



Original Article

Clinicopathological Spectrum of Thyroid Lesions in a Tertiary Care Teaching Hospital

Dr. Ashay D. Amlekar¹, Dr. Vikas V. Narhire², Dr. Sunil Y. Swami³, Dr. Umesh G. Kawalkar⁴

¹MBBS MD (Pathology), Senior Consultant, (Pathology), Bharatratna Dr. Babasaheb Ambedkar Memorial, Central Railway Hospital Byculla (East), Mumbai.

²MBBS MD (Pathology), Associate Professor, Pathology Department, ESIC Medical College & Hospital, Andheri, Mumbai.

³MBBS MD (Pathology), Associate Professor, Pathology Department, VDG MCH Latur

⁴Associate Professor, Community Medicine, Government Medical College, Washim

 OPEN ACCESS

Corresponding Author:

Dr. Vikas V. Narhire

MBBS MD (Pathology), Associate Professor, Pathology Department, ESIC Medical College & Hospital, Andheri, Mumbai.

Received: 27-05-2026

Accepted: 10-06-2026

Available online: 04-07-2026

Copyright © International Journal of
Medical and Pharmaceutical Research

ABSTRACT

Introduction: Thyroid lesions, encompassing both non-neoplastic and neoplastic types, rank among the most prevalent endocrine disorders globally. These lesions may manifest as benign hyperplastic conditions, inflammatory diseases or malignant tumors of the gland. This study aims to observe the frequency, age, gender distribution & analyse the spectrum of histomorphological pattern.

Methods: In this descriptive study, we gathered clinical profiles from 102 cases and connected them to histopathological and gross findings. Samples were received, processed to create paraffin blocks and stained with H and E stains for the histopathological study.

Results: The thyroid accounted for a mere 2.4% of all histopathological lesions. Nonneoplastic lesions (73.5%) were more frequent than neoplastic ones (26.5%). Among the neoplastic lesions, benign tumors (55.5%) outnumber malignant one (44.5%). The age group most affected was 21 to 40 years, with a notable female predominance, exhibiting a M:F ratio of 1:5.8. A midline neck swelling (74%) was the commonest symptom. The most frequent lesions in the nonneoplastic, benign, and malignant categories were goitre (49.1%), follicular adenoma (13.8%), and papillary carcinoma (9%) respectively.

Conclusion: Thyroid lesions represented a very small fraction of all histopathological lesions. Non-neoplastic lesions outweighed neoplastic lesions, but benign tumors outnumbered malignant tumors. The majority of those impacted were middle-aged people. Females outnumbered males, and midline neck swelling was the most common presentation. Goitre, follicular adenoma, and papillary carcinoma were the most common lesions in the nonneoplastic, benign, and malignant categories respectively.

Keywords: Thyroid, Nonneoplastic, Neoplastic, Benign, Malignant, Histopathological.

INTRODUCTION

Among endocrine organs, the thyroid gland is distinct in a number of ways. ^[1] It is the largest endocrine gland and the only one that may be directly examined and biopsied due to its superficial placement. ^[2] The occurrence and distribution of

thyroid disorders within a specific community differ according to several factors, including age, gender, diet, environmental exposure and geographic location. [3]

Thyroid lesions, which include a broad range of non-neoplastic and neoplastic lesions, are among the most prevalent endocrine diseases in the world. These lesions might be anything from benign hyperplastic diseases and inflammatory illnesses to malignant thyroid gland cancers. [4]

The histopathology continues to be the definitive method for verifying the diagnosis of thyroid lesions and is vital in determining the precise characteristics of neoplastic lesions. Numerous benign conditions, including nodular goiter, thyroiditis and follicular adenoma, can clinically resemble malignant tumors. On the other hand, malignant lesions such as papillary carcinoma, follicular carcinoma, medullary carcinoma, and anaplastic carcinoma display unique histopathological characteristics that are critical for accurate diagnosis and treatment strategy formulation [5].

Global research have found that the frequency of thyroid lesions varies by geography, environment and demographics. In developing nations, the majority of thyroid illnesses are caused by benign lesions such as colloid goiter and multinodular goiter, while malignant tumors make up a tiny but clinically relevant number of patients. Therefore, it's critical to comprehend the local pattern of thyroid lesions in order to guide suitable management and improve diagnostic techniques. [6]

This study aims to observe the frequency, age and gender distribution of thyroid lesions, analyse the spectrum of histomorphological pattern and categorize both non-neoplastic and neoplastic thyroid lesions in patients attending the tertiary care teaching hospital.

