

# Cytological Spectrum and Bethesda Classification of Thyroid Lesions at a Tertiary Care Hospital in Central India

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Anshita Chouhan <sup>1</sup>, Abhiraj Ramchandani <sup>2</sup>, Monika Singh Parihar <sup>1</sup>, Mamta Gupta <sup>2</sup>,  
Maj Gen Shrikant Nema <sup>2</sup>, Santosh Jayant <sup>2</sup>, Kirti Hada <sup>1</sup>, Pratishta Shrivastava <sup>1</sup>

<sup>1</sup>. Pathology, Amaltas Institute of Medical Sciences, Dewas, IND <sup>2</sup>. Pathology and Laboratory Medicine, Amaltas Institute of Medical Sciences, Dewas, IND

**Corresponding author:** Anshita Chouhan, chouhanshita2525@gmail.com

## Abstract

**Background and aim:** Fine-needle aspiration cytology (FNAC) is widely used to evaluate thyroid lesions and guide further management. This study aimed to describe the cytological spectrum and Bethesda category distribution of thyroid lesions, patients' demographic and clinical characteristics, and available thyroid-function and histopathological findings at a tertiary care hospital in Central India.

**Methods:** This prospective observational study included 103 patients evaluated in the Department of Pathology at Amaltas Institute of Medical Sciences, Dewas, over 18 months. Clinical findings were recorded, and thyroid aspirates were examined using Papanicolaou and May-Grünwald-Giemsa staining. Diagnoses were categorized according to the 2023 Bethesda System for Reporting Thyroid Cytopathology. Available thyroid-function and histopathological findings were assessed. Categorical data were summarized as frequencies and percentages.

**Results:** Women constituted 92 (89.3%) patients, and the largest age group was 38-47 years, comprising 29 (28.2%) patients. Anterior neck swelling was the predominant symptom in 91 (88.3%) patients. Colloid goiter and follicular neoplasm were each reported in 21 (20.4%) patients, followed by colloid cyst in 19 (18.4%) and lymphocytic thyroiditis in 13 (12.6%). Bethesda category II predominated in 74 (71.8%) patients, followed by category IV in 23 (22.3%) patients. Histopathology was available for 32 (31.1%) patients, with goitrous lesions accounting for 14 (43.8%) patients in this subgroup. Both concordant and discordant cytological-histopathological findings were observed.

**Conclusions:** Benign thyroid lesions predominated, while follicular-patterned lesions represented a substantial diagnostic group. FNAC supported diagnostic categorization, but findings require integration with clinical and ultrasonographic assessment. Limited histopathological verification precluded firm conclusions regarding diagnostic accuracy.

**Categories:** Medical Education, Pathology, Endocrinology/Diabetes/Metabolism

**Keywords:** fine needle aspiration cytology, histopathology, the bethesda system of reporting thyroid cytology, thyroid cytology, thyroid lesions

## Introduction

Thyroid lesions encompass a broad spectrum of non-neoplastic and neoplastic conditions, including nodular hyperplasia, thyroiditis, follicular neoplasms, and thyroid carcinoma. Their clinical presentation ranges from an incidental thyroid nodule to a palpable swelling associated with pressure symptoms or thyroid dysfunction. Although most thyroid nodules are benign, identifying lesions that require further investigation or surgical intervention remains a central concern in clinical practice [1]. High-resolution ultrasonography detects thyroid nodules in approximately 19%-68% of randomly selected individuals, with a higher frequency among women and older adults [2]. Accurate evaluation is therefore essential to identify clinically significant malignancy while avoiding unnecessary procedures.

Fine-needle aspiration cytology (FNAC) is an established method for evaluating thyroid nodules because it is minimally invasive and provides information that guides subsequent management. Clinical assessment, serum thyroid-stimulating hormone measurement, and ultrasonographic findings help determine which nodules warrant aspiration [2]. Cytological examination can identify benign follicular nodules, inflammatory lesions, and several thyroid malignancies. However, inadequate sampling and overlapping cytomorphological features can limit diagnostic certainty. In particular, distinguishing follicular adenoma from follicular carcinoma requires demonstration of capsular or vascular invasion on histopathological examination, which cannot be assessed by FNAC [1,2].

