DOI: 10.7860/NJLM/2025/78203.2925

Original Article

Pathology Section

Utility of Fine Needle Aspiration Cytology in the Diagnosis of Thyroid Gland Lesions: A Cross-sectional Study from Tertiary Care Hospital, in Hilly Area of Nilgiris District, Southern India

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ABSTRACT

Introduction: Thyroid disorders are the most common among the endocrine disorders encountered in the daily clinical practice. Hence, it is very essential to distinguish benign from malignant neoplasms of thyroid in order to avoid unnecessary surgeries. Fine Needle Aspiration Cytology (FNAC) has emerged as the most sensitive, minimally invasive diagnostic tool in the preoperative assessment of thyroid nodules. Lesions with follicular pattern are gray zone in areas of cytology. The aim of the present study was to assess the effectiveness of FNAC in diagnosing the thyroid gland lesions using Bethesda reporting system and to estimate the prevalence of goitre in a tertiary care hospital in Nilgiris, Tamil Nadu.

Aim: This study aimed to assess the effectiveness of FNAC in diagnosing thyroid lesions.

Materials and Methods: The present cross-sectional study was conducted from December 2019 to November 2022 in the Department of Pathology, Government Medical College and Hospital, Nilgiris, Tamil Nadu, India. Two hundred cases (200) with clinically palpable thyroid lesions were analysed by FNAC and reported using Bethesda system of thyroid cytopathology after thorough clinical evaluation. Data were entered in Microsoft excel and analysed using Statistical Package for the Social Sciences (SPSS) version 25. Descriptive data were analysed in the form of frequency, percentage, mean and standard deviation and presented by tables and charts. Fischer-exact test was used to find association between categorical variables. The p-value of less than 0.05 was considered significant.

Results: During this study period, a total of 200 cases were evaluated. Data analysis revealed 191 (95.5%) females and 55 (27.5%) cases of 31 to 40 years of age were commonly affected. The most common clinical presentation was solitary nodule in 105 (52.5%) patients followed by multiple nodules in 59 (29.5%) and diffuse swelling in 36 (18%). The commonest diagnosis was Nodular colloid goitre in 127 (63.5%) and Hashimoto's thyroiditis in 24 (12%). According to Bethesda system of thyroid cytopathology, benign lesions in 171 (85.5%) were common followed by follicular neoplasm/ suspicious for a follicular neoplasm and non diagnostic in 10 (5%) each.

Conclusion: FNAC has emerged as the most reliable, accurate, sensitive, cost effective, minimally invasive, gold standard diagnostic tool in the preoperative assessment of thyroid nodules.

Keywords: Bethesda, Iodine deficiency, Grave's disease, Multinodule

INTRODUCTION

Thyroid is a butterfly shaped gland present in the anterior aspect of neck. Thyroid disease commonly presents as neck swelling [1] which can be single nodule, multiple nodules or diffuse swelling. There is a huge burden of thyroid diseases in general population, most commonly among women (male to female ratio 1:3.2) [2]. The thyroid lesions may be developmental, inflammatory, hyperplastic and neoplastic. It comprises a spectrum of entities causing systemic (Graves' disease) or localised or diffuse enlargement or tumour mass [3]. The prevalence of thyroid nodule ranges from 4-7% in adults and 0.2-1.5% in children [4].

The highest incidence was observed in the fourth decade of age followed by third decade [5], with a mean age of 38-52 years [6]. Iodine deficient endemic goitre is prevalent in many high mountainous areas or in areas far away from sea, but it has been reported to be decreasing because of increased awareness and use of iodised salt.

Most of the thyroid nodules are benign and fewer than 5% are malignant. To overcome the dilemma of how to manage patients with benign thyroid nodule FNAC, a most effective and reliable diagnostic technique has been found. Studies show that 2-15% of FNAC are insufficient, 50-70% benign, 5-30% suspicious and 5-10% malignant [7]. The clinicopathological correlation of neck lesions reported that thyroid lesions were most common (31.06%) followed by lymph node (20.38%), skin and soft tissue lesions (18.44%) and salivary gland (6.79%) [8].

