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Original Article

Histopathological Profile of Thyroid Diseases at Hawassa University Comprehensive Specialized Hospital, Hawassa, Sidama, Ethiopia: A Descriptive Cross-sectional Study

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Abstract

Introduction: Thyroid diseases are diverse and can be classified as functional, goitrous, non-neoplastic, or neoplastic. Although global patterns vary by age, sex, ethnicity, and geographic location, histopathological data from southern Ethiopia remain scarce, limiting regional diagnostic and management strategies.

Objective: To determine the histopathological profile of thyroid diseases among patients attending Hawassa University Comprehensive Specialized Hospital, Sidama, Ethiopia.

Methods: This study employed a retrospective chart review of thyroid biopsy records collected over six years, from 1st January 2016 to 31st December 2021, at the Pathology Department of Hawassa University Comprehensive Specialized Hospital. Archived medical records of patients who underwent thyroid biopsy during the specified timeframe were reviewed. Data were entered into SPSS version 21 and analyzed using descriptive statistics, including frequencies and proportions, to summarize demographic characteristics and histopathological patterns.

Results: A total of 270 patients with thyroid disease were included in this study. The female-to-male ratio was 4:1. Most patients (91%) were aged 20−59 years. The main presenting symptom was anterior neck swelling (81%), and most of the patients (65.2%) presented within 5 years of symptom onset. Non-neoplastic lesions accounted for 179 (66.3%) thyroid lesions. The most common histologic form of thyroid disease was nodular colloid goiter (NCG) (n=161; 59.6%), followed by papillary thyroid carcinoma (PTC) (n=61; 22.6%). PTC was the most common thyroid carcinoma (83.6%), followed by medullary thyroid carcinoma (MTC) (8.2%). The majority of thyroid carcinomas were pT3 (n=29;

39.7%) and pT2 (n=27; 37%).

Conclusions: NCG was the most prevalent thyroid lesion, while papillary thyroid carcinoma emerged as the leading malignancy. These findings highlight the importance of strengthened early detection and diagnostic capacity to improve thyroid disease outcomes in southern Ethiopia.

Key words: Thyroid diseases, goiter, thyroiditis, thyroid carcinoma, thyroidectomy, histopathologic profile

Introduction

The thyroid gland is an endocrine organ located below and anterior to the larynx, consisting of two lateral lobes connected by a thin isthmus (1). Thyroid diseases encompass a wide range of clinical conditions, including those caused by excessive thyroid hormone production, hormone deficiency, and mass lesions of the gland (2).

The principal diseases of the thyroid gland are goiter (diffuse or nodular), hypothyroidism, hyperthyroidism, thyroiditis, and neoplasms (3). The prevalence and pattern of thyroid disorders depend on various factors, including sex, age, ethnicity, and geographical location (4). While thyroid disorders are among the most common endocrine conditions globally, endemic goiter is specifically linked to iodine deficiency, particularly in mountainous regions where soil and water contain little iodine. In sub–Saharan Africa, including parts of Ethiopia, iodine deficiency remains a recognized public health problem (5,6).

Virtually any disease of the thyroid can present as thyroid swelling. The prevalence of goitrous swelling of the thyroid is quite common; approximately 4% to 7% of the adult population has clinically palpable thyroid enlargement; on the other hand, the incidence of thyroid nodules found incidentally on ultrasonography is 19% to 67% (3, 7).

Thyroid cancer accounts for approximately 1% of all human malignancies. Although relatively rare, it represents the most common endocrine malignancy (1,7). Most thyroid cancers are well differentiated tumors, such as papillary and follicular carcinoma, which generally have an excellent prognosis, with survival rates exceeding 95% at 20 years (8). However, undifferentiated carcinomas, including anaplastic thyroid carcinoma, are aggressive and associated with high recurrence and mortality rates (9).

