



Research Article

# Clinicopathological Spectrum of Thyroid Lesions: A Cross-Sectional Study in a Tertiary Care Center

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## ABSTRACT

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**Background:** Thyroid lesions represent a wide spectrum of non-neoplastic and neoplastic conditions and are among the most common endocrine disorders encountered in clinical practice. Accurate diagnosis is important for appropriate management, as a small proportion of thyroid nodules may harbor malignancy. The present study was undertaken to evaluate the clinico-pathological spectrum of thyroid lesions in patients attending a tertiary care hospital.

**Methods:** This cross-sectional study was conducted in the Department of Pathology of a tertiary care teaching hospital. A total of 120 patients with thyroid lesions were included in the study. Relevant clinical details such as age and gender were recorded. Histopathological examination of thyroid specimens was performed after routine tissue processing and hematoxylin and eosin staining. The lesions were classified into benign and malignant categories based on histopathological findings, and the data were analyzed using descriptive statistical methods.

**Results:** The majority of patients were in the 31–40 years age group. Females were more commonly affected than males with a female-to-male ratio of approximately 2.7:1. Histopathological evaluation revealed that benign lesions constituted the majority of thyroid lesions. Colloid goiter was the most common lesion accounting for 43.3% of cases, followed by multinodular goiter and thyroiditis. Among malignant lesions, papillary carcinoma was the most frequent thyroid malignancy.

**Conclusion:** Benign thyroid lesions constitute the majority of thyroid disorders, with colloid goiter being the most common histopathological diagnosis. Although malignant lesions are less frequent, early and accurate diagnosis through histopathological examination is essential for appropriate management and improved patient outcomes.

**Keywords:** Thyroid lesions, Histopathology, Colloid goiter, Thyroid carcinoma, Papillary carcinoma, Thyroid nodules.

## INTRODUCTION

Thyroid disorders represent one of the most common endocrine diseases encountered worldwide and encompass a wide spectrum of non-neoplastic and neoplastic lesions. These lesions range from inflammatory conditions and benign hyperplastic disorders to malignant tumors of the thyroid gland. Thyroid nodules are particularly common in the general population, with epidemiological studies suggesting that palpable nodules occur in approximately 4–7% of adults, while ultrasonography may detect nodules in up to 50–60% of individuals [1]. Although most thyroid lesions are benign, a small but significant proportion may harbor malignancy, making accurate diagnosis essential for appropriate clinical management.

The evaluation of thyroid lesions involves a combination of clinical examination, imaging studies, cytological evaluation, and histopathological confirmation. Among these, fine needle aspiration cytology (FNAC) has emerged as the most reliable initial diagnostic modality for the assessment of thyroid nodules. FNAC is a minimally invasive, rapid, and cost-effective technique that provides valuable cytomorphological information and helps distinguish benign from malignant lesions, thereby reducing unnecessary surgical procedures [2]. Because of its high diagnostic accuracy and safety, FNAC has become the standard first-line investigation in the evaluation of thyroid nodules.

The introduction of standardized reporting systems such as the Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) has further improved the diagnostic utility of FNAC. This system categorizes thyroid cytology into six diagnostic categories with corresponding risks of malignancy and management recommendations, thereby facilitating effective communication between pathologists and clinicians [3]. The implementation of the Bethesda system has significantly enhanced the reproducibility and clinical relevance of thyroid cytology reporting.

Histopathological examination remains the gold standard for confirming the diagnosis of thyroid lesions and plays a crucial role in identifying the exact nature of neoplastic lesions. Various benign conditions such as nodular goiter, thyroiditis, and follicular adenoma may clinically mimic malignant tumors. Conversely, malignant lesions including papillary carcinoma, follicular carcinoma, medullary carcinoma, and anaplastic carcinoma exhibit distinct histopathological features that are essential for definitive diagnosis and treatment planning [4].

Several studies conducted worldwide have evaluated the clinico-pathological spectrum of thyroid lesions and have reported variations in their frequency based on geographic, environmental, and demographic factors. In many developing countries, benign lesions such as colloid goiter and multinodular goiter constitute the majority of thyroid diseases, whereas malignant tumors account for a smaller but clinically significant proportion of cases [5]. Understanding the local pattern of thyroid lesions is therefore important for improving diagnostic strategies and guiding appropriate management.