One of the important limitations of FNAC is its inability to differentiate follicular hyperplastic nodules and follicular adenomas from well differentiated follicular carcinoma which causes high incidence of "suspicious category" in all studies [9]. Recent studies has suggested the use of molecular based techniques such as BRAF and RAS gene mutations and Real Time-Polymerase Chain Reaction (RT-PCR) for RET/PTC gene rearrangements to improve the differentiation of malignant lesion from their benign counterparts among the suspicious category [10]. The false negative cytological diagnosis were encountered due to failure to obtain representative samples, needle has missed the lesion tangentially, central cystic, calcified, necrotic or haemorrhagic areas devoid of diagnostic mass [11]. The sensitivity of thyroid FNAC ranges from 65-99% and its specificity from 72-100%. The important reason for wide range of sensitivity and specificity is

how pathologists handle the category of "suspicious" and how they define the false positive and false negative results [12].

The inadequate sample in certain cases may be rectified by the use of ultra sound guided FNAC, especially in patients with small nodules. Occasionally, when FNAC results are inconsistent, it creates dispute among clinicians how to proceed with the treatment for the patients. The reason is approximately 10-30% of cases, cytology is indeterminate and non-diagnostic [13]. To avoid the diagnostic inconsistencies, the National Cancer Institute in the United States established the Bethesda system for reporting thyroid cytopathology, a six tiered diagnostic classification system based on a probalistic approach [13].

In the present study, genuine attempts were made to assess the prevalence of thyroid swelling in hilly area of Nilgiris district and appraise the efficacy of FNAC and advantages of utilising Bethesda system for reporting thyroid cytopathology in diagnosing various thyroid lesions and guiding the clinicians in the proper treatment of thyroid diseases, avoiding unnecessary surgeries in benign conditions.

The current study aimed,

- To assess the effectiveness of FNAC in thyroid swellings;
- To study the advantages of Bethesda system for reporting thyroid cytopathology;
- To evaluate the prevalence of various thyroid swellings in hilly area of Nilgiris district.

MATERIALS AND METHODS

The present cross-sectional study was conducted in the Department of Pathology, Government Medical College and Hospital, Nilgiris, Tamil Nadu, India for a period of three years (December 2019 to November 2022). Ethical committee approval obtained with IEC NO: IRBGMCTN0019. A detailed clinical history and thorough physical examination of patients with clinically palpable thyroid lesions were carried out and entered in the proforma.

Inclusion and exclusion criteria: All patients (all age groups, both genders) with clinically palpable thyroid gland lesions were included in the study. Patients with imminent hyperthyroid symptoms were excluded from the study. The patients were explained about the procedure, limitations and possible complications and informed consent was obtained. Data regarding relevant biochemical and radiological investigations were noted if done by the patient.

Study Procedure

Patients were made to lie down in supine position with a pillow under the shoulder, head falling back with extension of neck. During the procedure, Patients were asked not to swallow or speak. FNAC of the swellings were performed under aseptic precautions and standard technique by aspirating the material from the lesion using 23-24 gauge needles with syringe and smeared on clean glass slides. It was fixed in isopropyl alcohol and then stained with haematoxylin and eosin stains. Finally, the slides were examined under light microscope. Then the Bethesda system for reporting thyroid cytopathology was used to classify the thyroid lesions. The parameters such as age, sex, clinical findings and on microscopy cellularity, pattern of arrangement and morphology of cells along with nuclear features and nature of background were studied and tabulated. The confirmation of diagnosis with histopathology could not be done in all the patients due to lack of follow-up.

Cytological classification: The Bethesda System For Reporting Thyroid Cytopathology [13].

The 6- diagnostic approach includes six categories:

District of Columbia (DC I)- Non-diagnostic or unsatisfactory.