The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) provides standardized diagnostic

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terminology and links cytological findings to an estimated risk of malignancy and appropriate management options [3]. The 2023 revision retains the following six diagnostic categories: non-diagnostic, benign, atypia of undetermined significance, follicular neoplasm, suspicious for malignancy, and malignant. It also updates malignancy risk estimates and refines diagnostic terminology to improve communication between cytopathologists and treating clinicians [4]. This structured approach supports decisions regarding repeat aspiration, surveillance, additional testing, or surgery.

Indian studies have demonstrated the applicability of Bethesda reporting in routine thyroid cytology. Mondal et al., in a study of 1,020 thyroid aspirates, found that benign lesions predominated and demonstrated the clinical value of standardized categorization with histopathological follow-up [5]. Describing the spectrum encountered within an individual institution can provide useful information about its patient population and diagnostic workload.

This prospective observational study aimed to describe the cytological spectrum of thyroid lesions at Amaltas Institute of Medical Sciences, Dewas, a tertiary care hospital in Central India. The objectives were to summarize patients' demographics and presenting clinical characteristics; determine the distribution of specific cytological diagnoses and categories under the 2023 Bethesda System for Reporting Thyroid Cytopathology; and describe available thyroid-function and histopathological findings, including patterns of cytological-histopathological agreement and discordance in the subgroup with tissue diagnoses.

## Materials And Methods

### Study design and setting

This prospective observational study was conducted in the Department of Pathology at Amaltas Institute of Medical Sciences, Dewas, Madhya Pradesh, India, over 18 months from February 2024 to August 2025 following institutional ethical approval. The study evaluated the cytological spectrum of thyroid lesions, their demographic and clinical characteristics, and their categorization using the Bethesda System for Reporting Thyroid Cytopathology (TBSRTC).

### Study population

Patients with palpable thyroid swellings that moved with deglutition and those with thyroid lesions detected on imaging and referred for FNAC were eligible for inclusion in this study. Patients with neck swellings attributable to other causes, including lymphadenopathy, were excluded. Critically ill patients and those unable to cooperate with the procedure were also excluded. A total of 103 patients were included in the final analysis.

### Clinical assessment

A detailed clinical history was obtained before aspiration. This included the duration and progression of swelling, pain or tenderness, dysphagia, dyspnea, hoarseness, symptoms suggestive of thyroid dysfunction, previous thyroid treatment or surgery, neck irradiation, and family history of thyroid disease. General examination assessed pulse, blood pressure, tremors, exophthalmos, and other features suggestive of thyroid dysfunction.

Local examination documented the site, size, symmetry, surface, consistency, tenderness, and movement of the swelling during swallowing. Thyroid enlargement was recorded as diffuse enlargement, enlargement of one lobe, or a solitary nodule. Consistency was classified as soft, firm, or hard. Cervical lymph nodes were also examined. Available ultrasonographic findings and thyroid-function results were recorded for comparison with the cytological findings.

### Fine-needle aspiration procedure

FNAC was performed under aseptic precautions. Patients were positioned supine with the neck extended using a small pillow or towel beneath the shoulders. They were instructed to remain still and avoid swallowing during aspiration. The skin over the swelling was cleaned with an antiseptic solution.

A 23-25-gauge needle attached to a 10-mL disposable syringe was introduced into the lesion. Negative pressure was applied, and the needle was moved within the lesion in different directions to obtain representative material. Suction was released before withdrawing the needle. The aspirated material was then expelled onto clean glass slides for immediate smear preparation.

### Smear preparation and staining

Thin smears were prepared using direct spreading or gentle compression between two slides, depending on the consistency of the aspirated material. Smears intended for Papanicolaou staining were immediately fixed in 95% ethanol. Additional smears were air-dried and stained with May-Grünwald-Giemsa stain. Both preparations were examined to assess cellular architecture, nuclear and cytoplasmic features, and background material.

## Cytomorphological assessment and diagnostic classification

Two experienced cytopathologists independently examined the stained smears under low and high magnification. Assessment included specimen cellularity, the amount and nature of colloid, follicular architecture, inflammatory cells, macrophages, multinucleated giant cells, and oncocytic changes. Nuclear enlargement, chromatin characteristics, nuclear grooves, intranuclear cytoplasmic inclusions, and other features of atypia or malignancy were evaluated. Discordant interpretations were reviewed jointly to establish a consensus diagnosis.