Most primary thyroid cancers are epithelial tumors that originate from thyroid follicular cells. The three major pathologic types of thyroid carcinomas that arise from follicular cells are papillary thyroid carcinoma (PTC), follicular thyroid carcinoma (FTC), and anaplastic thyroid carcinoma (ATC). Medullary thyroid carcinoma (MTC) arises from thyroid parafollicular cells (10, 11)

Despite the considerable burden of thyroid disease, the epidemiology and histopathological spectrum of thyroid lesions in Ethiopia remain poorly characterized. This study therefore aimed to describe the histopathological patterns of thyroid lesions diagnosed at the Department of Pathology, Hawassa University Comprehensive Specialized Hospital (HUCSH), and the findings provided baseline evidence to inform clinical practice and guide future research.

Methods and materials

Study area

The study was conducted at the Department of Pathology, Hawassa University Comprehensive Specialized Hospital, located in Hawassa city,

Sidama Regional State, Ethiopia, approximately 275 km south of Addis Ababa. Hawassa serves as a regional medical hub, with two public and five private primary hospitals, as well as numerous clinics and pharmacies. The city also hosts one public university and several private colleges. The Department of Pathology at HUCSH provides diagnostic histopathology services for surgical specimens and cytology. The laboratory is equipped with standard instruments, including rotary microtomes, tissue processors, embedding stations, and light microscopes. The department is staffed by eight senior pathologists, twelve pathology residents, and seven trained laboratory technologists.

Study design and period

A cross-sectional study design was used to perform the study which was done from February to March 2020 in Hawassa City among food and drink establishments.

Source and Study population

A retrospective chart review was conducted using medical records of patients who underwent thyroid biopsy at Hawassa University Comprehensive Specialized Hospital between 1st January 2016 and 31st December 2021. The study utilized archived records available at the pathology department, covering a six-year institutional dataset.

Population and eligibility criteria

The study included 296 patients who had a thyroid biopsy at the department of pathology, HUCSH. However, 26 cases were excluded due to incomplete demographic or histopathological data, resulting in a final sample size of 270 patients. Data were collected from medical records between 1st September 2021 and 26th January 2022.

Data collection tools and procedures

All pathology records with a histopathological diagnosis of thyroid disease during the study period were identified from the HUCSH pathology department registry. For each eligible case, the biopsy request form, pathology report, and patient chart were reviewed to extract relevant demographic and diagnostic information. Data were collected using a pretested semi-structured checklist, which captured patient age, sex, histopathological diagnosis, and year of diagnosis. Two trained pathology residents independently performed data extraction under the supervision of a senior pathologist.

Data quality control

The data collection process included multiple quality assurance steps: a pilot test of the checklist was conducted on 20 randomly selected records to ensure clarity, all extracted data were cross-checked for completeness and consistency by the principal investigator, and discrepancies were resolved in consultation with a senior pathologist. Records with ambiguous or missing diagnostic information were excluded from the final analysis. To minimize transcription errors, the final dataset was double-entered and cross-checked before analysis.

Data entry and analysis

The collected data were checked for completeness, cleaned, coded, and entered into SPSS version 21 for analysis. Patient information from pathology request forms was cross-verified with medical records using registration numbers to ensure accuracy. Descriptive statistical methods were applied to summarize the data. Categorical variables, such as sex and histopathological diagnosis, were presented using frequencies and percentages. The distribution of histopathological patterns of thyroid lesions was analyzed by sex and age group.

Results

Socio-Demographic Characteristics

The study included mostly female participants, with the majority falling within the age range of 20 to 39 years. The youngest patient was 13 years old, while the oldest was 73 years old. The mean age of the participants was 35.7 years. Compared with males, females were more commonly affected by thyroid diseases (215 female patients, resulting in a female-to-male ratio of 4:1 (Table 1).

Predominant Presenting Symptoms

Among the 270 patients who underwent thyroidectomy, the primary symptom observed in most patients (219 patients, 81%) was anterior neck swelling. The remaining patients presented with other symptoms, either alone or in combination with anterior neck swelling. For the majority of these patients, the duration of symptoms was less than five years (176 patients, 65.2%) (Table 1).