1. It includes poor fixation and preservation, obscuring blood or ultrasound gel, inadequate cellularity or combination of above factors. Inadequate cellularity is defined as presence of <6 groups of well-preserved follicular cells on each of atleast two slides.
2. DC II- Benign. This includes nodular goitre, nodular goitre with hyperplastic nodule, colloid nodule, cyst contents with or without benign follicular cells and lymphocytic thyroiditis.
3. DC III- Atypia of undetermined significance or follicular lesion of undetermined significance. This denotes aspirates with borderline cellularity and is subdivided into two subcategories. One includes cases with microfollicular pattern and minimal colloid (FLUS). Two includes cases with nuclear atypia such as presence of occasional nuclear groups, nuclear crowding and abnormal chromatin pattern, which are characteristic of papillary carcinoma. These patients could benefit from a repeat FNAC.
4. DC IV- Follicular neoplasm or suspicious for a follicular neoplasm. This refers to cellular specimens with abundant follicular cellsin microfollicular pattern with minimal colloid. The differential diagnosis includes hyperplastic adenomatous nodule, follicular adenoma, follicular carcinoma and follicular variant of papillary carcinoma, where the nuclear features remains ill defined. It also includes Hurthle cell neoplasm, whose differential diagnosis includes hyperplastic adenomatoid nodule with Hurthle cell change, Hurthle cell adenoma and Hurthle cell carcinoma.
5. DC V- Suspicious for malignancy. This refers to specimens with features characteristic of a malignant neoplasm, which are quantitatively or qualitatively insufficient to make a definitive diagnosis of malignancy such as nuclear grooves, intra nuclear inclusions or Psammoma calcifications.
6. DC VI- Malignant. This represents specimens with unequivocal cytological evidence of a malignancy. All histological types of thyroid carcinoma are included: papillary carcinoma and its variants, medullary carcinoma, anaplastic carcinoma, lymphoma and metastatic lesions.

Primary outcome: The effectiveness of FNAC of thyroid swellings was assessed using Bethesda system of reporting for categorisation and distribution of cases across each diagnostic category. As the malignancy risk was established from established large scale studies which would provide proper management. The proportion of non-diagnostic samples was recorded to assess the technical adequacy of the procedure.

Secondary outcome:

1. Bethesda system for reporting thyroid cytology provides several advantages that make it a valuable framework for clinical and academic purpose. It gives a uniform, evidence based terminologies for classifying thyroid lesions which promotes consistency across the cyto pathologists and institutions improving the communication with clinicians. It also helps in risk stratification which aids in guiding the management efficiently and appropriately. It also helps in enabling better clinical research and quality assurance.
2. The prevalence is calculated by taking the number of patients with clinically palpable thyroid gland lesions during the study period.

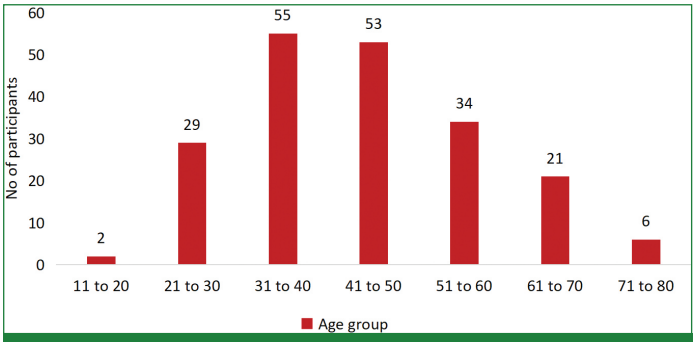
STATISTICAL ANALYSIS

The data were entered in Microsoft excel and SPSS version 25 was used for analysis. Descriptive data were analysed in the form of frequency, percentage, mean and standard deviation. Categorical variables were mentioned as frequency distribution and percentage. Data were represented by tables and charts wherever relevant. Fischer-exact test was used to find association between categorical variables. The p-value of less than 0.05 was considered significant.

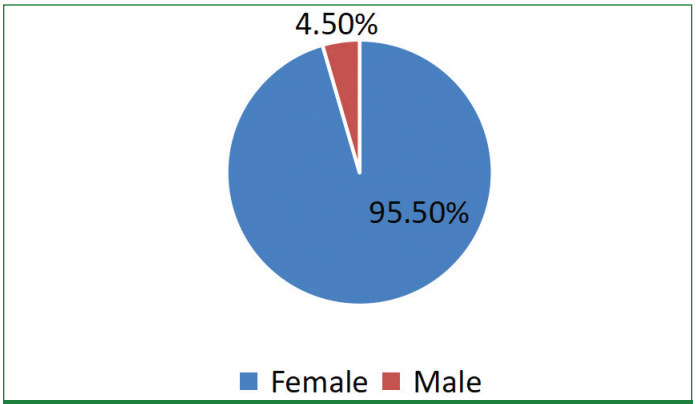
RESULTS

The mean age of the study cases was 44.93±13.17 years. The frequency of various age groups involved in this study is given in [Table/Fig-1]. Among the 200 cases, 191 were females and nine

were males [Table/Fig-2]. In this study, solitary nodule was found in 105 cases, multiple nodules in 59 and diffuse swelling in 36 [Table/Fig-3]. Out of 200 patients, 127 had Nodular colloid goitre, 17 had Nodular colloid goitre with cystic degeneration,24 had Hashimotos thyroiditis, five had suspicious for malignancy, three had Papillary carcinoma, one had anaplastic carcinoma and 10 were non diagnostic [Table/Fig-4]. Cytological examination of nodular colloid goitre revealed monolayered sheets of follicular epithelial cells admixed with abundant colloid and bare nuclei [Table/Fig-5].