MATERIALS & METHODS

This descriptive observational study was conducted in the Department of Pathology, Government Medical College and Hospital, over a period of two and a half years. The study was initiated after obtaining approval from the Institutional Ethics Committee. As the study involved histopathological evaluation of routinely received surgical specimens/biopsy samples, patient confidentiality was maintained throughout the study. No personal identifiers were used during data analysis or reporting.

A total of 102 clinically diagnosed cases of thyroid lesions were included in the study. Cases were selected based on clinical history, physical examination findings, clinical diagnosis, and availability of thyroid tissue specimens obtained by biopsy or surgical procedure. Conservatively managed patients, patients referred to other hospitals, and cases without histopathological evaluation were excluded from the study.

Relevant clinical information was collected from case records and histopathology requisition forms. Details regarding age, gender, anatomical site, presenting complaints, clinical diagnosis, relevant investigations and type of specimen received were recorded. The clinical findings were later correlated with gross and microscopic histopathological findings wherever possible.

All tissue specimens were received in 10% formalin. After adequate fixation, detailed gross examination was carried out. Gross features including size, shape, colour, consistency, external surface, cut surface, presence of cystic change, haemorrhage, necrosis, calcification and colloid material or solid tumour areas were noted. Representative tissue sections were taken from appropriate areas. Small biopsy specimens were submitted entirely for processing.

The tissue sections were processed routinely and embedded in paraffin blocks. Sections were cut using a microtome and stained with haematoxylin and eosin. The stained slides were examined under light microscopy. Detailed microscopic findings were recorded for each case. Special stains, including Congo red, were used wherever required, particularly for confirmation of amyloid deposition in suspected medullary carcinoma.

All neoplastic thyroid lesions were classified according to the World Health Organization classification of thyroid tumors. Non-neoplastic lesions were diagnosed based on standard histopathological criteria described in standard pathology textbooks such as Rosai and Ackerman's Surgical Pathology and Sternberg's Diagnostic Surgical Pathology.

Data were entered and analysed using descriptive statistics. Frequencies and percentages were calculated for categorical variables. Mean and range were calculated for continuous variables such as age. Chi-square test was applied to assess the association of age group and gender with the nature of thyroid lesion. Fisher's exact test was used wherever expected cell counts were less than five. A p value of less than 0.05 was considered statistically significant.

RESULT

During the study period of two and a half years, a total of 4174 specimens were received in the histopathology department, of which 102 were thyroid lesions, accounting for 2.4% of the total histopathological workload.

Table 1. Baseline clinicodemographic characteristics of thyroid lesions (n=102)

Variable	n (%)
Age group (years)	
0–20	6 (5.9)
21–40	68 (66.7)
41–60	22 (21.5)
>60	6 (5.9)
Gender	
Male	15 (14.7)
Female	87 (85.3)
Clinical presentation	
Midline neck swelling	75 (74.0)
Neck discomfort	12 (12.0)
Other symptoms	15 (14.0)

The mean age of patients was 33.2 years, with ages ranging from 8 to 65 years. The majority of cases were seen in the 21–40 years age group, comprising 68 cases (66.7%), followed by the 41–60 years age group with 22 cases (21.5%). Females constituted the majority of cases, with 87 cases (85.3%), while males accounted for 15 cases (14.7%), giving a male-to-female ratio of 1:5.8. Midline neck swelling was the most common clinical presentation, observed in 75 cases (74.0%), followed by neck discomfort in 12 cases (12.0%).

Table 2. Association of age and gender with nature of thyroid lesions

Variable	Non neoplastic n (%)	Neoplastic n (%)	Total	p value
Gender				
Male	14 (18.7)	1 (3.7)	15	0.116
Female	61 (81.3)	26 (96.3)	87	
Age group (years)				
0–20	5 (6.7)	1 (3.7)	6	0.780
21–40	48 (64.0)	20 (74.1)	68	
41–60	18 (24.0)	4 (14.8)	22	
>60	4 (5.3)	2 (7.4)	6	
Total	75 (100)	27 (100)	102	

Among the 102 thyroid lesions, non-neoplastic lesions were more common, accounting for 75 cases (73.5%), while neoplastic lesions constituted 27 cases (26.5%). Among the neoplastic lesions, benign tumors were observed in 15 cases (55.5%) and malignant tumors in 12 cases (44.5%).