Hence, the present study was undertaken to analyze the clinico-pathological spectrum of thyroid lesions in patients attending a tertiary care hospital and to evaluate the distribution of various thyroid lesions based on clinical and histopathological findings.

## MATERIALS AND METHODS

The present cross-sectional study was conducted in the Department of Pathology of a tertiary care teaching hospital over a period of one year. The study included patients presenting with clinically suspected thyroid lesions who were referred to the pathology department for cytological or histopathological evaluation. All patients with thyroid swellings undergoing fine needle aspiration cytology (FNAC) or thyroidectomy during the study period were included. Relevant clinical details such as age, sex, clinical presentation, and site of thyroid swelling were obtained from the patient records and requisition forms. Cases with incomplete clinical information or inadequate cytological material were excluded from the study.

FNAC of thyroid lesions was performed using a sterile disposable needle and syringe under aseptic precautions. The aspirated material was smeared onto clean glass slides, air dried or fixed in alcohol, and stained with May–Grünwald–Giemsa and Papanicolaou stains for cytological evaluation. Cytological diagnoses were categorized according to standard cytological criteria and, wherever applicable, classified using the Bethesda System for Reporting Thyroid Cytopathology. In cases where thyroidectomy specimens were available, histopathological examination was performed after routine tissue processing and hematoxylin and eosin staining. The cytological findings were correlated with histopathological diagnosis wherever possible. The collected data were compiled and analyzed using descriptive statistical methods, and the results were expressed in frequencies and percentages.

## RESULTS

**Fig 1: Age-wise Distribution of Patients with Thyroid Lesions (n = 120)**

**Figure 1: Age-wise distribution of patients with thyroid lesions (n=120)**

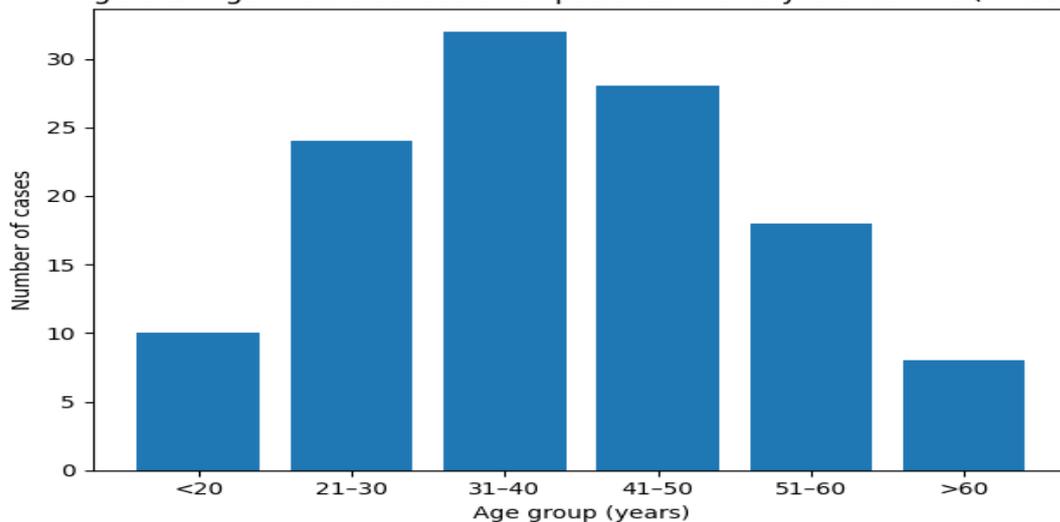


Figure 1 shows the age-wise distribution of patients with thyroid lesions included in the present study. The patients ranged in age from less than 20 years to more than 60 years. The highest number of cases was observed in the 31–40 years age group (32 cases, 26.7%), followed by the 41–50 years age group (28 cases, 23.3%) and 21–30 years age group (24 cases, 20.0%). A comparatively lower number of cases were noted in the 51–60 years age group (18 cases, 15.0%). The least number of cases were recorded in patients below 20 years (10 cases, 8.3%) and above 60 years (8 cases, 6.7%). Overall,

thyroid lesions were most commonly observed in young and middle-aged adults, particularly in the third and fourth decades of life.