Aspirates were classified according to the 2023 revision of TBSRTC into the following six categories: (I) non-diagnostic, (II) benign, (III) atypia of undetermined significance, (IV) follicular neoplasm, (V) suspicious for malignancy, and (VI) malignant [4]. This classification provides standardized terminology and category-specific estimates of malignancy risk to support clinical management.

Specific cytological diagnoses were recorded alongside the Bethesda category. Cytological findings were compared with clinical examination and available ultrasonographic findings. Histopathological diagnoses, where available, were compared with the corresponding FNAC findings.

## Study variables and outcomes

The principal outcome was the distribution of thyroid lesions by specific cytological diagnosis and Bethesda category. Additional variables included age group, sex, predominant presenting symptom, pattern of thyroid enlargement, and consistency of the swelling. Thyroid functional status was summarized among patients with available thyroid-function results. The histopathological spectrum and patterns of agreement or discordance with cytology were assessed in the subgroup with available tissue diagnoses.

## Statistical analysis

Data were analyzed using IBM SPSS version 31.0 (Armonk, NY: IBM Corp.) statistics for Windows. Categorical variables were summarized as frequencies and percentages. Percentages for demographic, clinical, and cytological findings were calculated using the total study population as the denominator. Thyroid-function and histopathological findings were summarized using their respective available-case denominators. Percentages were rounded to one decimal place. The analysis was descriptive; no inferential statistical tests were performed.

## Results

This study included 103 patients. Women predominated, and the largest age group was 38–47 years. Anterior neck swelling was the most frequent presenting complaint. Diffuse enlargement and soft consistency were the predominant examination findings (Table 1). FNAC demonstrated a varied cytological spectrum. Colloid goiter and follicular neoplasm were the joint most frequent diagnoses, followed by colloid cyst and lymphocytic thyroiditis. Papillary carcinoma was the only explicitly identified carcinoma in the detailed cytological diagnosis table. The remaining diagnoses comprised less frequent nodular, inflammatory, oncocytic, and paucicellular findings (Table 2).

| Characteristics                | Category                | Frequency, n (%) |
|--------------------------------|-------------------------|------------------|
| Age group (years)              | ≤27                     | 13 (12.6)        |
|                                | 28-37                   | 24 (23.3)        |
|                                | 38-47                   | 29 (28.2)        |
|                                | 48-57                   | 18 (17.5)        |
|                                | 58-67                   | 10 (9.7)         |
|                                | >67                     | 9 (8.7)          |
| Sex                            | Female                  | 92 (89.3)        |
|                                | Male                    | 11 (10.7)        |
| Predominant presenting symptom | Anterior neck swelling  | 91 (88.3)        |
|                                | Pain                    | 6 (5.8)          |
|                                | Dysphagia               | 4 (3.9)          |
|                                | Dyspnea                 | 1 (1.0)          |
|                                | Hoarseness              | 1 (1.0)          |
| Appearance of swelling         | Diffuse enlargement     | 48 (46.6)        |
|                                | Enlargement of one lobe | 41 (39.8)        |
|                                | Solitary nodule         | 14 (13.6)        |
| Consistency                    | Soft                    | 78 (75.7)        |
|                                | Firm                    | 23 (22.3)        |
|                                | Hard                    | 2 (1.9)          |

TABLE 1: Demographic and clinical characteristics of the study population.
Percentages use the total study population as the denominator (n=103) and are rounded to one decimal place. Each characteristic is summarized separately.

| Cytological diagnosis                               | Frequency, n (%) |
|-----------------------------------------------------|------------------|
| Colloid goiter                                      | 21 (20.4)        |
| Follicular neoplasm                                 | 21 (20.4)        |
| Colloid cyst                                        | 19 (18.4)        |
| Lymphocytic thyroiditis                             | 13 (12.6)        |
| Colloid nodule                                      | 7 (6.8)          |
| Nodular goiter                                      | 5 (4.9)          |
| Multinodular goiter                                 | 4 (3.9)          |
| Papillary carcinoma                                 | 3 (2.9)          |
| Non-specific thyroiditis                            | 3 (2.9)          |
| Hemorrhagic and inflammatory aspirate               | 2 (1.9)          |
| Thyroid lesion, unspecified                         | 1 (1.0)          |
| Hürthle cell adenoma                                | 1 (1.0)          |
| Oncocytic neoplasm                                  | 1 (1.0)          |
| Paucicellular aspirate without definitive pathology | 1 (1.0)          |
| Solitary adenomatoid nodule                         | 1 (1.0)          |
| Total                                               | 103 (100.0)      |

TABLE 2: Distribution of specific diagnoses reported on fine-needle aspiration cytology.