On statistical analysis, there was no significant association between gender and the nature of thyroid lesion ($\chi^2 = 2.47$, $p = 0.116$). Similarly, age group was not significantly associated with the nature of thyroid lesion ($\chi^2 = 1.08$, $p = 0.780$).

Table 3. Histopathological spectrum of thyroid lesions (n=102)

Histopathological diagnosis	n (%)
Non-neoplastic lesions	
Thyroglossal cyst	4 (3.9)
Colloid goitre	23 (22.6)
Colloid goitre with secondary changes	15 (14.8)
Adenomatoid/Multinodular goitre	10 (9.8)
Multinodular goitre with secondary changes	2 (1.9)
Solitary thyroid nodule	1 (0.9)
Thyroid cyst	9 (8.8)
Hemorrhagic colloid cyst	2 (1.9)
Lymphocytic thyroiditis	7 (6.8)
Hashimoto thyroiditis	1 (0.9)
Granulomatous thyroiditis	1 (0.9)
Benign neoplastic lesions	
Follicular adenoma	14 (13.8)
Hurthle cell adenoma	1 (0.9)
Malignant neoplastic lesions	

Papillary carcinoma	9 (8.8)
Medullary carcinoma	1 (0.9)
Insular carcinoma	1 (0.9)
Hurthle cell carcinoma	1 (0.9)
Total	102 (100)

Among the non-neoplastic lesions, goitrous lesions were the most common, comprising 50 cases (49.1%) of all thyroid lesions. These included colloid goitre, colloid goitre with secondary changes, adenomatoid/multinodular goitre, and multinodular goitre with secondary changes. Thyroid cyst was seen in 9 cases (8.8%), followed by lymphocytic thyroiditis in 7 cases (6.8%).

Within the benign category, follicular adenoma (13.8%) was identified as the most common benign tumor. Single case of hurthle cell adenoma was reported in a 35 years old female presented with midline neck swelling with typical gross features and microscopy (Fig.1)

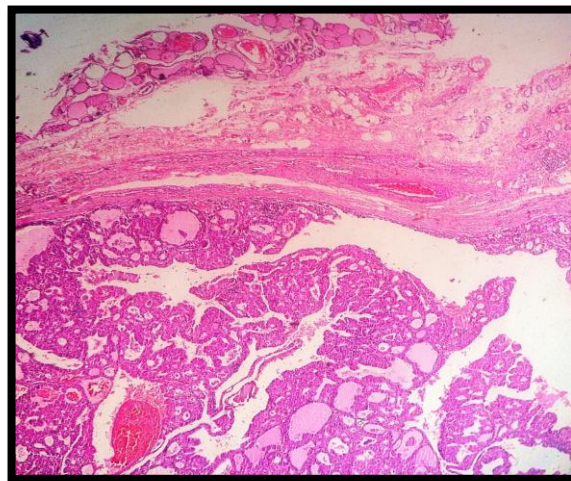


Figure 1: Hurthle cell adenoma of thyroid - Photomicrograph showing fibro collagenous capsule, trabecular pattern of hurthle cell and inspissated intraluminal colloid. (H & E: 10x)

Among malignant tumors, papillary carcinoma of the thyroid, accounting for 9% (9/12 cases), is recognized as the most common type. A single case involving a 38-year-old female with the follicular variant of papillary carcinoma was documented, showcasing distinct gross features (Fig. 2) and microscopic characteristics (Fig. 3).