**Fig 2: Gender Distribution of Patients**

Figure 2: Gender distribution of patients with thyroid lesions (n=120)

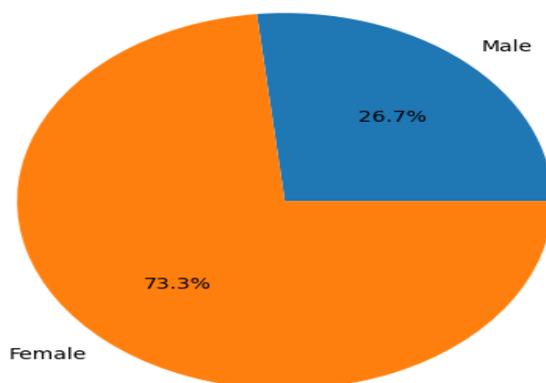


Figure 2 shows the gender distribution of patients with thyroid lesions in the present study. Out of the total 120 cases, 88 patients (73.3%) were females and 32 patients (26.7%) were males. This indicates a clear female predominance with a female-to-male ratio of approximately 2.7:1. The higher frequency of thyroid lesions among females may be attributed to hormonal influences and the increased prevalence of thyroid disorders in women.

**Table 1: Histopathological Spectrum of Thyroid Lesions**

Histopathological diagnosis	Number of cases	Percentage (%)
Colloid goiter	52	43.3
Multinodular goiter	18	15.0
Thyroiditis	12	10.0
Follicular adenoma	10	8.3
Papillary carcinoma	20	16.7
Follicular carcinoma	5	4.2
Medullary carcinoma	3	2.5
<b>Total</b>	<b>120</b>	<b>100</b>

Table 1 shows the histopathological spectrum of thyroid lesions observed in the present study. Among the 120 cases examined, colloid goiter was the most common lesion, accounting for 52 cases (43.3%). This was followed by papillary carcinoma with 20 cases (16.7%) and multinodular goiter with 18 cases (15.0%). Thyroiditis was identified in 12 cases (10.0%), while follicular adenoma was observed in 10 cases (8.3%). Malignant lesions included follicular carcinoma in 5 cases (4.2%) and medullary carcinoma in 3 cases (2.5%). Overall, benign thyroid lesions constituted the majority of cases, with malignant tumors forming a smaller proportion of the total thyroid lesions.

**Table 2: Association between Age Group and Nature of Thyroid Lesion**

Age group (years)	Benign lesions	Malignant / Suspicious lesions	Total
<20	9	1	10
21–30	21	3	24

Age group (years)	Benign lesions	Malignant / Suspicious lesions	Total
31–40	26	6	32
41–50	20	8	28
51–60	11	7	18
>60	3	5	8
<b>Total</b>	<b>90</b>	<b>30</b>	<b>120</b>

Table 2 shows the association between age group and the nature of thyroid lesions in the present study. Among patients aged less than 20 years, 9 cases were benign lesions and 1 case was malignant or suspicious. In the 21–30 years age group, 21 cases were benign and 3 were malignant or suspicious. The highest number of cases was observed in the 31–40 years age group, where 26 cases were benign and 6 were malignant or suspicious. In the 41–50 years age group, 20 benign lesions and 8 malignant or suspicious lesions were recorded. Among patients aged 51–60 years, 11 cases were benign while 7 were malignant or suspicious. In patients above 60 years, 3 benign lesions and 5 malignant or suspicious lesions were observed. Overall, benign lesions were more common across all age groups; however, the proportion of malignant or suspicious lesions increased with advancing age.