Percentages are based on n=103. Diagnoses with no reported cases are omitted.

FNAC: fine-needle aspiration cytology

Bethesda categorization showed a predominance of category II, followed by category IV. The other categories constituted a small proportion of aspirates (Figure 1). This distribution indicates that benign and follicular-patterned lesions accounted for most cytological assessments. Thyroid-function results were available for 32 (31.1%) patients. Within this subgroup, 16 (50.0%) were euthyroid, nine (28.1%) were hypothyroid, and seven (21.9%) were hyperthyroid. Thus, normal thyroid function was the most frequent functional status among patients with available results.

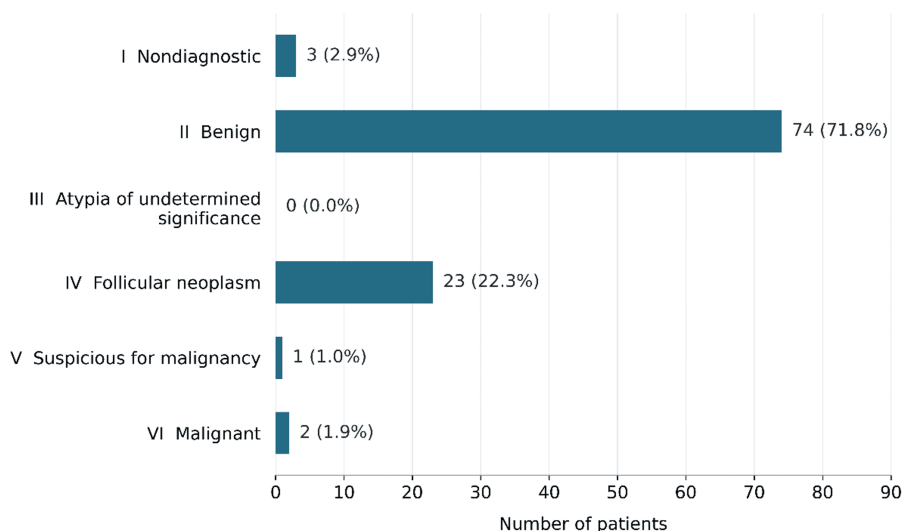


**FIGURE 1: Distribution of thyroid aspirates according to the Bethesda System for Reporting Thyroid Cytopathology.**

Bars represent the number of patients in each Bethesda category. Data labels show the frequency (percentage), calculated using the total study population (n=103). Percentages are rounded to one decimal place. No cases were classified as category III (atypia of undetermined significance).

Histopathological findings were available for 32 (31.1%) patients. Goitrous lesions predominated, followed by lymphocytic thyroiditis and follicular variant of papillary carcinoma. The histopathological spectrum also included follicular carcinoma, encapsulated papillary carcinoma, follicular adenomas, and non-invasive follicular thyroid neoplasm with papillary-like nuclear features (Table 3).

| Histopathological diagnosis                                                             | Frequency, n (%) |
|-----------------------------------------------------------------------------------------|------------------|
| Multinodular goiter/nodular goiter/colloid goiter                                       | 14 (43.8)        |
| Lymphocytic thyroiditis                                                                 | 4 (12.5)         |
| Follicular variant of papillary carcinoma                                               | 3 (9.4)          |
| Hashimoto's thyroiditis                                                                 | 2 (6.3)          |
| Colloid cyst                                                                            | 2 (6.3)          |
| Thyroid amyloidosis with chronic thyroiditis                                            | 1 (3.1)          |
| Follicular thyroid carcinoma, left lobe                                                 | 1 (3.1)          |
| Left-lobe nodular hyperplasia with papillary changes and right-lobe pleomorphic adenoma | 1 (3.1)          |
| Right-lobe NIFTP with left-lobe adenomatoid nodule                                      | 1 (3.1)          |
| Encapsulated papillary carcinoma                                                        | 1 (3.1)          |
| Follicular adenoma with multinodular goiter                                             | 1 (3.1)          |
| Follicular adenoma with focal lymphocytic thyroiditis                                   | 1 (3.1)          |
| Total                                                                                   | 32 (100.0)       |

**TABLE 3: Histopathological diagnoses among patients with available tissue findings.**

Percentages use the histopathology subgroup as the denominator (n=32). Rounding may cause percentages to slightly exceed 100%. Combined diagnoses represent individual patients.