Thyroid histopathology

Nonneoplastic diseases of the thyroid are more prevalent than neoplastic diseases. Among the 270 thyroid gland biopsies evaluated in this study, 179 (66.3%) were nonneoplastic. The non-neoplastic-to-neoplastic ratio was 2:1. In the neoplastic category, malignant neoplasms accounted for 73 patients (27%) (Table 1).

This study examined the histologic patterns of 179 nonneoplastic thyroid diseases classified into two categories: nodular colloid goiter (NCG) and inflammatory disease (thyroiditis). NCG was the most common nonneoplastic condition, accounting for 161 (89.9%) patients (Table 1). Of the 270 total biopsies, 18 (6.7%) or 10% of the patients with nonneoplastic diseases were diagnosed with inflammatory disease (thyroiditis), with a female predominance of 94% and a female-to-male ratio of 17:1. Among the thyroiditis patients, 55.6% had chronic lymphocytic thyroiditis, 38.8% had Hashimoto's thyroiditis, and 5.5% had granulomatous thyroiditis. All cases of Hashimoto's thyroiditis and granulomatous thyroiditis were found in females. Nine cases of chronic lymphocytic thyroiditis were also found in females.

Distribution of the biological behavior and histologic patterns of neoplastic diseases of the thyroid

This study analyzed the histologic patterns of 91 neoplastic thyroid diseases, of which 73 (80%) were malignant, giving a malignant to benign ratio of 4:1. Follicular adenoma accounted for 11 (61.1%) of the benign neoplasms, while papillary thyroid carcinoma (PTC) was the most common malignant neoplasm, representing 83.6% of cases (Table 1). Among the PTC patients, 18 (30%), 3 (5%), and 2 (3.3%) were diagnosed with follicular, encapsulated, and papillary microcarcinoma variants, respectively. The variants of the remaining PTCs or other carcinomas were not specified.

Age and sex distributions of patients with neoplastic diseases of the thyroid gland

This study investigated the age and sex distributions of 91 neoplastic thyroid diseases. The majority of the neoplastic diseases 49 (53.8%) occurred in the 20−39-year-old age group (Table 2). The mean age of patients with benign neoplasms was 29 ± 8.5 years. The patients with malignant neoplasms had a wider age range, from 13 to 73 years, with a mean age of 36.9 years and a standard deviation of 12.5 years. Among patients diagnosed with malignant thyroid neoplasms, the highest proportion was observed in the 20- to 39-year-old age group, accounting for 35 (48%) cases.

Table 1: Sociodemographic characteristics of the study participants at HUCSH

Variables	Category			Overall Frequency (%)
Sex	Male			55 (20.4)
	Female			215 (79.6)
Age in years	<20			11 (4)
	20−39			159 (59)
	40-59			87 (32)
	≥60			13 (5)
Presenting symptoms	Anterior neck swelling			219 (81)
	Toxic symptoms			25 (9.3)
	Pressure symptoms			16 (6)
	Voice change			7 (2.6)
	Pain			2 (0.7)
	Lateral neck swelling			1 (0.4)
Duration of presentation(years)	<5			176 (65.2)
	6−10			58 (21.5)
	11−20			30 (11.1)
	>20			6 (2.2)
Pathologic diseases	Non neoplastic N=179/270 (66.3%)		NCG 161/179 (89.9%)	161 (59.6)
			Chronic lymphocytic thyroiditis 10/179 (5.6%)	10 (3.7)
			Hashimoto thyroiditis 7/179 (3.9%)	7 (2.6)
			Granulomatous thyroiditis, 1/179 (0.6%)	1 (0.4)
	Neoplastic N= 91/270 (33.7%)	Benign neoplasm N=18/91 (19.8%)	Follicular adenoma 11/18(61.1%)	11 (4)
			Hurthle cell adenoma 7/18(38.9%)	7 (2.6)
		Malignant neoplasm N=73 (80.2%)	PTC 61/73(83.6%)	61 (22.6)
			MTC 6/73(8.2%)	6 (2.2)
			FTC 3/73(4.1%)	3 (1.1)
			ATC 2/73(2.7%)	2 (0.7)
			PDTC 1/73(1.4%)	1 (0.4)

NCG: Nodular Colloid Goiter; PTC: Papillary Thyroid Carcinoma; FTC: Follicular Thyroid Carcinoma; MTC: Medullary Thyroid Carcinoma; ATC: Anaplastic Thyroid Carcinoma; PDTC: Poorly Differentiated Thyroid Carcinoma.