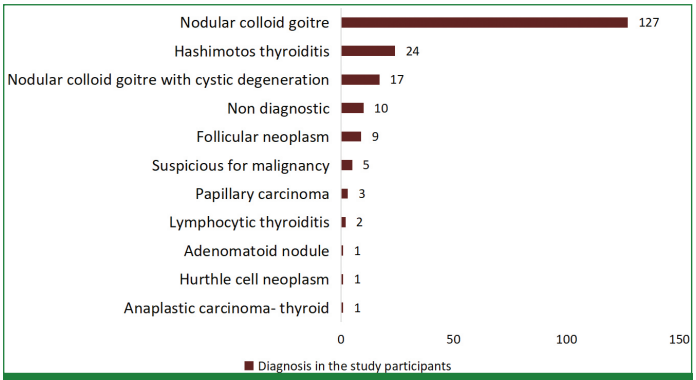
[Table/Fig-1]: Age group of the study participants.



[Table/Fig-2]: Gender of the study participants.

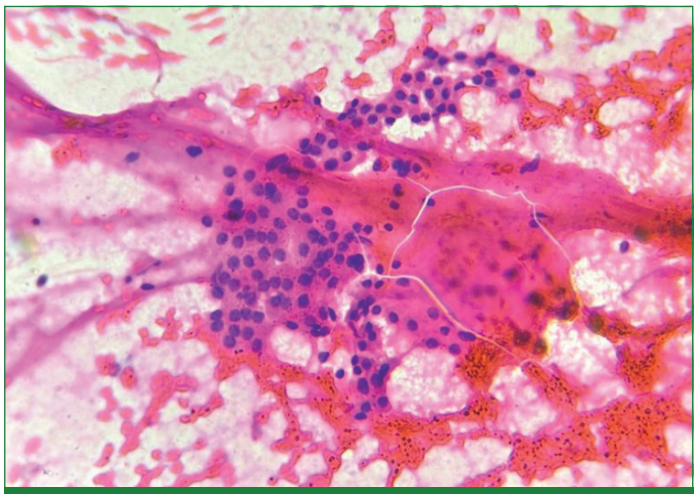
Clinical findings	Frequency (N=200)	Percentage (in %)
Solitary nodule	105	52.5
Multiple nodules	59	29.5
Diffuse swelling	36	18
Total	200	100

[Table/Fig-3]: Clinical findings in the study cases.

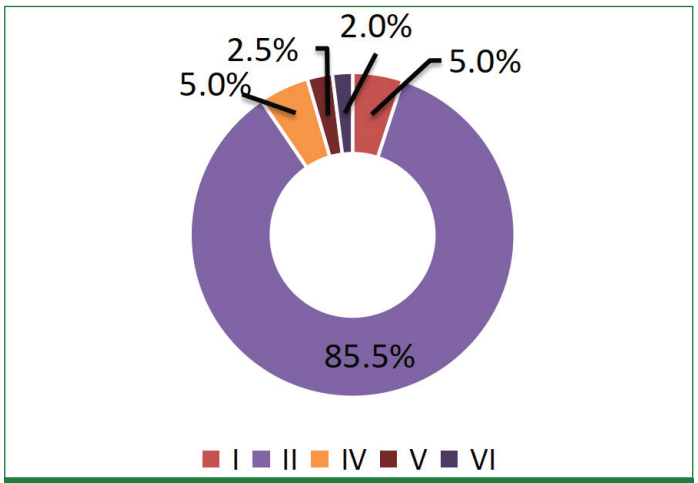


[Table/Fig-4]: Diagnosis in the study participants.

