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TO STUDY THE DISTRIBUTION AND HISTOPATHOLOGICAL SPECTRUM OF THYROID LESIONS: A STUDY FROM KOTA

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ABSTRACT

Thyroid disorders encompass a broad range from hormonal dysfunction and autoimmune enlargement to tumor formation. Hence, we aimed to study the frequency and histo-morphological pattern of various non-neoplastic and neoplastic thyroid lesions and finding out the most prone age group for these lesions so as to target them for various screening programmes for early detection of non-neoplastic and neoplastic distribution and histopathological spectrum of thyroid lesions. A descriptive cross-sectional study was conducted over a span of two years, from 2022 to 2023, 165 thyroidectomy samples were examined. The ages of the patients ranged between 10 and 72 years, with the highest incidence of thyroid conditions observed between the second and sixth decades of life, comprising 93.33% of cases. The majority of patients were female, representing 84%, while males accounted for 16%, resulting in a female-to-male ratio of 5:1.Non-neoplastic thyroid conditions were more prevalent, making up 80.62% (133 cases) of the specimens, whereas neoplastic lesions accounted for 19.38% (32 cases). Among the non-neoplastic types, multinodular goitre was the most frequently diagnosed (42.85%), followed by colloid goitre (27.07%). These lesions primarily appeared in patients aged between the third and fifth decades and demonstrated a strong female predominance (83.87%). Neoplastic lesions were present in a minority of cases (19.38%), comprising 28.13% benign, 9.37% low-risk, and 62.5% malignant tumors. Across all specimens studied, multinodular goitre was the most common pathological finding, seen in 35.76% of cases, followed by colloid goitre (21.81%), papillary carcinoma and its variants (10.91%), and Hashimoto thyroiditis (10.91%). Other identified conditions included mixed lesions (5.47%), follicular adenoma (4.24%), colloid cysts (3.65%), thyroglossal cysts (1.83%), oncocytic adenoma (1.21%), non-invasive follicular thyroid neoplasms with papillary-like nuclear features (1.21%), follicular tumors of uncertain malignant potential (0.6%), toxic multinodular goitre (0.6%), De Quervain thyroiditis (0.6%), follicular carcinoma (0.6%), and medullary carcinoma (0.6%). Among malignant lesions, papillary carcinoma was the most frequently observed. The study emphasizes the importance of adhering to WHO guidelines for uniform reporting and calls for continued research into the molecular mechanisms behind thyroid pathology to refine diagnosis, improve treatment, and enhance patient care.

Keywords: Thyroid gland, histopathology, neoplastic, non-neoplastic.

INTRODUCTION

The thyroid gland, resembling a butterfly in shape, is the body's largest endocrine organ[1] and the first to form during fetal development.[2] Located in the neck, it plays a vital role in

regulating metabolism and maintaining internal balance through hormone secretion, impacting nearly every organ system. It is seen in front of the 2nd, 3rd and 4th tracheal rings and weighs around 20-25gm.[3] Thyroid disorders encompass a broad range from hormonal dysfunction and autoimmune enlargement to tumor formation. Their incidence is influenced by multiple factors including age, sex, geography, diet, and environment.[4] WHO estimate that 7% of the global population has visible goitre, with a higher prevalence in developing nations due to iodine deficiency. In India, thyroid conditions are especially widespread, and women are disproportionately affected due to physiological demands across different life stages.[5,6] Most thyroid enlargements are non-cancerous. Malignant cases form less than 5% but represent a significant share of endocrine malignancies.[7] Histopathological analysis is essential for accurate classification. Nodular colloid goitre is the most commonly encountered benign lesion, especially in women in their fourth decade. Multinodular goitre is often a result of prolonged hormonal stimulation, while Hashimoto's thyroiditis an autoimmune condition is common in the third decade and characterized by painless swelling. [8]

Benign neoplasms like follicular adenomas differ in metabolic activity and appear as solitary, encapsulated growths. Distinguishing these from follicular carcinomas requires thorough microscopic examination. Malignant thyroid tumors can mimic benign ones, both clinically and on imaging, making histological study critical for diagnosis. A solitary thyroid nodule, due to its potential malignancy risk (5–35%), deserves particular attention.[9-11] Diffuse thyroid diseases affect the whole gland, while nodular ones lead to localized swellings and include both non-neoplastic hyperplasia and tumors. Though thyroid cancers are uncommon, they still contribute to 0.7% of malignancies in women and 0.2% in men.[12] Diagnostic tools like TFTs, USG, and FNAC aid evaluation, but definitive diagnosis often requires tissue biopsy due to interpretive limitations.[13]

Among malignant types, papillary carcinoma is the most frequent, especially in women aged 20–40, and often involves lymph node spread. It displays characteristic papillary structures and calcifications microscopically. Follicular carcinoma, more prevalent in iodine-deficient areas, typically affects older women. Medullary carcinoma originates from parafollicular cells and may be sporadic or linked to genetic syndromes like MEN-2. The most aggressive thyroid tumors anaplastic and poorly differentiated carcinomas are rare but carry significant clinical implications due to their rapid progression and poor prognosis.[14]

Hence, we aimed to study the frequency and histo-morphological pattern of various non-neoplastic and neoplastic thyroid lesions and finding out the most prone age group for these lesions so as to target them for various screening programmes for early detection of non-neoplastic and neoplastic distribution and histopathological spectrum of thyroid lesions.

