

HISTOPATHOLOGICAL PATTERNS OF THYROID NEOPLASMS IN IBADAN NIGERIA: A TWENTY YEAR RETROSPECTIVE STUDY.

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Background: The thyroid gland is an endocrine organ whose physiological functions are of great importance in the regulation of normal body metabolism. Thyroid neoplasms, when clinically apparent, usually present as solitary or multiple nodules, which are discretely palpable within an otherwise normal thyroid gland.

This retrospective study aimed at describing the histopathological patterns of various thyroid neoplasms at the Pathology Department, University College Hospital (UCH), Ibadan during a twenty-year period.

Methods: All cases with diagnosis of thyroid neoplasm were retrieved from the records of the department and the population-based cancer registry. Haematoxylin and eosin stained slides were reviewed and where necessary the paraffin blocks were recut and stained. The World Health Organization Histological Classification of Thyroid tumour (2004) was used in this study.

Results: A total 74,202 biopsies were received in the department over the study period. 1,207 cases were thyroid gland specimens constituting 1.6% of all biopsies in the study period. 174 cases (14.4%) were thyroid gland neoplasms of which 122 (70.1%) were females and 52 (29.9%) were males giving a female to male ratio of 2.3:1. Seventy six (43.7%) cases were benign and 98 (56.3%) cases were malignant. Follicular adenoma accounted for 89.5% of benign thyroid neoplasms with peak age incidence in the 5th decade. Papillary carcinoma was the most common malignant thyroid neoplasm in this study with the peak age incidence in the 3rd decade.

Conclusion: The study showed a female predominance and that follicular adenoma and papillary carcinoma were the commonest benign and malignant neoplasms respectively.

Keywords: Thyroid gland, Ibadan, neoplasms, benign, malignant

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INTRODUCTION

Thyroid neoplasms, when clinically apparent, ~~usually present as~~ solitary or multiple nodules, which are discretely palpable within an otherwise normal thyroid gland¹. The estimated incidence of solitary palpable nodules in the adult population of the United States is about 2-4%, although it is significantly higher in endemic goitrous regions.¹ Single nodules are about four times more common in women than men². The incidence of thyroid nodules increases throughout life³

The overwhelming majority of solitary nodules of the thyroid prove to be benign lesion such as follicular adenomas which account for 90% of cases¹. Carcinomas, by contrast, are rare, accounting for well under 1% of solitary thyroid nodules and representing about 15, 000 new cancer cases each year in the United States¹.

Several clinical criteria may provide a clue to the nature of a given thyroid nodule and these include: Solitary nodules, in general, are more likely to be neoplastic than multiple nodules. Nodules in younger patients and males are more likely to be neoplastic than older patients and females respectively; and a history of radiation treatment to the head and neck region is associated with an increased incidence of thyroid malignancy.^{1,2}

Our study aimed at describing the histopathological patterns of various thyroid neoplasms seen at the department of Histopathology of the University College Hospital, Ibadan from 1987-2006.

MATERIALS AND METHOD

The study was a retrospective review of all thyroid neoplasms histologically diagnosed in the Department of Pathology, University College Hospital (UCH), Ibadan Nigeria, over a period of twenty years from January 1987 to December 2006. The cases were identified from the available records in the Surgical Daybooks of the Department of Pathology during the study period. The department of Pathology UCH, receives histopathological consultation mostly from medical centres located with the southwestern region of Nigeria and occasionally from other parts of the country.

Hematoxylin and eosin stained slides of all cases were retrieved, reviewed and classified histologically according to the 2004 WHO classification⁴ Data regarding the age, gender and incidental findings were retrieved from the histopathology request form of each case. Cases which lacked any of the demographic data were excluded ~~from the study~~. Data were entered into a Microsoft Excel data sheet and statistical analysis was done using the SPSS program  the means were compared using the t-test and non continuous variables were compared using the chi square test.

RESULTS

General findings

During the study period, 74,202 surgical specimens were received and analysed in our laboratory. One thousand two hundred and seven cases (1.6%) were thyroid gland specimens. One hundred and seventy-four (14.4%) of the thyroid specimens were neoplastic. Seventy-six (43.7%) of the thyroid neoplasms were benign and ninety-eight cases were malignant giving ratio of 1:1.3.