According to Bethesda grading, 10 cases had grade I, 171 had grade II, 10 had grade IV, five had grade V and four cases had grade VI [Table/Fig-6].The maximum number of nodular colloid goitre was diagnosed in the age group of 31 to 50 years. From 31 to 40 years of age, 39 had nodular colloid goitre, five had nodular colloid goitre with cystic degeneration, five had Hashimotos thyroiditis, three had follicular neoplasm, one had suspicion for malignancy and two were non-diagnostic. From 41 to 50 years of age, 32 had Nodular colloid goitre, four had nodular colloid goitre with cystic degeneration, 11 had Hashimotos thyroiditis, one had follicular neoplasm, one had suspicion for malignancy, one had papillary carcinoma and two were non diagnostic. This difference was not statistically significant by Fischer-exact test (p=0.69). The relationship between different age groups and diagnosis in the cases is given below [Table/Fig-7]. Cytological examination of Hashimotos thyroiditis revealed lymphocytic infiltration admixed with Hurthle cell change and follicular epithelial cells [Table/Fig-8a,b].



[Table/Fig-5]: Low power view of Colloid goitre displaying sheet of follicular epithelial cells and colloid. (Haematoxylin & Eosin (H&E) 10X).



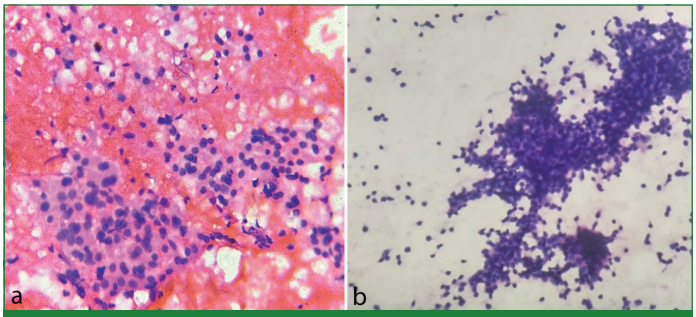
[Table/Fig-6]: Bethesda grading in the study participants.

Amidst females, 119 had Nodular colloid goitre, 17 had Nodular colloid goitre with cystic degeneration, 24 had Hashimotos thyroiditis, two had Lymphocytic thyroiditis, one had adenomatoid nodule, nine had follicular neoplasm, one had Hurthle cell neoplasm, five had suspicion for malignancy, three had papillary carcinoma, one had anaplastic carcinoma of thyroid, and nine were non diagnostic. In males, eight had nodular colloid goitre and one was non diagnostic. This difference was not statistically significant by Fischer-exact test. (p=0.91) [Table/Fig-9]. Cytological examination of follicular neoplasm revealed repetitive uniform follicular pattern, occasional nuclear crowding, clusters and scant to no colloid [Table/Fig-10].

Among the cases with solitary nodule, 63 had Nodular colloid goitre, 14 had Nodular colloid goitre with cystic degeneration, five had Hashimotos thyroiditis, one had Lymphocytic thyroiditis, one had adenomatoid nodule, eight had follicular neoplasm, one had Hurthle cell neoplasm, four had suspicion for malignancy, one had papillary carcinoma and seven were non-diagnostic. Cytological examination of Hurthle cell neoplasm showed clusters of Hurthle cells with abundant eosinophilic cytoplasm, round nuclei and prominent nucleoli [Table/Fig-11]. Amidst the cases, having multiple nodules, 49 had Nodular colloid goitre, two had Nodular colloid

Age group (Years)	Nodular colloid goitre	Nodular colloid goitre with cystic degeneration	Hashimotos thyroiditis	Lymphocytic thyroiditis	Adenomatoid nodule	Follicular neoplasm	Hurthle cell neoplasm	Suspicious for malignancy	Papillary carcinoma	Anaplastic carcinoma-	Non diagnostic
11-20	1 (50%)	0	1 (50%)	0	0	0	0	0	0	0	0
21-30	20 (69%)	1 (3.4%)	2 (6.9%)	1 (3.4%)	1 (3.4%)	0	0	1 (3.4%)	1 (3.4%)	0	2 (6.9%)
31-40	39 (70.9%)	5 (9.1%)	5 (9.1%)	0	0	3 (5.5%)	0	1 (1.8%)	0	0	2 (3.6%)
41-50	32 (60.4%)	4 (7.5%)	11 (20.8%)	1 (1.9%)	0	1 (1.9%)	0	1 (1.9%)	1 (1.9%)	0	2 (3.8%)
51-60	22 (64.7%)	2 (5.9%)	3 (8.8%)	0	0	2 (5.9%)	1 (2.9%)	1 (2.9%)	0	0	3 (8.8%)
61-70	10 (47.6%)	4 (19%)	2 (9.5%)	0	0	2 (9.5%)	0	0	1 (4.8%)	1 (4.8%)	1 (4.8%)
71-80	3 (50%)	1 (16.7%)	0	0	0	1(16.7%)	0	1 (16.7%)	0	0	0
Total	127 (63.5%)	17 (8.5%)	24 (12%)	2 (1%)	1 (0.5%)	9 (4.5%)	1 (0.5%)	5 (2.5%)	3 (1.5%)	1 (0.5%)	10 (5%)

