27) were males, translating to a female-to-male ratio of 12.5: 1

Table 1 shows the summary statistics of thyroidectomy patients' ages, weight of thyroid gland excised, duration of mass before presentation, and length of hospital stay after surgery. The age of the patients ranged from 17

**Table 1: Patients' characteristics**

Variables	Statistic		
	Range	Mean (SD)	Median (IQR)
Age(years)	17-65	40.9 (10.6)	40.0 (35.0-48.0)
Duration of symptom(years)	0.3- 50	11.0 (11.3)	10.0 (10.0-11.5)
Weight of organ(gram)	30-420	186.9 (119.9)	155 (100.0-292.5)
Hospital stay(days)	2-10	3.9 (2.0)	4 (3.0-5.0)

*SD: Standard deviation; IQR: Interquartile range*

to 65 years, with the median age being 40 years. About 63% (17/27) of all cases were seen in the age group of 30 to 49 years (Table 2).

The duration of symptoms at presentation was highly variable, with a number of outlying values. This duration ranged from 3 months to 50 years with a median value of 10 years. Duration of hospital stay after surgery ranged from 2 to 10 days, with a mean of 3.9 (SD=2) days. The weight of resected thyroid mass ranged from 30 to 420 grams, with a median weight of 155 grams. In fact, about 75% of the resected thyroid masses weighed 5 to 21 times more than normal thyroid (normal: 10-20g). At 48.1% (13/27), sub-total thyroidectomy was the most common surgical procedure. Multinodular goiter was the most

common underlying pathology in resected thyroid masses, 70.4% (19 out of 27 cases), followed by Papillary thyroid carcinoma (PTC) seen in 22.2% (6 out of 27) of the excised masses. PTC, classic and follicular variants, was the only cancer type present in the cases.

## DISCUSSION

There has not been any previous study of thyroid disorders in Sierra Leone, even though thyroid masses occur regularly in our practice, and anecdotal evidence suggests that it may be relatively common in the population. About 50 percent of respondents in an unpublished survey by the authors could recall knowing someone with a thyroid mass, and 10 percent knew of a household

**Table 2: Characteristics and thyroid mass distribution**

Variable	Frequency	Percent	
Age group (n=27)	< 20 yrs	1	3.7
	20- 29 yrs	4	14.8
	30- 39 yrs	8	29.6
	40- 49 yrs	9	33.3
	50- 59 yrs	3	11.1
	>60 yrs	2	7.4
	Total	27	100.0
Type of surgery(n=27)	Lobectomy	7	25.9
	Subtotal thyroidectomy	13	48.1
	Total thyroidectomy	7	25.9
	Total	27	100.0
Weight of surgically removed thyroid(n=27)	< 100g	5	18.5
	100- 199g	10	37.0
	200- 299g	3	11.1
	300- 399g	3	11.1
	>400g	3	11.1
	ms*	3	11.1
	Total	27	100.0
Histological diagnosis(n=27)	Subacute thyroiditis	1	3.7
	Lymphocytic thyroiditis	1	3.7
	Multinodular goiter	19	70.4
	PTC**	6	22.2
	Total	27	100.0

\*ms: missing; \*\*Classic Papillary thyroid carcinoma =3 cases; Follicular variant of PTC=3; yrs: Years

where at least two people have the condition. Endemic goiter, defined as a total goiter rate (TGR) of greater than 5% in school-aged children, is a feature of iodine-deficient environments [4]. Decades of universal salt iodization programs in Africa have greatly improved the iodine status of most African countries [6,7]. Because of the iodization policy, up to 75% of households in Sierra Leone consume adequately iodized salt and, by median urinary iodine concentration in school-age children and women of reproductive age, the country's iodine nutrition is adjudged adequate [5,6].

The persistence of a high goiter rate in an iodine-sufficient environment has been attributed to other factors, such as selenium deficiency and excess of thiocyanate goitrogens in poorly detoxified cassava [8]. By design, the present study cannot make any conclusion on the endemicity of goiters in Sierra Leone, such a conclusion being derivable only from physical or ultrasonographic examination for thyroid masses in a population sample of adequate size. However, a finding of thyroidectomy frequency of 4.5% in our histopathology laboratory was relatively higher than the 3.7% and 0.9% frequencies reported in Ghanaian and Nigerian centers that were identified as endemic and non-endemic, respectively [9,10]. In our study, over 63% of the patients were between 30 and 49 years but thyroid enlargements had been present for 8 years or more in most patients (65%) before presentation. The long interval of time between the discovery of the mass and presentation for treatment proves that most thyroid masses are tolerably asymptomatic. When they present to the hospital, surgery is indicated in cases with benign cytology only when the mass becomes cosmetically disfiguring or compressive of close anatomical structures. All resected masses in our study were grade 3 goiters by WHO classification, and about 75% weighed 5 to 21 times more than the normal thyroid. Congruent with findings of previous reports [9,11], nodular goiter was the preponderant histology in our study. A majority were borne for many years, with no serious consequence attesting to its hyperplastic and non-neoplastic nature. One case in our study had been present for 50 years.

In spite of the large sizes of the excised masses, surgeries were very successful and complication-free. Post-operative hospital stay was short, with a mean (SD) of 4 (2) days. The high success rate

of surgery may be explained by a number of factors, including years of accumulated experience handling thyroid masses.

Sex distribution of goiters and the female to male ratio of 12.5: 1 recorded in our study was higher than 4.7: 1 reported from Ethiopia [11], 7.3: 1 from a center in India [2], 4.4:1 in Nigeria [12], 6:1 reported from South Africa [13] and 7.2:1 seen in Ghana [9]. A higher prevalence of thyroid disorders in females may be attributable to a number of causes, including biological factors and health-seeking behavior among patients. It has been suggested that a lower female-to-male frequency of goiter is more likely to occur in endemic situations, as both sexes are exposed to goitrogenic factors [11].

## CONCLUSION

Thyroid masses constitute about 4.5% of all surgical specimens in our laboratory. The demographic profile of those patients matches the pattern that has been established in many previous studies. Most thyroid masses are borne for years, and some of the resected masses are up to 20 times the size of a normal gland. The frequency of malignant diagnoses in thyroid masses was 22.5%, while multinodular goiter constituted about 70% of the masses.

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