Sex distribution

The patients with thyroid neoplasms comprised 122 females (70.1%) and 52 males (29.9%), giving a female to male ratio of 2.3:1 (Table 1). Out of the 76 cases of benign thyroid neoplasms, 60 were females (78.9%) while 16 were males (21.1%), with a female to male ratio of 3.7:1. Of the 98 cases of malignant thyroid neoplasms, 62 were females (63.3%) while 36 were males (36.7%), with a female to male ratio of 1.7:1. There was a significantly greater proportion of male patients with malignant neoplasms as compared to female patients ($\chi^2 = 5.02$, df (degrees of freedom) = 1, $p = 0.025$). Figure 1 shows the gender distribution of patients with benign and malignant thyroid neoplasms.

Age distribution

Thyroid neoplasms affected individuals from all age groups ranging from 5 months to 77 years of age. Of the 174 cases of thyroid neoplasms, the majority occurred between the ages of 30-39 years, with a mean age of 39 ± 16.3 years.

Benign thyroid neoplasms had a peak occurrence between the ages of 30-39 years, while malignant thyroid neoplasms displayed bimodal peak occurrences between the ages of 20-29 years and 50-59 years, as shown in Figure 2. The mean age of the patients with benign thyroid neoplasms $35\text{yrs} \pm 13.44$ was significantly less than that of the mean age of the patients with malignant thyroid neoplasms $42\text{yrs} \pm 17.45$ ($t = -2.792$, $df = 172$, $p = 0.006$).

The peak occurrence of benign thyroid neoplasms in males was between the ages of 30-39 years (mean 35 ± 11.61), while the peak occurrence in females was between the ages of 40-49 years (mean 35 ± 19.73). However, the mean age of female patients was not significantly greater than that of male patients ($t = 1.620$, $df = 172$, $p = 0.094$). Similarly, the peak occurrence of malignant thyroid neoplasms in males was between the ages of 50-59 years, as compared to a peak occurrence between the ages of 30-39 years in females ($t = 1.620$, $df = 172$, $p = 0.094$).

BENIGN THYROID NEOPLASMS

Follicular adenoma accounted for 89.5% of benign thyroid neoplasms. It was most common between ages 40-49 years and least common between ages 0-9 years and 70-79 years, with a female to male ratio of 4:1. The other variants include hurthle cell adenoma, mature teratoma, and neurofibroma which accounted for 2.5%, 4% and 4% of benign thyroid neoplasms respectively. (Table 1)

MALIGNANT THYROID NEOPLASMS

Papillary carcinoma, follicular carcinoma and medullary carcinoma accounted for 41.8%, 32.7% and 6.1% of malignant thyroid neoplasms respectively. All of these variants show female preponderance ranging from male to female ratio of 1:1.5-2.7.

Hurthle cell carcinoma accounted for 6.1% of malignant thyroid neoplasms with the male to female ratio of 1:1. The others include undifferentiated carcinoma (4.1%), malignant peripheral nerve sheath tumour (2%); squamous cell carcinoma, primary lymphoma, and secondary tumours were seen in 4.1% each of the cases.

TABLE 1-GENDER DISTRIBUTION OF PATIENTS WITH SPECIFIC BENIGN AND MALIGNANT THYROID NEOPLASMS

HISTOLOGICAL TYPES	Female	Male	Total	%
A. BENIGN NEOPLASMS				
Follicular adenoma	55	13	68	39.1
Neurofibroma	1	2	3	1.7
Mature teratoma	2	1	3	1.7
Hurthle cell adenoma	2	0	2	1.1
B. MALIGNANT NEOPLASMS				
Papillary carcinoma	30	11	41	23.6
Follicular carcinoma	19	13	32	18.4
Medullary carcinoma	4	2	6	3.4
Undifferentiated carcinoma	1	3	4	2.3
Squamous cell carcinoma	2	2	4	2.3
Hurthle cell carcinoma	3	3	6	3.4
Non-Hodgkin lymphoma	0	2	2	1.1
Malignant peripheral nerve sheath tumour	1	0	1	0.6
Metastatic neoplasms	2	0	2	1.1
TOTAL	122	52	174	100