[Table/Fig-7]: Association between age group and diagnosis in the study cases.
Fischer exact test value= 4.59; p-value= 0.69 (not statistically significant)

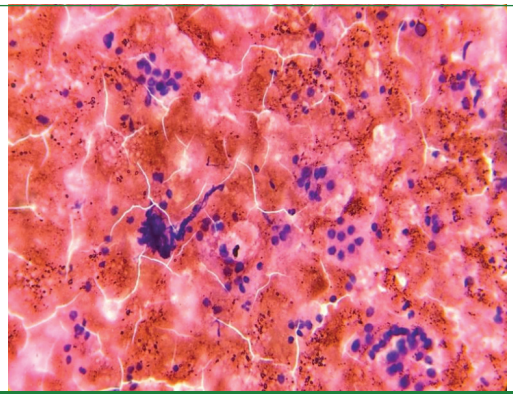


[Table/Fig-8]: a) High power view of Hashimotos thyroiditis with sheets of follicular epithelial cells and Hurthle cell change. (H&E 40X); b) Low power view showing lymphocytic infiltration (H&E 10X).

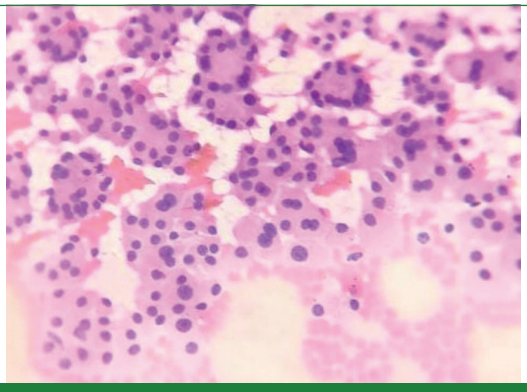
goitre with cystic degeneration, four had Hashimotos thyroiditis, one had follicular neoplasm, two had papillary carcinoma and one had anaplastic carcinoma of thyroid. Cytological examination of papillary carcinoma revealed high cellularity with sheets and papillary formations of follicular epithelial cells showing nuclear crowding, overlapping, grooves with scant colloid [Table/Fig-12a,b]. Among cases with diffuse swelling, 15 had Nodular colloid goitre, one had Nodular colloid goitre with cystic degeneration, 15 had Hashimotos thyroiditis, one had Lymphocytic thyroiditis, one had suspicion for malignancy and three were non-diagnostic. This difference was not statistically significant by Fischer-exact test (p=0.32) [Table/Fig-13]. These diagnosis were not confirmed by histopathology due to lack of follow-up of the patients.

Gender	Nodular colloid goitre	Nodular colloid goitre with cystic degeneration	Hashimotos thyroiditis	Lymphocytic thyroiditis	Adenomatoid nodule	Follicular neoplasm	Hurthle cell neoplasm	Suspicious for malignancy	Papillary carcinoma	Anaplastic carcinoma	Non diagnostic
Female	119 (62.3%)	17 (8.9%)	24 (12.6%)	2 (1%)	1 (0.5%)	9 (4.7%)	1 (0.5%)	5 (2.6%)	3 (1.6%)	1 (0.5%)	9 (4.7%)
Male	8 (88.9%)	0	0	0	0	0	0	0	0	0	1 (11.1%)
Total	127 (63.5%)	17 (8.5%)	24 (12%)	2 (1%)	1 (0.5%)	9 (4.5%)	1 (0.5%)	5 (2.5%)	3 (1.5%)	1 (0.5%)	10 (5%)