**Table 3: Association between Gender and Nature of Thyroid Lesion**

Gender	Benign lesions	Malignant / Suspicious lesions	Total
Male	22	10	32
Female	68	20	88
<b>Total</b>	<b>90</b>	<b>30</b>	<b>120</b>

Table 3 shows the association between gender and the nature of thyroid lesions in the present study. Among male patients, 22 cases were benign lesions while 10 cases were malignant or suspicious, giving a total of 32 cases. Among female patients, 68 cases were benign and 20 cases were malignant or suspicious, accounting for a total of 88 cases. Although thyroid lesions were more frequently observed in females compared to males, statistical analysis using the Chi-square test ( $\chi^2 = 0.91$ ) indicated that there was no statistically significant association between gender and the nature of thyroid lesions in the present study.

## DISCUSSION

Thyroid lesions represent a broad spectrum of pathological conditions ranging from non-neoplastic disorders to malignant tumors. The evaluation of thyroid swellings is an important aspect of clinical practice because a small proportion of thyroid nodules may harbor malignancy. Histopathological examination remains the gold standard for diagnosing thyroid lesions and plays a crucial role in differentiating benign from malignant conditions [4]. Understanding the clinico-pathological pattern of thyroid lesions in a particular region is useful for improving diagnostic strategies and guiding appropriate management.

In the present study, the majority of patients belonged to the 31–40 years age group followed by the 41–50 years age group. Similar age distribution has been reported in several studies where thyroid lesions were most commonly observed in young and middle-aged adults. Gupta et al. reported that the peak incidence of thyroid lesions occurred during the third and fourth decades of life [6]. Likewise, a study by Handa et al. also demonstrated that thyroid nodules were most frequently encountered in patients between 30 and 50 years of age [7]. The increasing proportion of malignant lesions with advancing age observed in the present study has also been documented in previous studies.

The present study showed a clear female predominance with a female-to-male ratio of approximately 2.7:1. This observation is consistent with earlier studies that have reported a higher prevalence of thyroid disorders among females. Vanderpump highlighted that thyroid diseases occur several times more frequently in women than in men due to hormonal and autoimmune factors [1]. Similarly, studies conducted by Nggada et al. and Kaliszewski et al. also reported a higher frequency of thyroid lesions among female patients [8,9].

Histopathological evaluation in the present study revealed that benign lesions constituted the majority of thyroid lesions. Colloid goiter was the most common lesion followed by multinodular goiter and thyroiditis. Similar findings have been reported in several previous studies where colloid goiter represented the most frequent thyroid lesion. Gupta et al. observed that colloid goiter accounted for the largest proportion of thyroid diseases in their series [6]. These benign conditions are often associated with iodine deficiency, hormonal imbalance and environmental influences.

Among malignant lesions, papillary carcinoma was the most common malignancy identified in the present study. Papillary carcinoma is known to be the most frequent thyroid malignancy worldwide and accounts for the majority of thyroid cancers [7]. Other malignant tumors such as follicular carcinoma and medullary carcinoma were less commonly observed. Similar patterns have been reported in several clinicopathological studies where papillary carcinoma constituted the predominant thyroid malignancy [10].

The analysis of association between age group and nature of thyroid lesion in the present study showed that benign lesions were more common across all age groups, although the proportion of malignant lesions increased with advancing age. Additionally, the association between gender and nature of thyroid lesion did not show a statistically significant difference. These findings are comparable with previous studies which reported that although thyroid lesions are more common in females, the likelihood of malignancy does not differ significantly between genders [9].

Overall, the findings of the present study indicate that benign thyroid lesions constitute the majority of thyroid diseases, while malignant tumors represent a smaller but clinically important proportion. Early diagnosis through clinical examination, cytological evaluation and histopathological confirmation is essential for appropriate management and improved patient outcomes.

## CONCLUSION

The present study highlights the clinico-pathological spectrum of thyroid lesions encountered in a tertiary care hospital. Benign lesions constituted the majority of thyroid disorders, with colloid goiter being the most common histopathological diagnosis. Malignant lesions accounted for a smaller proportion of cases, with papillary carcinoma emerging as the most frequent thyroid malignancy. Thyroid lesions were more commonly observed in females and predominantly affected patients in the third and fourth decades of life. The study emphasizes the importance of histopathological evaluation in the accurate diagnosis and classification of thyroid lesions, which is essential for appropriate clinical management and improved patient outcomes.

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