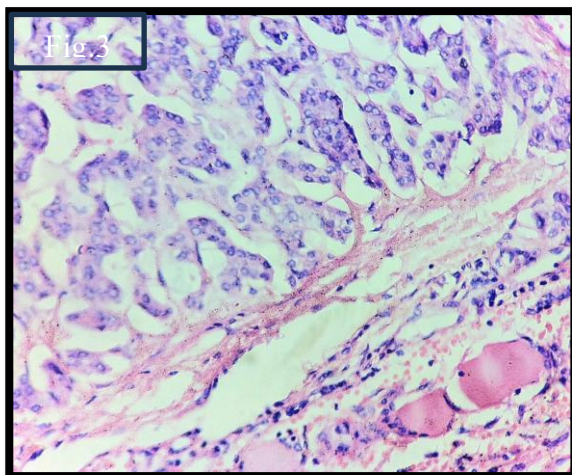
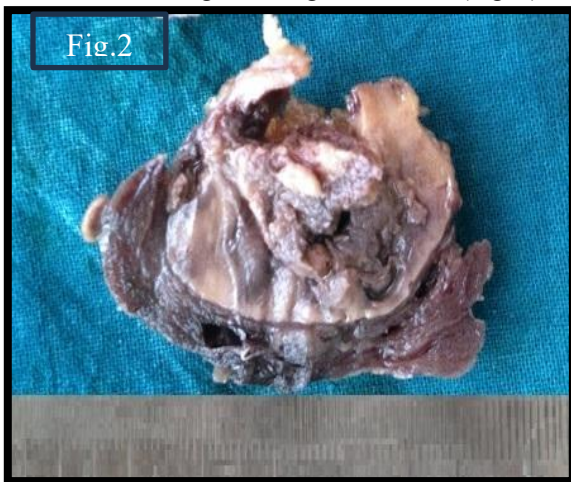


Figure 2: Follicular variant of papillary carcinoma of thyroid – Gross photograph showing well circumscribed lesion with grey white areas of tumor tissue.

Figure 3: Follicular variant of papillary carcinoma of thyroid - Photomicrograph showing tumor tissue composed entirely of follicles lined by optically clear nuclei. (H & E: 10x)

We reported a case of medullary carcinoma of thyroid in a 51-year-old female patient, exhibiting distinct gross and microscopic features (Fig. 4), including the presence of amyloid, confirmed through Congo red staining. (Fig. 5)

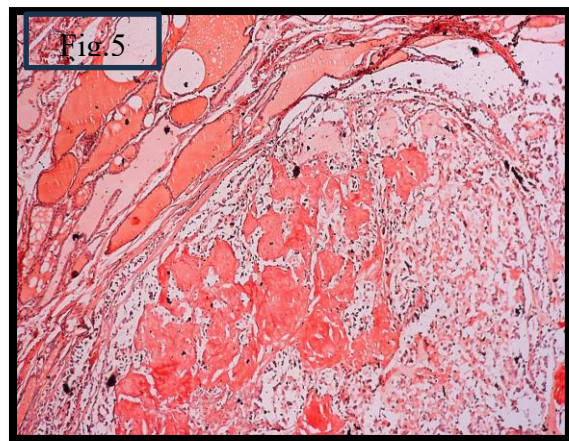
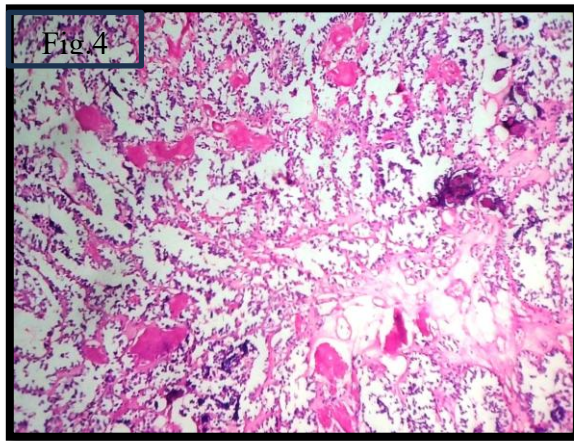


Figure 4: Medullary carcinoma of thyroid - Photomicrograph showing diffuse chords and follicular pattern with deposition of amyloid and focal calcification. (H & E; 10x)

Figure 5: Medullary carcinoma of thyroid- Photomicrograph showing positivity for amyloid material. (Congo red; 10x)

We observed an uncommon and rare case of insular carcinoma of the thyroid in a 62-year-old woman, characterized by distinct gross (Fig.6) and microscopic features (Fig.7).