NIFTP: non-invasive follicular thyroid neoplasm with papillary-like nuclear features

Comparison of the paired cytological and histopathological findings showed both concordant and discordant diagnoses. Colloid cyst and Hashimoto's thyroiditis showed corresponding cystic and lymphocytic cytological findings, respectively. However, follicular-patterned carcinomas had variable preceding cytological diagnoses, including follicular neoplasm, colloid cyst, and lymphocytic thyroiditis. The reported cytological diagnosis of papillary carcinoma in the histopathology subgroup corresponded to lymphocytic thyroiditis on tissue examination. These findings demonstrate diagnostic discordance in the available paired cases; they do not establish overall diagnostic accuracy.

## Discussion

This prospective observational study describes the cytological spectrum of thyroid lesions at a tertiary care hospital in Central India. Benign lesions predominated, while follicular-patterned lesions formed a substantial diagnostic group. Inflammatory lesions, particularly lymphocytic thyroiditis, also contributed to the spectrum. These findings broadly agree with Indian studies reporting a predominance of benign thyroid aspirates [5,6]. However, the present findings describe an institutional referral population and should not be interpreted as the prevalence of thyroid disease in the wider community.

Women constituted 92 (89.3%) patients, and the largest age group was 38–47 years, comprising 29 (28.2%) patients. Female predominance is consistent with the recognized distribution of thyroid nodules [2]. Bamanikar et al. similarly reported a predominance of women, although their patients were more frequently aged 21–40 years [7]. Differences in age distribution may reflect the populations served, referral practices, and timing of presentation. The present study did not examine hormonal, nutritional, or environmental determinants, so their contribution to the observed demographic pattern cannot be established.

Anterior neck swelling was the predominant presenting complaint, and diffuse enlargement and soft consistency were the most frequent examination findings. This clinical pattern accompanied a predominantly benign cytological spectrum. Nevertheless, clinical examination alone cannot reliably distinguish benign from malignant thyroid lesions. Established diagnostic approaches combine clinical history, thyroid-function assessment, ultrasonographic features, and cytology [1,2]. Consequently, the absence of pain, compressive symptoms, or hard consistency should not be used to exclude malignancy.

Bethesda category II accounted for 74 (71.8%) patients. This predominance of benign cytology agrees with the study by Mondal et al., in which 87.5% of 1,020 aspirates were classified as benign [5]. Colloid goiter and colloid cyst were prominent specific diagnoses in the present study. Bamanikar et al. also identified nodular colloid goiter as the most common cause of thyroid swelling [7]. These findings illustrate the practical role of FNAC in identifying benign cytological patterns and supporting management according to clinical and ultrasonographic risk. However, benign cytology does not remove the need for reassessment when imaging findings or subsequent clinical changes raise concern [2].

Bethesda category IV was reported in 23 (22.3%) patients, representing a substantial proportion of the study population. This proportion was higher than the suspicious-for-follicular-neoplasm group reported by Mondal et al. [5]. Direct comparison requires caution because the studies differed in reporting system, patient selection, and institutional setting. Follicular neoplasm is a cytological classification rather than a definitive diagnosis of carcinoma. The distinction between follicular adenoma and follicular carcinoma depends on histopathological demonstration of capsular or vascular invasion [1,4]. Accordingly, in this study, follicular carcinoma preceded by a cytological diagnosis of follicular neoplasm reflects an expected limitation of cytology rather than necessarily a diagnostic error.

Standardized Bethesda reporting provides a common framework for communicating diagnostic uncertainty and linking findings to an estimated malignancy risk [3,4]. The meta-analysis by Bongiovanni et al. supported its usefulness in organizing thyroid aspirates into clinically meaningful categories [8–10]. Nevertheless, published malignancy-risk estimates should not be treated as locally measured risks. The present study had limited histopathological verification and therefore could not establish reliable institution-specific malignancy risks for individual Bethesda categories.