123 **TABLE 2-AGE DISTRIBUTION OF PATIENTS WITH BENIGN AND MALIGNANT**
124 **THYROID NEOPLASMS**

HISTOLOGICAL VARIANTS	AGE GROUP (YEARS)								TOTAL
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	
BENIGN NEOPLASMS									
Follicular adenoma	1	6	10	20	22	6	2	1	68
Neurofibroma	0	2	1	0	0	0	0	0	3
Mature teratoma	2	1	0	0	0	0	0	0	3
Hurthle cell adenoma	0	0	0	1	0	1	0	0	2
MALIGNANT NEOPLASMS									
Papillary carcinoma	0	3	12	8	1	7	8	2	41
Follicular carcinoma	1	0	7	4	5	6	4	5	32
Medullary carcinoma	0	0	0	2	2	2	0	0	6
Squamous cell carcinoma	0	0	0	1	0	2	0	1	4
Undifferentiated carcinoma	0	0	1	0	2	1	0	0	4
Secondary tumour	0	0	0	1	1	0	0	0	2
Lymphoma	0	1	0	1	0	0	0	0	2
Hurthle cell carcinoma	0	0	1	1	0	4	0	0	6
Malignant peripheral nerve sheath tumour	0	0	0	0	0	1	0	0	1
Total	4	13	32	39	33	30	14	9	174

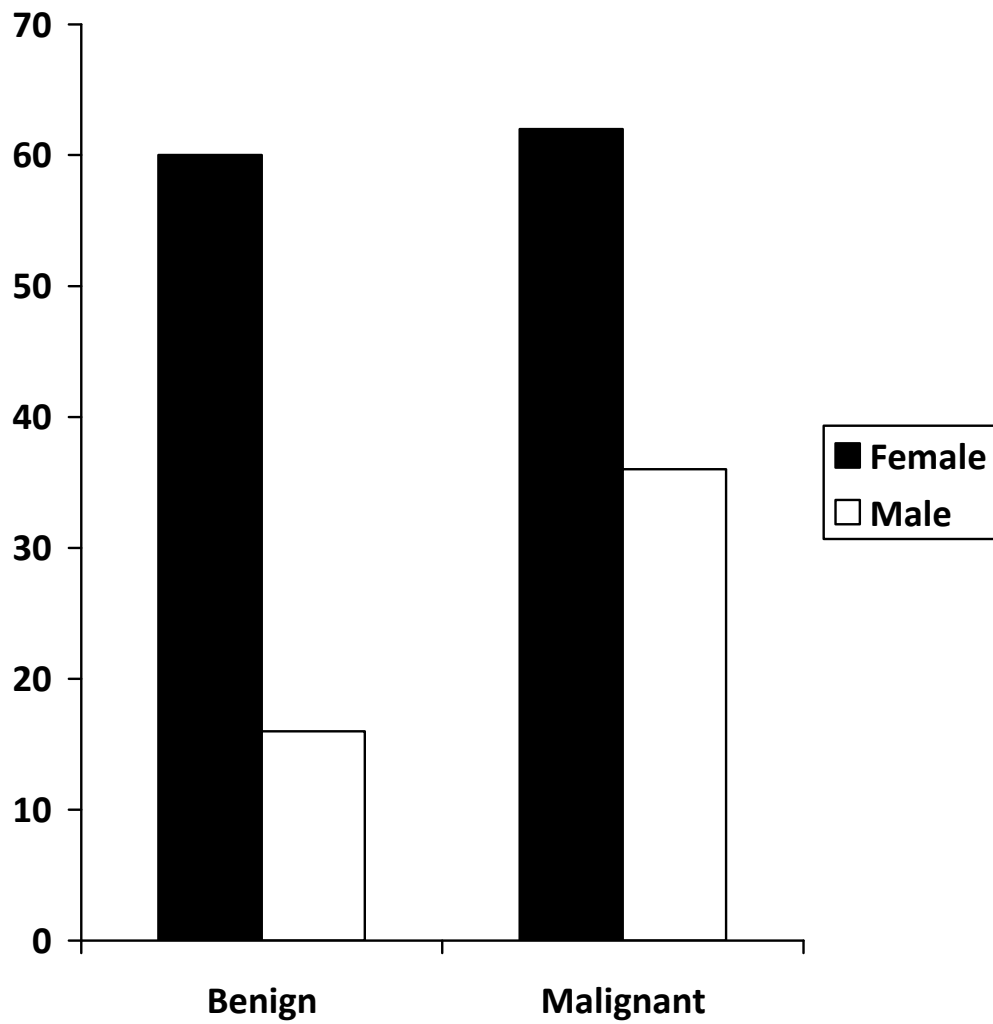


Figure 1-Gender distribution of patients with benign and malignant thyroid neoplasms

DISCUSSION

In the current study malignant thyroid neoplasms predominated, accounting for 56.3% while benign thyroid neoplasms accounted for 43.7%. Unlike majority of other studies which shows predominance of benign neoplasms.

