



*Full Length Research Paper*

# Histopathological review of thyroid diseases in southern Nigeria-a ten year retrospective study

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## ABSTRACT

Diseases of the thyroid gland presents with either an alteration of hormone secretion or as enlargement of the thyroid gland. Previous reviews have shown that thyroid diseases pattern varies with regional and socioeconomic factors. Histologically confirmed thyroid diseases seen within the ten year period were reviewed. 133 out of 139 cases were reviewed because of incomplete forms and inability to find slides and blocks in 6 cases. There were 121 females (91%) and 12 males (9%) with M:F ratio 1:10. Non neoplastic disorders were 91 (68.4%) and neoplastic disorders 42 (31.6%). Major histologic subtypes include: Goitre 79 (59.4%) including simple colloid goitre 65(48.9%) and multinodular goitre 14 (10.5%), Toxic hyperplasia 2 (1.5%), Thyroiditis 3(2.3%), Cystic diseases 7 (5.3%), Adenoma 22 (16.6%) and carcinoma 20 (15%). Follicular adenoma was the commonest neoplasm (52.4%) with M:F ratio of 1:6. Of the malignant diseases, papillary carcinoma was the commonest (55%) followed by follicular carcinoma (30%), medullary carcinoma (10%), and poorly differentiated carcinoma (5%). This study showed that majority of thyroid diseases are benign and are seen mainly in women. Colloid goitre and follicular adenoma were the commonest non neoplastic and neoplastic diseases respectively. This compares favourably with most studies in our country and beyond.

**Keywords:** Thyroid gland, histopathology, neoplastic, non-neoplastic

## INTRODUCTION

Leonardo da Vinci originally depicted the thyroid in his drawing as two separate glands on either side of the larynx (Orlo et al 2004). The thyroid gland is unique among the endocrine glands because of its size. It is the largest endocrine gland and one of the most responsive organs in the human body (Maitra et al 2004).

Diseases of the thyroid are of great importance because most are amenable to medical or surgical management. They include conditions associated with excessive release of thyroid hormones (hyperthyroidism), those associated with thyroid hormone deficiency (hypothyroidism) and those that present as mass lesions of the thyroid (Maitra et al 2004). Incidence of thyroid gland diseases also vary with geographical location (Hedinger 1981).

Cassava (*Manihot esculenta* crantz) a widely used vegetable of Indian origin and a staple food item in Nigeria contains dietary goitrogens. Rats fed on cooked or fresh cassava have been reported to develop a morphological and biochemical state of hypothyroidism even in presence of adequate iodine intake (Amar et al 2006).

Iodine deficiency has been identified as a significant public health problem in 129 countries and at least one-third of the world's population live in areas at risk of iodine deficiency (WHO 1993). Nigeria is one of such countries especially in the mountainous areas of the country.

The consequences of persisting iodine deficiency are goitre, hyper avidity of the thyroid for iodide and

subclinical hypothyroidism during pregnancy and early infant (with a concomitant risk of minor brain damage and irreversible impairment of the neuropsychointellectual development of the offspring (Delange et al 2002). Iodine deficiency disorders are prevented by fortification of salt with iodine, a practice which is now common in Nigeria (UNICEF 2003).

The incidence of some thyroid diseases especially carcinomas differ with the iodine status of the community and follicular carcinoma has been noted to have higher incidence in areas of iodine deficiency. This study aims at the histopathological pattern of thyroid diseases in our environment and comparing it with other studies within and outside Nigeria; and also to find any changing trend in the incidence.

## MATERIALS AND METHODS

This study is a retrospective histological review carried on the thyroidectomy specimens received in the Anatomical Pathology Department of the University of Port Harcourt Teaching Hospital between January 1999 and December 2008.

The data on age and sex was extracted from the histopathology register and laboratory request forms. The histological diagnoses were reviewed from the histological slides and duplicate copies of histology reports. All the thyroid tissues were stained with Haematoxylin and Eosin; no special stains were used. In some cases, slides were remounted while in others, fresh sections were cut from the original paraffin blocks and stained with haematoxylin and eosin.

The lesions were broadly classified into: Colloid Goitres, Thyroiditis, Thyroglossal duct cysts, Diffuse hyperplasia, Adenoma and Malignant neoplasms using the WHO classification (IARC Lyon 2004).

## RESULTS

Out of the 8727 samples received and processed in the department over the 10-year period (1999-2008), 139(1.6%) were either partial or total thyroidectomy samples. Six cases were excluded from the study due to incomplete records and inability to find the slides and blocks leaving a study population of 133 patients.

There were 12 (9%) males and 121(91%) females with a male to female ratio of 1:10 (Table 1). The age range for our study population was 2-70 years with peak age incidence between 21-40 years (Table 1).