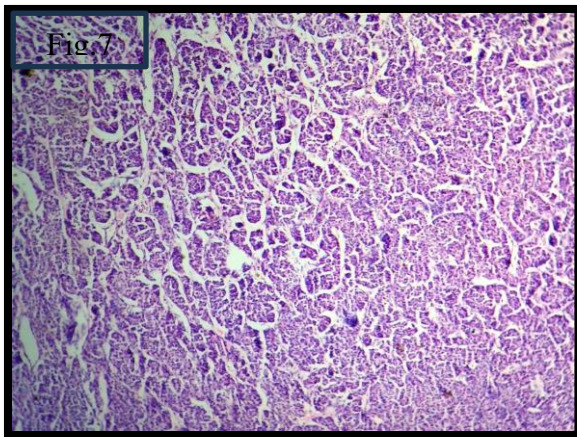


Figure 6: Insular carcinoma of thyroid – Gross photograph showing solid, firm, grey white and infiltrating tumor tissue.

Figure 7: Insular carcinoma of thyroid – Photomicrograph showing trabecular and insular pattern of tumor cells arrangement. (H & E; 10x)

DISCUSSION

The occurrence of thyroid lesions varies by geographical area, age and gender. [8] Here, an attempt was made to evaluate the clinicopathological and histopathological patterns of thyroid lesions.

In present study, thyroid lesions accounted for 2.4% of all histopathological specimens received during the study duration. This finding aligns with the results of Rajagopal et al, [9] who indicated that non-neoplastic thyroid lesions represented 2% of all surgical specimens processed in the histopathology department. The marginally elevated percentage noted in the current study may be due to the inclusion of both non-neoplastic and neoplastic thyroid lesions.

Information about the percentage of thyroid lesions in the overall histopathology workload is still scarce in literature because the majority of published studies concentrate on the histopathological spectrum of thyroid lesions. As a result, the current study offers further information about the institutional burden of thyroid pathology in a teaching hospital.

In our study, nonneoplastic lesions made up 73.5% in contrast to neoplastic one, which represented 26.5%. This information aligns with findings from other studies. For instance, the study conducted by Urmiladevi P et al, [10] indicated 62.5% of lesions were nonneoplastic and 37.5% were neoplastic. Similarly, the research by Turkey HA et al, [11] revealed that 83.75% were nonneoplastic while 16.25% were neoplastic lesions. Additionally, the study by Prasanna PL et al, [12] reported 82% of lesions as nonneoplastic and 18% as neoplastic.

Table 4: Comparative analysis of age wise distribution of thyroid lesions

	No. of cases (%)
--	------------------

Study Age (Years)	Manur JS et al [13]	Gopal MR et al [14]	Urmiladevi P et al [10]	Present study
0-20	10 (8.3%)	05 (7%)	07 (4.3%)	06 (5.9%)
21-40	56 (46.7)	37 (51.4%)	92 (57.5%)	68 (66.7%)
41-60	46 (38.3%)	29 (40.3%)	55 (34.4%)	22 (21.5%)
> 60	08 (6.7)	01 (1.3%)	06 (3.8%)	06(5.9%)
Total	120 (100%)	72 (100%)	160 (100%)	102 (100%)

The age group with the highest frequency of thyroid lesions in the current study was 21–40 years old (66.7%), followed by 41–60 years old (21.5%). The age group that was most frequently engaged in all of the aforementioned studies was 21–40, followed by 41–60, which is similar to the current study.

In the current study, females outnumbered males in all thyroid lesions, demonstrating a significant difference with a M:F ratio of 1:5.8. Comparable findings were reported in a study by Ajmera RJ et al, [15] which indicated M:F ratio of 1:3.2. Additionally, research by Khurana C et al, [16] revealed M:F ratio of 1:4.9, while a study by Turkey HA et al, [11] presented M:F ratio of 1:4. These results clearly suggest that thyroid lesions are more prevalent in females, albeit with a slight difference compared to males.

The dominance of thyroid lesions in the age group of 21 to 40 years in this study is in agreement with earlier studies and can be rationalized by increased hormonal activity, a higher prevalence of autoimmune thyroid disorders and a greater propensity for healthcare-seeking behaviour in this reproductive age group. It is well-documented that autoimmune thyroid diseases tend to manifest more frequently in young and middle-aged individuals, particularly women, with peak incidence occurring in the third to fifth decades of life, presumably due to the effects of estrogen and immune system regulation. [7]. [17]

In this study, midline neck swelling was the most frequently observed presentation, accounting for 74% of cases. This aligns with the findings of Gopal MR et al [14] and Urmiladevi P et al [10], who reported that midline neck swelling was the predominant manifestation in 95.8% and 94.3% of their respective cases.

Table 5: Comparative analysis of histopathological spectrum of thyroid lesions.