All malignant neoplasms in patients under 20 years of age were papillary thyroid carcinomas (PTCs), making them the most common malignant thyroid tumor in the pediatric age group. PTC also accounted for 32 (52.4%) patients in the 20−39-year-old age group and 20 (32.8%) patients in the 40–59-year-old age group. The mean age for PTC patients was 35.6 years. Medullary thyroid carcinoma (MTC) occurred mostly in the 40- to 59-year-old age group, accounting for 4 (66.67%) patients, and had a mean age of 42.4 years, which was slightly higher than that of PTC patients. There was only one patient with poorly differentiated thyroid carcinoma (PDTC) at the age of 67 years and two patients with anaplastic thyroid carcinoma

(ATC) at the ages of 50 and 70 years, with a mean age of 60 years (Table 2).

Both benign and malignant thyroid neoplasms were more common in females than in males, with male-to-female ratios of 1:2.6 for benign and 1:3.3 for malignant neoplasms. Of the 215 female patients in this study, 56 (26%) were diagnosed with malignant neoplasms, while of the 55 male patients, 17 (31%) were diagnosed with malignant neoplasms, indicating a greater risk of malignancy in male patients with thyroid disease than in female patients, although this difference was not statistically significant. Most of the histologic types of thyroid carcinoma in this study also affected females more than males. The male-to-female ratio for PTC was 1:3.7, and that for MTC was 1:2.

Pathologic TNM staging of thyroid carcinoma

This study performed pathologic TNM staging of 73 patients with thyroid carcinoma based on their medical charts. The majority of the carcinomas were classified as pT3, with 29 (39.7%) cases, followed by pT2, with 27 (37%) cases; pT1, with 16 (21.9%) cases; and pT4, with 1 (1.4%) case. Fourteen thyroid biopsies from patients who were diagnosed with carcinoma were accompanied by lymph node biopsies, of which 10 patients had nodal involvement, resulting in 13.7% having N1 disease. The remaining 63 (86.3%) patients with carcinoma did not undergo lymph node biopsy. Distal metastasis was very uncommon in this study, with only one case (1.4%) of scalp metastasis.

Table 2: Age and sex of the patients vs. histologic pattern of thyroid diseases at HUCSH

Variables		Neoplastic n (%)							
		Benign		Malignant					
		FA	HA	PTC	MTC	FTC	ATC	PDTC	Total
Sex	Male	4(4.4%)	1(1%)	13(14.3%)	2(2.2%)	-	-	1(1%)	21 (23%)
	Female	7(7.7%)	6(6.6%	48(52.7%)	4(4.4%)	3(3.3%)	2(2.2%)	-	70 (77%)
	Total	11(12%)	7(7.7%)	61 (67%)	6(6.6%)	3(3.3%)	2(2.2%)	1(1%)	91(100%)
Age	<20	-	-	5(5.5%)	-	-	-	-	5(5.5%)
in	20-39	8(8.8%)	6(6.6%)	32(35%)	2(2.2%)	1(1%)	-	-	49 (53.8%)
years	40-59	3(3.2)	1(1%)	20(22%)	4(4.4%)	1(1%)	1(1%)	-	30 (33%)
	≥60	-	-	4(4.4%)	-	1(1%)	1(1%)	1(1%)	7 (7.7%)
	Total	11(12%)	7(7.7%)	61 (67%)	6(6.6%)	3(3.3%)	2(2.2%)	1(1%)	91(100%)

FA: Follicular Adenoma, HA: Hurthle cell Adenoma, PTC: Papillary Thyroid Carcinoma; FTC: Follicular Thyroid Carcinoma; MTC: Medullary Thyroid Carcinoma; ATC: Anaplastic Thyroid Carcinoma; PDTC: Poorly Differentiated Thyroid Carcinoma.