Non-diagnostic aspirates were reported in three (2.9%) patients. Although this proportion was small, it cannot independently establish the quality of sampling or exclude missed lesions. Information on repeat aspiration, ultrasound guidance, and adequacy assessment would be needed for a more complete evaluation. Poller et al. emphasized that thyroid cytology quality depends on several stages, including specimen collection, interpretation, communication, and follow-up [11]. Their proposed framework supports reviewing non-diagnostic and discordant cases alongside clinical and imaging findings. In the present setting, a prospective audit of specimen adequacy and repeat-aspiration outcomes would help clarify the significance of the observed non-diagnostic rate.

No patients were classified as Bethesda category III. This observation should be interpreted cautiously rather than regarded as evidence of superior diagnostic certainty. Guleria et al., in their systematic review and meta-analysis, documented substantial heterogeneity in the use and outcomes of the atypia of undetermined significance/follicular lesion of undetermined significance category across published studies

[12]. Differences in diagnostic thresholds and interpretation can influence category assignment. The absence of category III in this relatively small cohort therefore warrants consideration alongside the substantial category IV group, although the available data do not establish that cases were reassigned between these categories.

Lymphocytic thyroiditis was an important component of the cytological spectrum. The paired histopathological findings also included Hashimoto's thyroiditis and lymphocytic thyroiditis, demonstrating the relevance of inflammatory lesions in patients presenting with thyroid enlargement. These lesions can create diagnostic difficulties when reactive nuclear changes, oncocytic cells, or limited sampling overlap with features of neoplasia. Poller et al. identified lymphocytic thyroiditis, oncocytic lesions, and follicular-patterned lesions among recognized sources of interpretive difficulty [11]. Careful assessment of the cellular background and architecture, together with clinical and imaging correlation, is therefore particularly important in such cases.

Thyroid-function results were available for a subgroup, among whom euthyroid status predominated. This illustrates that structural thyroid lesions may occur despite normal thyroid function. Biochemical testing and cytology address different aspects of thyroid disease and should be interpreted together. The American Thyroid Association and American Association of Clinical Endocrinologists (AACE)/American College of Endocrinology (ACE)/Associazione Medici Endocrinologi (AME) guidelines incorporate thyroid-function assessment into the evaluation of thyroid nodules and recommend further investigation according to biochemical and imaging findings [2,13]. The present study could not determine whether functional status was associated with particular cytological diagnoses because paired biochemical data were limited.

Ultrasonography provides an additional means of selecting lesions for aspiration and interpreting cytological findings. The American College of Radiology Thyroid Imaging Reporting and Data System (ACR TI-RADS) uses sonographic characteristics to support decisions regarding biopsy and follow-up [14]. Although ultrasonographic findings were available in the thesis, consistently recorded risk categories were insufficient for a systematic comparison with Bethesda diagnoses. Future studies should document nodule size, composition, echogenicity, margins, shape, and echogenic foci using a specified risk-classification system. This would permit clearer assessment of imaging-cytology discordance and its effect on subsequent management.

Histopathological findings were available for 32 (31.1%) patients and showed both concordant and discordant diagnoses. Colloid cyst and Hashimoto's thyroiditis had corresponding cytological findings, whereas follicular variant of papillary carcinoma had variable preceding diagnoses. The cytological diagnosis of papillary carcinoma within the histopathology subgroup corresponded to lymphocytic thyroiditis on tissue examination. Sampling variation, interpretive overlap, or documentation discrepancies are possible explanations, but none was established by this study. Yang et al. demonstrated the importance of reviewing discrepant thyroid aspirates alongside histology and clinical follow-up [9]. The present discordant cases therefore require review of the original smears, tissue sections, and patient-level records before conclusions about false-positive or false-negative performance are made.

The histopathological identification of non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP) further illustrates the distinction between cytological assessment and definitive tissue classification. NIFTP requires evaluation of the lesion's architecture and boundary and exclusion of invasion. Its introduction followed evidence supporting the indolent behavior of carefully defined non-invasive encapsulated follicular-patterned tumors [10]. Therefore, a definitive diagnosis cannot be established from FNAC alone. Such lesions should be considered separately from invasive carcinoma when evaluating cytological outcomes and malignancy risks [4,10].