Non neoplastic, non inflammatory swelling of the thyroid gland (goitre) is the most common disorder accounting for 79 (59.4%) of all the cases (Table 2).

Neoplastic disorders were the second most common

disorders and accounted for 31.6% of the cases. Of the 42 neoplastic disorders, 22 cases were benign while 20 were malignant. All the benign neoplasms were adenomas. Thyroglossal cyst was seen in 7 patients constituting 5.3% of the cases studied.

Inflammatory thyroid diseases accounted for 3 (2.3%) while toxic hyperplasia of the thyroid accounted for only 2 (1.5%) of all the cases.

The majority of the goitres occurred in the age group 31-40years constituting 40.5% of cases (Table 3). Sixty-five cases (82%) of goitres are simple colloid goitre, while the multinodular goitres in which large follicles are divided by fibrous bands into nodules, with areas of haemorrhage and calcification accounted for the remaining 14 cases (18%).

Neoplastic disorders constitute 31.6% of all the cases studied (Table 1). Benign neoplasms were 22(16.5%) while malignant ones accounted for 20 cases (15.1%).

All the benign lesions were adenomas. Follicular adenoma was the commonest thyroid neoplasm accounting for 52.4% of thyroid neoplasms, with 19 females to 3 males giving a ratio of about 6:1. The peak age group was 21-30 years and made up of only female patients.

Malignancies of the thyroid seen were all carcinomas accounting for 20 cases (15.1%). Majority occurred in females 16(80%) while only 4(20%) cases were found in male patients with a male to female ratio of 1:4 (Table 1). Thyroid carcinoma had two peaks at age groups of 21-30 and 61-70 years corresponding to age group for papillary carcinoma and follicular carcinoma respectively.

Papillary carcinoma was the most common variant with 11(55%) out of the 20 cases followed by follicular carcinoma 6(30%), medullary carcinoma and poorly differentiated (insular) carcinoma were seen in 2(10%) and 1(5%) respectively. (Table 4)

The male to female ratio of papillary carcinoma and follicular carcinoma of thyroid are 1:8 and 1:5 respectively. (Table 5)

The two patients with medullary carcinoma were female and male aged 24 and 34 years. The only case of poorly differentiated carcinoma was seen in a male of 61 years. The youngest patient with carcinoma was 21years with papillary carcinoma while the oldest was 65 years with follicular carcinoma.

There was no case of anaplastic carcinoma, sarcomas, lymphomas or metastatic tumours seen in the study (Table 4).

Inflammatory thyroid diseases accounted for 3 (2.3%) cases, 2 cases of Reidel's thyroiditis and one case of lymphocytic thyroiditis, all of which were seen in females.

Toxic hyperplasia of the thyroid was seen in 2 patients constituting 1.5% of all the cases studied.

Thyroglossal cyst was found in 7 patients with age range 2-25 years and 6 of them were female.

**Table 1.** Sex distribution of Histological types of thyroid diseases

Histology classification	Sex		Total	Percentage %
	Male	Female		
<b>Goitre</b>				
Simple	3	62	65	48.9
Multinodular	1	13	14	10.5
Toxic hyperplasia	-	2	2	1.5
<b>Inflammatory diseases</b>				
Riedel's thyroiditis	-	2	2	1.5
Lymphocytic thyroiditis	-	1	1	0.8
<b>Cystic diseases</b>				
Thyroglossal cyst	1	6	7	5.3
<b>Neoplastic diseases</b>				
Benign	3	19	22	16.6
Malignant	4	16	20	15.0
<b>Total</b>	<b>12</b>	<b>121</b>	<b>133</b>	<b>100</b>

**Table 2.** Age and sex distribution of thyroid diseases

Age group (years)	Sex		Total	Percentage %
	Male	Female		
1-10	1	2	3	2.3
11-20	1	6	7	5.3
21-30	1	38	39	29.3
31-40	4	42	46	34.6
41-50	3	17	20	15
51-60	-	10	10	7.5
61-70	2	6	8	6.0
<b>Total</b>	<b>12</b>	<b>121</b>	<b>133</b>	<b>100</b>

**Table 3.** Age and sex distribution of patients with goitre

Age group	Sex		Total (%)
	Male	Female	
11-20	1(1.3%)	3(3.8%)	4 (5.1)
21-30	1(1.3%)	20(25.3%)	21( 26.6)
31-40	1(1.3%)	31(39.2)	32 (40.5)
41-50	1(1.3%)	13(16.4%)	14 (17.7)
51-60	-	5(6.3%)	5 (6.3)
61-70	1(1.3%)	2 (2.5%)	3 (3.8)
<b>TOTAL</b>	<b>5 (6.5%)</b>	<b>74(93.5%)</b>	<b>79 (100)</b>