~~Thyroid neoplasms were more common in females than males in this study with females accounting for 70.1% and males accounting for 29.9% with a female to male ratio of 2.3:1. This fact is strongly supported also by the female predominance in other studies.~~

~~Amongst benign thyroid neoplasms follicular adenoma is the most common in this study accounting for 89.5%. It is more common in females than in males with a female to male ratio of 4.6:1. The peak age incidence is within the fifth decade of life.~~ Earlier studies in Nigeria by Adeniji et al⁵ in Ilorin were in support of this present study, by reporting follicular adenoma as the predominant benign thyroid neoplasm, and which was more common in females with peak age incidence within the fifth decade of life. Also in support of this present study were studies by Anidi et al⁶ in Enugu, Gitau⁷ in Kenya and Bashier et al⁸ in Khartoum, Sudan, which all reported follicular adenoma as the major benign thyroid neoplasm with female preponderance, but with peak age incidences in the fourth and third decade of life in the studies of Anidi and Gitau respectively.

Neurofibroma, mature teratoma and Hurthle cell adenoma are exceedingly rare among benign thyroid neoplasms accounting for 3.9%, 3.9% and 2.5% respectively. The exceedingly rare occurrence of other benign thyroid neoplasms is attested to by the fact that the other Nigerian and African studies cited have shown no record of these entities^{5,6,7,8}.

This study has clearly shown the predominance of papillary carcinoma among malignant thyroid neoplasms accounting for 41.8%. It is more common in females and the peak age incidence is within the third decade of life. In agreement with this present study Anidi et al⁶ in Enugu reported papillary carcinoma to be most common malignant thyroid neoplasm (41.9%) followed by follicular carcinoma (35.5%), with both showing female predominance. Ersumo et al⁹ in Addis Ababa was also in agreement with this present study and simply reported papillary carcinoma as being the most common thyroid malignancy with a female preponderance. In the United States, papillary carcinoma is the most common malignant thyroid neoplasm accounting for 75 to 85% of cases, followed by follicular carcinoma (5%).

Follicular carcinoma is the second most common amongst malignant thyroid neoplasms in this study 32%. It is also more common in females and the peak age incidence is within the fifth decade of life. Thomas and Ogunbiyi's study¹⁰ in Ibadan was in agreement with this present study by reporting papillary carcinoma as the most common malignant thyroid neoplasm (45.3%), followed by follicular carcinoma (44.5%) with both showing female predominance, although the peak age incidences were within the fifth and seventh decades respectively, in contrast to the finding of peak occurrence in the third and fifth decades respectively in the present study. The study of Malandzi et al¹¹ in Durban, South Africa reported racial differences in the proportions of thyroid neoplasms, with papillary

carcinoma (57%) being the most common thyroid malignancy among Indians living in South Africa, while follicular carcinoma (68%) was the most common thyroid malignancy among black Africans in South Africa. This implies that racial and genetic factors play an important role in the aetiopathogenesis of thyroid neoplasms.

In 1973, Olurin et al¹² from Ibadan showed that follicular carcinoma was the most common with 60% followed by papillary carcinoma (18%). It therefore appears that there has been a temporal variation in the relative frequency of the two major forms of thyroid neoplasms of follicle cell derivation. This may be related to increasing iodination of diet, which results in reduced incidence of colloid goitre and follicular carcinoma, with increased incidence of papillary carcinoma. A second major contributing factor may be the recognition that the diagnosis of papillary carcinoma is primarily by nuclear features than architectural disposition into branching papillary fronds.

In contrast with most other studies, Adeniji et al⁵ in Ilorin, Nkaza¹³ in Cameroun and Omran¹⁴ in Khartoum Sudan, all reported follicular carcinoma to be the most common malignant thyroid neoplasm, citing figures of 73%, 70% 42%, respectively. These findings may be explained by either a wider prevalence of iodine deficiency in these regions, or partly by the non-recognition of the follicular variant of papillary carcinoma in earlier classifications of thyroid carcinoma, as stated above.

Other histological types of malignant thyroid neoplasms were not common in this study. Medullary carcinoma and anaplastic carcinoma accounted for 5.1% and 4.4% of cases respectively in the study of Thomas and Ogunbiyi¹⁰, which is comparable with the findings in the present study.