SN	Histopathological diagnosis	No. of cases (%)			
		Urmiladevi P et al [10]	Bhattacharya S et al [18]	Manur JS et al [13]	Present study
Non neoplastic					
1	Colloid goiter, colloid goiter with secondary changes	1 (0.6%)	24 (20.5%)	52 (43.3%)	38 (37.4%)
2	Adenomatoid/Multinodular goiter, Multinodular goiter with seco. changes	86 (53.8%)	53 (45.3%)	18 (15%)	12 (11.7%)
3	Thyroglossal cyst	-	-	-	04 (3.9%)
4	Solitary thyroid nodule	-	-	-	01 (0.9%)
5	Thyroid cyst	-	-	-	09 (09%)
6	Hemorrhagic colloid cyst	1 (0.6%)	-	-	02 (1.9%)
7	Lymphocytic thyroiditis	1 (0.6%)	10 (8.7%)	12 (10%)	07 (7%)
8	Hashimoto's thyroiditis	10 (6.3%)	-	-	1 (0.9%)
9	Granulomatous thyroiditis	1 (0.6%)	-	-	1 (0.9%)
Benign					
10	Follicular adenoma	34 (21.3%)	7 (6%)	10 (8.3%)	14 (13.8%)
11	Hurthle cell adenoma	-	-	-	1 (0.9%)
Malignant					
12	Papillary carcinoma	20 (12.5%)	20 (17.1%)	20 (16.7%)	09 (09%)
13	Medullary carcinoma	3 (1.9%)	1 (0.9%)	3 (2.5%)	1 (0.9%)
14	Insular carcinoma	1 (0.6%)	-	-	1 (0.9%)
15	Hurthle cell carcinoma	-	-	-	1 (0.9%)
16	Follicular Carcinoma	-	2 (1.7%)	5 (4.2%)	-
17	Anaplastic Carcinoma	2 (1.2%)	-	-	-

Total cases	160 (100%)	117 (100%)	120 (100%)	102 (100%)
-------------	------------	------------	------------	------------

In the present study, we observed a variety of distinct lesions across all categories. Goiter emerged as the commonest non-neoplastic lesion, accounting for 50 cases (49.1%), a finding that aligns with all study groups. This prevalence can be attributed to the significant occurrence of iodine imbalance, which results in diffuse and multinodular hyperplasia of the thyroid gland. Additionally, follicular adenoma (13.8%) was identified as the most common benign tumor across all study groups, aligning with its classification as a frequently encountered encapsulated neoplasm originating from follicular epithelial cells. In terms of malignant tumors, papillary carcinoma of the thyroid accounted for 9% and is acknowledged as the most common type, reaffirming its status as the predominant malignant tumor across all study groups and this can be explained as it is commonly associated with genetic alterations such as BRAF mutations and RET/PTC rearrangements. [7], [17]

We documented several atypical lesions, including a singular instance of hurthle cell adenoma, medullary carcinoma, insular carcinoma and hurthle cell carcinoma. In contrast, the research conducted by Urmiladevi P et al, [10] identified unusual cases such as anaplastic carcinoma, medullary carcinoma and insular carcinoma. Furthermore, the study by Bhattacharya S et al, [17] reported two cases while Manur JS et al, [13] reported five cases of follicular carcinoma.

This study identified rare thyroid lesions at a notably low frequency, reflecting their acknowledged rarity. Similar rare entities have been reported in other studies, though the frequencies vary. The differences in the occurrence of these lesions in various studies may be attributed to geographic diversity, institutional referral trends and sample size variations, all of which can affect the identification of rare tumors.

CONCLUSION

This study examines the clinicopathological spectrum of thyroid lesions observed in a tertiary teaching hospital. Thyroid lesions represent a minor fraction of all histopathological specimens. Non-neoplastic lesions were more prevalent than neoplastic ones. The age group most frequently affected was 21-40 years, with a predominance of females and the most common presenting symptom was the midline neck swelling. The most common non-neoplastic lesion was goiter; the most common benign tumor was follicular adenoma; and the most common malignant tumor was papillary carcinoma of the thyroid.

Histopathological examination continues to be the benchmark for the conclusive diagnosis of thyroid lesions offering essential insights into disease classification, clinical management and assisting in the prognosis. This study highlights the critical importance of histopathology in assessing thyroid lesions and stresses the necessity for ongoing clinicopathological correlation to guarantee the best possible patient care.