Discussion

This retrospective descriptive study summarized the histopathological patterns of thyroid lesions diagnosed at Hawassa University Comprehensive Specialized Hospital over six years. A total of 270 thyroid biopsies were described, revealing that non-neoplastic lesions were more frequent than neoplastic lesions, with a ratio of approximately 2:1. Nodular colloid goiter (NCG) constituted the majority of non-neoplastic lesions, consistent with other

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Ethiopian and international studies (12, 13). Thyroiditis accounted for a smaller proportion, similar to studies in India and Saudi Arabia (13, 14).

The overall female predominance observed (approximately 4:1) aligns with other descriptive studies reporting higher thyroid disease rates among women (15,16). Non-neoplastic lesions, including NCG and thyroiditis, were predominantly seen in females, which is consistent with hormonal and autoimmune influences described in previous literature. Both benign and malignant neoplasms also showed female predominance, though the ratio was lower compared to non-neoplastic lesions (13,17).

Regarding age distribution, the majority of thyroid lesions occurred in the 20–39-year age group (59%), followed by 40–59 years (32%). This pattern of peak incidence in young and middle-aged adults aligns with studies conducted in Addis Ababa and Nigeria (12, 15). Malignant neoplasms were also predominantly observed in the 20–39-year age group, with papillary thyroid carcinoma (PTC) being the leading type. Similar age patterns have been documented in other African and Asian studies (13, 16, 17).

Among the 91 neoplastic lesions, malignant tumors were more common than benign tumors (4:1). PTC accounted for 83.6% of malignancies, followed by medullary thyroid carcinoma (MTC) and follicular thyroid carcinoma (FTC). Anaplastic thyroid carcinoma (ATC) and poorly differentiated thyroid carcinoma (PDTC) were rare. This distribution aligns with the WHO classification and is consistent with descriptive studies conducted in Ethiopia, Nigeria, and India (12, 13, 15).

Tumor staging showed most carcinomas presenting at pT2 and pT3 stages, suggesting delayed diagnosis compared to international trends where early-stage detection is increasingly common (18,19). This highlights the need for better public awareness, timely health-seeking behavior, and expanded use of diagnostic imaging in the region.

Limitations

There were some limitations to this study regarding the incompleteness of the data, which was partly due to the absence of patient medical records. Significant cases without staging and lack of classification according to recent WHO protocols, as well as the absence of CAP synoptic reporting, were important challenges.

Conclusion

The outcomes of this study revealed a distinct trend in the epidemiology of thyroid diseases in southern Ethiopia, where nonneoplastic conditions particularly nodular colloid goiter is the most frequently observed. Although malignant neoplasms significantly exceed benign ones, papillary thyroid carcinoma is recognized as the predominant malignancy across different age groups, especially in younger individuals. The distribution of thyroid lesions by age and sex, with a significant prevalence in women aged 20–39, underscores the need for awareness and screening programs that cater to the demographic most affected.

Crucially, the dominance of early-stage diagnoses implies that histopathological evaluation is successful when it is accessible, but it also reveals gaps in diagnostic availability. These observations necessitate the fortification of healthcare infrastructure, particularly in pathology services, to ensure timely and accurate diagnoses across the region. By focusing on early detection and increasing diagnostic capacity, health systems can improve patient outcomes, lessen the burden of advanced thyroid cancers, and foster more equitable care for those impacted.

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Ethical considerations

This study was conducted after obtaining ethical approval from the Institutional Review Board (IRB) of Hawassa University College of Medicine and Health Sciences with reference number IRB/249/13. As this was a retrospective review of pathology records, the requirement for individual informed consent was waived by the IRB. Importantly, the authors did not have access to any information that could identify individual participants during or after data collection. Patient confidentiality was strictly maintained throughout the study: all data were coded and de-identified, and access to the records was restricted to the research team.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author via correspondence e-mail: abebemelis@hu.edu.et

Conflicts of interest

The authors declare that there are no competing interests.

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