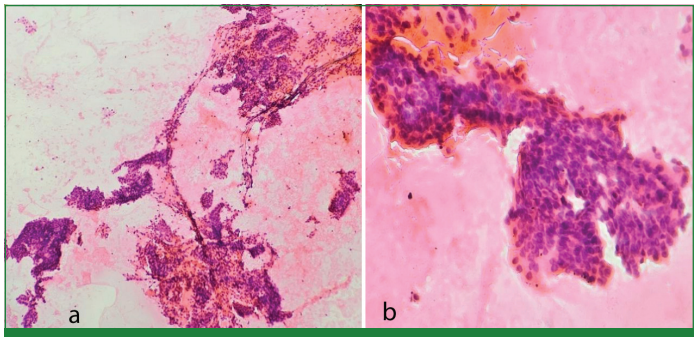
[Table/Fig-9]: Association between gender and diagnosis in the study cases.
Fischer-exact test value= 7.18; p-value= 0.91 (not statistically significant)



[Table/Fig-10]: Low power view of follicular neoplasm showing repetitive microfollicular pattern (H&E 10X).



[Table/Fig-11]: High power view of Hurthle cell neoplasm displaying clusters of Hurthle cells with abundant eosinophilic cytoplasm (H&E 40X).



[Table/Fig-12]: a) Scanner view of Papillary carcinoma showing sheets and papillary formations of follicular epithelial cells (H&E 4X); b) Low power view showing papillary formation with nuclear crowding and overlapping (H&E 40X).

DISCUSSION

The FNAC is the preliminary investigations in diagnosing thyroid swellings and it has also become a challenge to pathologists to come out with definitive diagnosis for the efficient management of thyroid lesions in order to avoid unnecessary surgeries. The present study was conducted to focus on the prevalence of goitre in hilly areas and the role of FNAC and the Bethesda system of reporting thyroid cytopathology in diagnosis of various thyroid lesions and guiding the clinicians in the proper treatment of thyroid diseases. Since Nilgiris district has diverse population with unique genetics, dietary and lifestyle factors which influences thyroid disease prevalence and presentation. The present study stands apart from similar studies done previously as it is done in hilly areas of Nilgiris district, where no major studies have been done. Since people of Nilgiris may have limited access to advanced diagnostic tools, making FNAC an

Clinical findings	Nodular colloid goitre	Nodular colloid goitre with cystic degeneration	Hashimotos thyroiditis	Lymphocytic thyroiditis	Follicular neoplasm	Adenomatoid nodule	Hurthle cell neoplasm	Suspicious for malignancy	Papillary carcinoma	Anaplastic carcinoma	Non diagnostic
Solitary nodule	63 (60%)	14 (13.3%)	5 (4.8%)	1 (1%)	8 (7.6%)	1 (1%)	1 (1%)	4 (3.8%)	1 (1%)	0	7 (6.7%)
Multiple nodules	49 (83.1%)	2 (3.4%)	4 (6.8%)	0	1 (1.7%)	0	0	0	2 (3.4%)	1 (1.7%)	0
Diffuse swelling	15 (41.7%)	1 (2.8%)	15 (41.7%)	1 (2.8%)	0	0	0	1 (2.8%)	0	0	3 (8.3%)
Total	127 (63.5%)	17 (8.5%)	24 (12%)	2 (1%)	9 (4.5%)	1 (0.5%)	1 (0.5%)	5 (2.5%)	3 (1.5%)	1 (0.5%)	10 (5%)

[Table/Fig-13]: Association between clinical findings and diagnosis in the study cases.
Fischer-exact test value= 10.41; p-value= 0.32

effective and valuable diagnostic option and evaluating its efficacy and implementation in this setting is novel.

Among the 200 cases involved in the study, the mean age was 44.93±13.17 years. The most common age group involved was third and fourth decades (54%) in the present study similar to Babu P et al., identified that most of the patients belong to third to fifth decades of life with a mean age of 38-52 years [6]. Females (95.5%) were commonly affected than males in the present study as in Bhatia S et al., study where male to female ratio was 1:3 [2].

The most common clinical presentation was solitary nodule in thyroid region (52.5%), followed by multiple nodules (29.5%) and diffuse swelling (18%). Colloid goitre presented as single, multiple nodules and diffuse swelling in our patients. The most common presentation of Hashimoto's thyroiditis was diffuse swelling.