**Table 4.** Sex and histologic types of thyroid carcinoma

Histologic type	Sex		Total	Percentage %
	Male	Female		
Papillary carcinoma	1(5%)	10(50%)	11	55
Follicular carcinoma	1(5%)	5 (25%)	6	30
Medullary carcinoma	1(5%)	1 (5%)	2	10
Poorly differentiated carcinoma	1(5%)	-	1	5
<b>Total</b>	<b>4(20%)</b>	<b>16(80%)</b>	<b>20</b>	<b>100</b>

**Table 5.** Age and sex distribution of thyroid carcinoma

Age group (Years)	Sex			Percentage %
	Male	Female	total	
21-30	-	5 (25%)	5	25
31-40	1 (5%)	3 (15%)	4	20
41-50	-	3(15%)	3	15
51-60	1 (5%)	2 (10%)	3	15
61-70	2 (10%)	3(15%)	5	25
<b>TOTAL</b>	<b>4 (20%)</b>	<b>16(80%)</b>	<b>20</b>	<b>100</b>

## DISCUSSION

During the ten year study period, thyroid diseases constituted 1.6% of all the surgical specimens received. This is a small proportion of the total surgical specimens and it suggests that thyroid diseases are relatively uncommon in the University of Port Harcourt Teaching Hospital. The study from Enugu Eastern Nigeria (Anidi et al 1993) showed a rate of 1.8% which supports the impression that thyroid diseases are probably uncommon in the eastern part of Nigeria.

The finding in this study is in consonance with previous studies which have established thyroid diseases as predominantly a female disease. This has been attributed to the increased hormonal activity associated with menstruation and childbearing. The female to male ratio of 10:1 in this study concurs with 11:1 and 14:1 recorded for Kano and Enugu from North East and South Eastern parts of Nigeria respectively (Anidi et al 1993, Edino et al 2004). It however differs slightly with the reports from Lagos and Ife, both from Western Nigeria which recorded ratio of 7:1 and 6:1 respectively (Abdulkareem et al 2005, Ngadda et al 2008). The difference is probably due to geographical and socioeconomic variation in these areas. (Herbinger et al 1981)

A broad age range of 2 to 70 years was observed in the study with a peak age incidence in the 21-40 age groups. This is also similar to previous studies which showed that thyroid diseases occur predominantly in the 21-59 age groups (Anidi et al 1993, Tsegaye & Eregete 2003, Messele and Tadesse 2003, Gitau 1975). The study from Enugu (Anidi et al 1993) showed a peak age incidence in the 31-40 age group, and that of Gitau (1975) in Kenya showed a peak in the 21-30 age group. These age groups especially in the female coincide with the time for increased hormonal activity associated with menstruation and childbearing and thus a higher demand for iodine.

The most common pathological entity found was colloid goitre with 79 cases (59.4%) of all the cases studied. Anidi et al (1993) reported 52.4%, Edino et al (2004) in Kano reported 92%, and the Lagos and Ife studies reported 74% and 75% respectively (Anidi et al

1993, Edino et al 2004, Abdulkareem et al 2005, Nggada et al 2008). Studies from other African countries also showed that goitre was the most common pathology (Gitau 1975, Monabeka et al 2005, Ntyonga-Pono 1998). Messele and Tadasse (2003) in Ethiopia reported 54.2%. (Reference with number 14 is in France language, so I couldn't understand whether Messele and Tadesse is a region or not) The finding of goitre being the commonest pathology concurs with most previous reports from Nigeria except for the higher figures in Lagos and Ife (Abdulkareem et al 2005, Ngadda et al 2008). Simple colloid goitre and multinodular goitres have been attributed to iodine deficiency which is most often dietary (Abdulkareem et al 2005). Port-Harcourt like Lagos is along the coast-line and has not been noted as an iodine deficiency area while Ife is closer to Ilesha and Ekiti in south-west, Nigeria which are endemic goitre areas.

The peak age incidence for simple non-toxic goitre in the study is 31-40 years with a female to male ratio of 14.8:1, which corroborates the third decade recorded in the other studies (Anidi et al 1993, Abdulkareem et al 2005, Gitau 1975). The reason for the preponderance of goitre among female may be due to the previously deduced reason of increased demands at time of increased activity on a background of relative iodine deficiency.

Diffuse hyperplasia of the thyroid gland associated with hyperthyroidism (toxic goitre) represented only 1.5% of all the cases. This figure is lower than that from Ibadan in Nigeria by Olurin et al (1975) (5.3%) probably because Port Harcourt is not a goitre endemic area. Generally, reports from Africa show a lower relative frequency of toxic goitre compared to Europe and America except in the goitre endemic area following introduction of iodised salt (Gitau 1975).