The current study was limited by its design which was conducted at a single center and encompassed only cases that underwent histopathological evaluation. The referral bias inherent in a tertiary care facility may have influenced the variety of lesions identified.

Conflict of interest: Nil

Source of funding: Nil

REFERENCES

1. Maitra, A. The endocrine system. Chap- 24. In: Mitchell R, Kumar V, Abbas A, et al, eds. Robbins and Cotran pathologic basis of disease. 8th edn. Philadelphia (PA): Saunders Elsevier 2011:164-165.
2. Carcangiu ML, DeLellis RA. Thyroid gland. Chap- 6. In: Damjanov I, James L, eds. Anderson's pathology. Vol. 2. 10th edn. St. Louis (MO): Mosby 1996:1943-1979.
3. Sreedevi A, Sheela K. Histopathological spectrum of non-neoplastic and neoplastic lesions of thyroid 2 year study in a tertiary care teaching hospital. J Med Sci Clin Res. 2018;6:514-9.
4. Vanderpump MPJ. The epidemiology of thyroid disease. Br Med Bull. 2011;99:39-51
5. Rosai J, Albores-Saavedra J, Ascoli S. Tumors of the thyroid gland. In: Rosai and Ackerman's Surgical Pathology. 11th ed. Philadelphia: Elsevier; 2018.
6. Baloch ZW, Livolsi VA. Pathology of thyroid and parathyroid disease. In: Mills SE, editor. Sternberg's Diagnostic Surgical Pathology. 6th ed. Philadelphia: Wolters Kluwer; 2015.
7. Lloyd RV, Osamura RY, Klöppel G, Rosai J, editors. WHO Classification of Tumours of Endocrine Organs. 4th ed. Lyon: International Agency for Research on Cancer; 2017.
8. Antony J, Celine TM, Chacko M. Spectrum of thyroid disorders: a retrospective study at a medical college hospital. Thyroid Res Pract 2014;11(2):55-9.
9. Rajagopal JA, Patil SB, Mane MA. Histopathological assessment of non-neoplastic thyroid lesions - A cross-sectional study. IP Arch Cytol Histopathology Res 2021;6(1):35-40.
10. Urmiladevi P, Sravani P, Bhagyalakshmi A, et al. Clinico-histopathological study of thyroid lesions in a tertiary care center over a period of one year. J. Evid. Based Med. Healthc. 2018; 5(32), 2374-2379.

11. Turkey HA, Mahadani J. Analysis of histopathological pattern of thyroid lesions in a tertiary care hospital. *IP Arch Cytol Histopathology Res* 2022;7(1):42-46.
12. Prasanna PL, Kumar PN. Clinico-pathological study of multinodular swellings of thyroid by histopathology, FNAC and ultrasound correlation. *J Cardiovasc Dis Res.* 2023;14(11):315-318.
13. Manur JS, Koujalagi T, Manur RK. Clinicopathological spectrum of thyroid lesions: a cross-sectional study in a tertiary care center. *Int J Med Pharm Res.* 2025;6(4):1600-1604.
14. Gopal MR, Rao KJ, Sai AR. Clinico-pathological study of thyroid lesions over a period of one year in a tertiary care centre. *J Evol Med Dent Sci.* 2018;7(31):3513-3517.
15. Ajmera RJ, Kokandakar HR, Nilkanth SP. Observational study on clinicopathological spectrum of thyroid lesions in tertiary cancer care centre at Marathwada region of Maharashtra, India. *Natl J Lab Med.* 2021;10(1):PO63-PO66.
16. Khurana C, Kanetkar SR, Oswal RM, Gupta S, Nazeer RM, Pingle PA. Histopathological spectrum of thyroid lesions in a tertiary care hospital. *Sch J App Med Sci.* 2019;7(4):1621–1625.
17. Kumar V, Abbas AK, Aster JC. *Robbins and Cotran Pathologic Basis of Disease.* 10th ed. Philadelphia: Elsevier; 2021.
18. Bhattacharya S, Bhardwaj A, Aggarwal V, Khatoon N, Sahoo SK, Gupta A, *et al.* Clinicopathological spectrum of thyroid lesions: Insights from a 5-year retrospective audit at a north Indian tertiary centre. *Thyroid Res Pract* 2025;21:124-7.