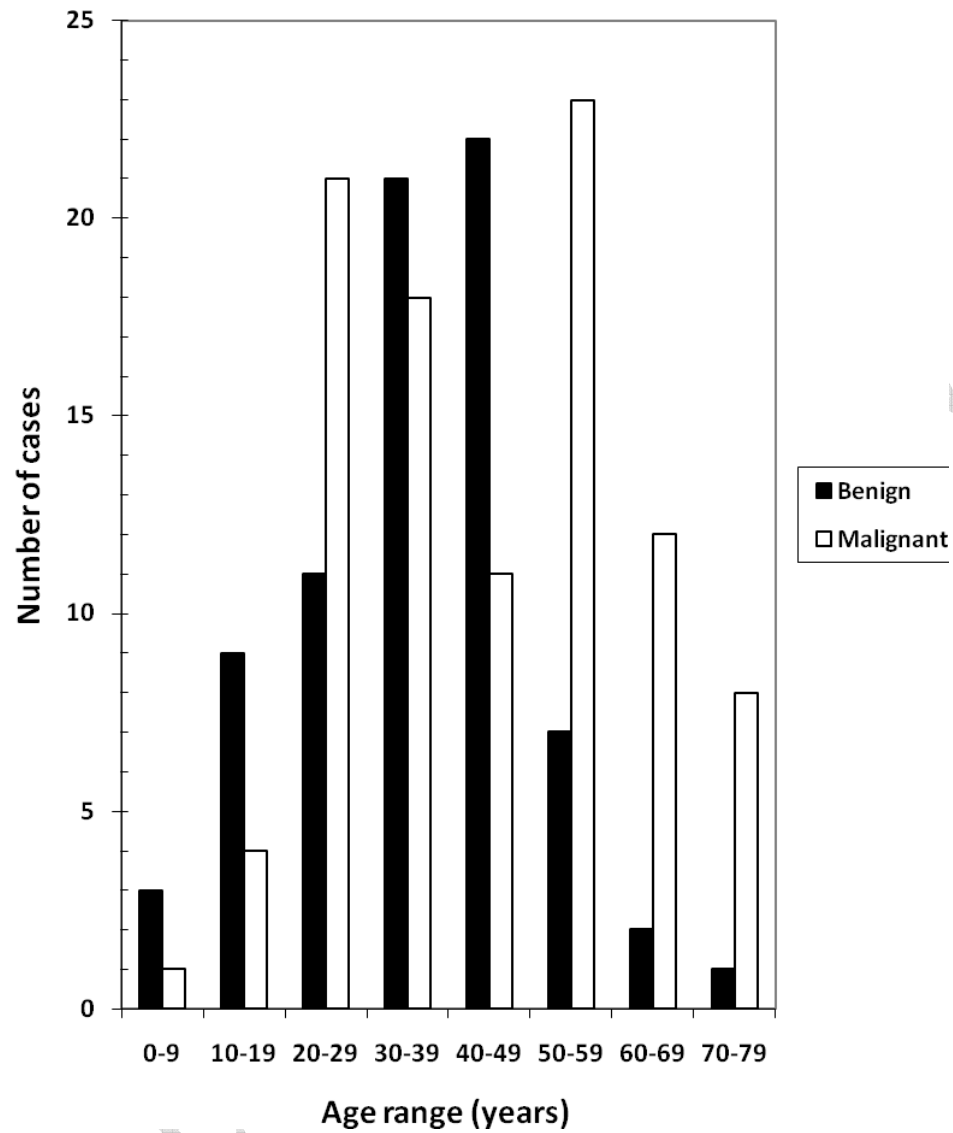
The female preponderance that has been noted among adult patients developing thyroid carcinoma has been correlated with the expression of oestrogen receptors on neoplastic epithelium. In contrast, cases presenting in childhood and late adult life are distributed equally among male and female.¹ However, this present study showed constant female preponderance across all age groups.

CONCLUSION

This study shows that thyroid neoplasm affects all age group. Thyroid neoplasms are predominantly seen in females, and the most common type is papillary carcinoma, which is more often seen in the third decade. The higher incidence of follicular carcinoma in some of other studies cited might be partly ascribed to the less comprehensive criteria for diagnosis of papillary carcinoma and partly to the higher incidence of follicular carcinoma in iodine deficient regions. With the widespread introduction of dietary iodine supplementation, the incidence of follicular carcinoma will most probably decline and the papillary carcinoma will become more prevalent.

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246 16. Figure 2- Age distribution of patients with benign and malignant thyroid
247 neoplasms

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