Thyroiditis is noted to be rare in Africans from different studies. Enugu and Lagos both in Nigeria recorded 7.1% and 2% respectively; and Kenya 1% which compares favourably with 2.3% found in our study (Anidi et al 1993, Abdulkareem et al 2005, Gitau 1975).

Forty two cases of thyroid gland neoplasms were seen in this study with a female to male ratio of 5:1. Our study compares favourably with majority of previous studies which showed a female predominance with female to

male ratio ranging between 3.6:1 and 10:1 (Anidi et al 1993, Gitau et al 1975, Ahmed et al 2007, Ariyibi et al 2013).

Benign thyroid neoplasms were generally noted to be more common than malignant ones accounting for 52.4% of all neoplastic lesions studied. Previous studies from Nigeria have reported similar finding though with higher relative frequencies. In Lagos, it accounted for 58.8%; 57% was reported from Zaria, 71.4% from Kano and 81.4% from Enugu (Anidi et al 1993, Edino et al 2004, Abdulkareem et al 2005, Ahmed et al 2007). In a study in Kenya benign neoplasms accounted for 80.2% (Gitau 1975).

Thyroid (follicular) adenoma which is the only benign lesion seen in this study had a female to male ratio of 6:1 representing 16.5% of the cases. The studies in Lagos and Enugu showed follicular adenoma in 10% and 36.6% of their cases (Abdulkareem et al 2005, Anidi et al 1993). The female to male ratio of 6:1 compares with 5.2:1 recorded in Zaria, Northern Nigeria. Follicular adenoma is the second most common pathology in our study which compared favourably with the reports from other studies (Anidi et al 1993, Edino et al 2004, Abdulkareem 2005, Nggada et al 2008).

Thyroid malignancies are not very common and carcinomas are more frequent than sarcomas. In this study only carcinomas were seen which accounted for 15.1%; a figure which is higher than most reports from Nigeria. Reports from Lagos showed that malignancy represented 7% while 8.3% was reported from Enugu (Abdulkareem et al 2005, Anidi et al 1993, Ariyibi et al 2013). The higher figure in this study may probably be due to oil exploratory activity and contamination of ground water in our area. We suggest this could be the focus of future studies. There was a wide age difference with two peaks at the 3<sup>rd</sup> and 7<sup>th</sup> decade which corresponded to the peaks for papillary and follicular carcinoma respectively. The female to male ratio of 4:1 recorded for malignant thyroid neoplasm in this study concurs with previous studies (Adeniji et al 1998, Ariyibi et al 2013).

Papillary carcinoma was the most common carcinoma in this study representing 55% which is similar to the findings from Enugu (44.9%) and Zaria (70.5%) in Nigeria and North America (75-85%) (Anidi et al 1993, Ahmed et al, Carcangui et al 1985, Pellegrini et al 2013, Wartofsky L (2010).

Papillary carcinoma is acknowledged to be the most common histological type of primary malignant thyroid tumour worldwide (Rakesh 1999) and it is seen in iodine sufficient areas. Our finding of peak incidence in the 4<sup>th</sup> decade of life therefore corroborates previous studies which have established that papillary carcinoma commonly affect children and young adult (Ariyibi et al 2013, Hancock et al 1995).

Follicular carcinoma accounted for 30% of the carcinomas; it is second to papillary carcinoma. Several

studies in Nigeria and Kenya reported its predominance (Edino et al 2004, Abdulkareem et al 2005, Nggada 2008, Gitau 1975). The study also showed a female predominance with a female to male ratio of 5:1. The peak age in our study is in the 7<sup>th</sup> decade of life which is almost two decades later than the peak age of papillary carcinoma.

Medullary carcinoma was seen in two cases in our study. This finding thus corroborates previous studies from Nigeria which showed that it is uncommon. Four cases were reported in the study from Lagos, three cases from Zaria and the Enugu study recorded no case while about 5% were reported in Ibadan (Abdulkareem et al 2005, Ahmed et al 2007, Anidi et al 1993, Ariyibi et al 2013). Medullary carcinoma can present in a familial or sporadic form but it could not be confirmed if any of the two cases was associated with multiple endocrine neoplasia.

Only one case of poorly differentiated (insular) carcinoma was seen in a male of 61 years.

## CONCLUSION

In conclusion this study has shown that thyroid diseases are uncommon in this environment and that they are also more common in women. The predominant histological lesion is colloid goitre which could be simple or multinodular and in the Port-Harcourt area papillary carcinoma is the commonest malignant thyroid lesion.

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