Nodular colloid goitre was the most common diagnosis (63.5%) irrespective of the age groups in contrary to Chakrabarti PR et al., study in which peak incidence was found in 4th decade [14]. Following colloid goitre, Hashimoto's thyroiditis (12%) was the next common lesion, in different to another study where Hashimoto's thyroiditis was the common lesion [15]. Because of solidification of gland, diminished vascularity and lymphocytic infiltration the initial aspirate was inadequate by non-aspiration technique, hence aspiration with negative suction with syringe was done [14,16]. The above mentioned findings were corresponding to Bhatia S et al., Babu P et al., and Esmaili HA et al., study which observed that among thyroid lesions, multinodular goitre (64%, 36.3% and 94.4%, respectively) was the most common lesion followed by thyroiditis and Graves disease [2,6,7]. In the present study, 9 patients had follicular neoplasm. Marked cellularity may be present in hyperplastic nodule, adenoma or carcinoma. It is difficult to distinguish adenoma from carcinoma as capsular and vascular invasion cannot be assessed in FNAC [17]. A 2% of the patients were diagnosed with malignancy more common being papillary carcinoma in contrast to Bhatia S et al., and Esmaili HA et al., studies where neoplastic lesions comprised of 16% and 7.8% [2,7]. Papillary carcinoma was the most common lesion observed similar to our study followed by follicular carcinoma, medullary carcinoma, Non Hodgkin lymphoma and metastatic carcinomain Esmaili HA et al., study [7]. In our study, the malignant patients belonged to 61-70 years of Age in similar to observation made by Chakrabarti PR et al., [14]. The gender wise distribution of malignancy is more towards females in our study which was not mentioned in other studies.

Due to the wide range of sensitivity and specificity of thyroid FNAC and to assist the pathologists in handling suspicious category , the Bethesda reporting system was used [12]. In this study, 5% were non diagnostic due to inadequate cellularity, material obscured by blood and inadequate number of thyroid follicles. Cytology was indeterminate and non-diagnostic (10-30%) in Misiakos EP et al., study [13].Various authors Pandit AA and Kinare SG explained that false negative diagnosis were due to failure to obtain representative samples, needle has missed the lesion tangentially, central cystic, calcified, necrotic or haemorrhagic areas devoid of diagnostic mass [11].

Misiakos EP et al., observed that 60-70% of thyroid FNA specimens were classified as benign and 20-30% fall into categories of suspicious for follicular neoplasm, suspicious for malignancy and malignant. The remaining 10% of cases represent with some form of AUS-FLUS [13]. In contrast to Misiakos EP study, the observation in the present study was 85.5% benign and 9.5% falls into suspicious for follicular neoplasm, suspicious for malignancy and malignant. The DC IV, DC V and DC VI cases were managed operatively with thyroidectomy. The malignancy rate of AUS-FLUS category was estimated to be 5-15% and the common diagnosis after surgery initially classified as AUS-FLUS is papillary carcinoma, usually of follicular variant [13]. As there is increasing malignancy in India it is essential to detect suspicious and carcinoma early as it is crucial for the management.

Limitation(s)

The limitations of the present study was that the sample size was considerably small and the diagnosis obtained from FNAC could not be confirmed by histopathological examination in all the cases due to inadequate follow up of the patients mainly due to the limited access of the hilly terrain.

CONCLUSION(S)

The diagnosis of thyroid lesions can be done through various investigations which includes Thyroid function tests, ultrasonogram, CT scan and FNAC. Though these tests are available, the accessibility of it in hilly areas remains questionable. Among these investigations, FNAC remains as a cornerstone in evaluation and management of thyroid lesions. Its minimally invasive nature, cost effectiveness and high sensitivity makes it an invaluable tool in distinguishing benign and malignant lesions. It also reduces the need for unnecessary surgical intervention and also provides rapid management in case of malignancy. Thus, FNAC along with Bethesda reporting system continues to be a pivotal modality in the approach of diagnosing thyroid lesions.

Acknowledgement

We would like to thank our medical college and hospital for its support and patients for cooperating with the study.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Jan 22, 2025
- Manual Googling: Jun 03, 2025
- iThenticate Software: Jun 21, 2025 (6%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Jan 21, 2025**
Date of Peer Review: **Apr 23, 2025**
Date of Acceptance: **Jun 23, 2025**
Date of Publishing: **Jul 01, 2025**