The substantial follicular-neoplasm group also raises the potential relevance of ancillary molecular testing in selected indeterminate lesions. Alexander et al. demonstrated that a gene-expression classifier could help identify benign nodules among those with indeterminate cytology [15]. Steward et al. subsequently evaluated a multigene genomic classifier in a prospective, blinded, multicenter study and demonstrated its ability to refine risk assessment in Bethesda III and IV nodules [16]. These studies provide a basis for considering molecular testing where appropriate and available. However, molecular testing was not performed in the present study, and its diagnostic value, affordability, or effect on surgical decisions in this population cannot be inferred.

The clinical implication of the present findings is the need to interpret FNAC as part of an integrated diagnostic pathway. Benign aspirates, follicular-patterned lesions, inflammatory lesions, and non-diagnostic specimens require different approaches according to the accompanying clinical and imaging findings [2,4,13]. Multidisciplinary review is particularly relevant when cytology and imaging are discordant or when an indeterminate lesion is being considered for surgery [11]. Although the study describes these diagnostic groups, it did not measure changes in management, avoided operations, or patient outcomes. Claims of improved clinical outcomes would therefore exceed the available evidence.

The study's strengths include its prospective design, documentation of clinical and cytomorphological

findings, independent examination by two cytopathologists, and standardized Bethesda categorization. Its limitations include the single-center setting, modest sample size, limited biochemical data, and selective availability of histopathology. Partial verification restricts estimates of diagnostic accuracy and category-specific malignancy risk. The discrepancy between the detailed FNAC carcinoma count and the Bethesda malignant-category count also requires reconciliation. Long-term follow-up, systematic imaging-risk assessment, and management outcomes were not reported. Larger studies with verified patient-level records and structured follow-up would provide a stronger basis for evaluating diagnostic performance and clinical utility. Histopathological findings were available for only 32 of 103 patients (31.1%). This selectively verified subgroup may differ from patients without tissue diagnoses, introducing potential selection and partial verification bias. Consequently, its histopathological distribution and cytological-histopathological agreement cannot be generalized to the entire cohort. Incomplete biochemical and ultrasound data also restricted assessment of relationships between cytological diagnoses, thyroid functional status, and imaging findings.

## Conclusions

Benign thyroid lesions predominated in this tertiary care cohort, with Bethesda category II being the most frequent classification and category IV representing a substantial group. These findings describe the distribution of cytological diagnoses among patients referred for FNAC at this institution.

Histopathological findings were available for a selected subgroup. Limited tissue verification and the absence of established nodule-level matching restrict interpretation of apparent cytological-histopathological discordance and preclude firm conclusions regarding diagnostic accuracy or category-specific malignancy risk. The potential relevance of these findings to clinical management requires further evaluation, as management decisions and patient outcomes were not assessed.

## Additional Information

### Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

**Concept and design:** Anshita Chouhan, Abhiraj Ramchandani, Monika Singh Parihar, Maj Gen Shrikant Nema, Mamta Gupta, Kirti Hada, Santosh Jayant, Pratishtha Shrivastava

**Acquisition, analysis, or interpretation of data:** Anshita Chouhan, Abhiraj Ramchandani, Monika Singh Parihar, Maj Gen Shrikant Nema, Mamta Gupta, Kirti Hada, Santosh Jayant, Pratishtha Shrivastava

**Drafting of the manuscript:** Anshita Chouhan, Abhiraj Ramchandani, Monika Singh Parihar, Maj Gen Shrikant Nema, Mamta Gupta, Kirti Hada, Santosh Jayant, Pratishtha Shrivastava

**Critical review of the manuscript for important intellectual content:** Anshita Chouhan, Abhiraj Ramchandani, Monika Singh Parihar, Maj Gen Shrikant Nema, Mamta Gupta, Kirti Hada, Santosh Jayant, Pratishtha Shrivastava

**Supervision:** Anshita Chouhan, Abhiraj Ramchandani, Monika Singh Parihar, Maj Gen Shrikant Nema, Mamta Gupta, Kirti Hada, Santosh Jayant, Pratishtha Shrivastava

### Disclosures

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