MATERIALS AND METHODS

This descriptive cross-sectional study was carried out over a two-year period (January 2022 to December 2023) in the Department of Pathology at Government Medical College, Kota. It focused on all histologically examined thyroid specimens both neoplastic and non-neoplastic received during this time. Tissue samples were preserved in 10% formalin, processed using standard paraffin embedding techniques, and stained with Hematoxylin and Eosin before microscopic evaluation. Lesions were classified as benign or malignant following the World Health Organization's histological guidelines for thyroid tumors. The study included specimens from various thyroid surgeries such as lobectomy, hemithyroidectomy, subtotals, and total thyroidectomy, specifically those suspected of inflammatory or neoplastic thyroid

pathology. It excluded antenatal cases, drug-induced thyroid disorders, and samples with inadequate fixation or poor morphology. Data collection involved reviewing all eligible specimens processed during the study period for a comprehensive analysis of thyroid lesions.

RESULTS

The present study was descriptive cross-sectional type for period of two years starting from January 2022 to December 2023 in the Department of pathology, Government Medical College, Kota. All the cases of non-neoplastic and neoplastic thyroid lesion received for histopathology in our department was the part of the study.A total of 165 specimens of thyroidectomy received during this period were studied and analyzed.

Age and Sex Distribution

Thyroid lesions were observed across a wide age spectrum, from 10 to 72 years. The majority of cases approximately 97% were found in individuals between their third and sixth decades of life. The youngest participant in the study was a 10-year-old girl diagnosed with a thyroglossal cyst, while the oldest was a 72-year-old man presenting with Multiple Nodular Goitre. Women accounted for 84% of all cases, resulting in a Female to Male ratio of 5:1. A summary of the age and gender distribution of the patients is provided in Table 1.

Table 1: Age and gender distribution of thyroid lesions

Age groups (Years)	Number of cases	Percentages	Females	Males	Total
01-10	1	0.60	1	0	1
11-20	8	4.86	4	4	8
21-30	40	24.24	35	5	40
31-40	33	20	24	9	33
41-50	46	27.86	44	2	46
51-60	17	10.31	15	2	17
61-70	18	10.90	13	5	18
71-80	02	01.23	01	01	02
81-90	00	00	00	00	00
Total	165	100	137	28	165

Table 2: Clinical variables of thyroid lesions

Histological patterns of thyroid lesions	Lesions	No. of cases 165 (100%)
	Non-neoplastic	133 (80.62%)
Neoplastic	Benign	09 (5.45%)
	Borderline (low risk)	03 (1.81%)
	Malignant	20 (12.12%)
Non-neoplastic lesions		No. of cases 133 (100%)
	Multinodular goitre	59 (44.35%)
	Colloid goitre	36 (27.07%)
	Hashimoto thyroiditis	18 (13.54%)
	Mixed lesion	09 (06.77%)
	Colloid cyst	06 (04.52%)
	Thyroglossal cyst	03 (02.25%)
	Diffuse toxic goitre(Graves' disease	01 (00.75%)
	De-Quervain thyroiditis	01 (00.75%)

Neoplastic lesion			No. of cases 32 (100%)	
	Benign		09 (28.13%)	
	Borderline (low risk)		03 (09.37%)	
	Malignant		20 (62.50%)	
Malignant lesion			No. of cases 20 (100%)	
	Papillary Carcinoma & its subtypes		18 (90%)	
	Follicular Carcinoma		01 (05%)	
	Medullary Carcinoma		01 (05%)	
Non-neoplastic thyroid lesions in relation to age group	Age (Years)		No. of cases 133 (100%)	
	01-10		01 (0.75%)	
	11-20		08 (6.02%)	
	21-30		24 (18.04%)	
	31-40		26 (19.53%)	
	41-50		42 (31.57%)	
	51-60		15 (11.27%)	
	61-70		15 (11.27%)	
	71-80		02 (01.55%)	
	81-90		00(00.00%)	
	91-100		00(00.00%)	
Neoplastic thyroid lesions in relation to age group	Age (Years)		No. of cases 32 (100%)	
	01-10		00 (00%)	
	11-20		00 (00%)	
	21-30		16 (50%)	
	31-40		07 (21.87%)	
	41-50		04 (12.5%)	
	51-60		02 (06.25%)	
	61-70		03 (9.38%)	
	71-80		00 (00%)	
Non-neoplastic thyroid lesions in relation to gender	Diagnosis	Male (20)	Female (113)	Total (133)
	Multinodular goitre	10	49	59
	Colloid goitre	5	31	36
	Hashimoto thyroiditis	0	18	18
	Mixed Lesions	1	8	9
	Colloid cyst	2	4	6
	Thyroglossal cyst	2	1	3
	Diffuse toxic goitre	0	1	1
	De-Quervain thyroiditis	0	1	1
Neoplastic thyroid lesions in relation to gender	Diagnosis	Male	Female	Total
Benign	Follicular adenoma	1	6	7
	Oncocytic adenoma	0	2	2
Borderline (Low risk)	Non-invasive follicular thyroid with papillary like nuclear feature(NIFTP)	1	1	2
	Follicular tumor of uncertain malignant potential (FT-UMP)	0	1	1
Malignant	Diagnosis	Male (5)	Female (27)	Total (32)
Papillary Ca	Classical	0	12	12
	Follicular variant	1	3	4
	Encapsulated variant	1	0	1
	Tall cell variant	0	1	1
Follicular Ca		0	1	1
Medullary Ca		1	0	1

Histopathological Profile of Thyroid Lesions

This study classified thyroid lesions into neoplastic and non-neoplastic types, with non-neoplastic conditions dominating at 80.62% (133 of 165 cases), and neoplastic lesions comprising 19.38% (32 cases). Within the neoplastic group, benign tumors made up 28.13%, borderline/low-risk tumors accounted for 9.37%, and malignant tumors represented the majority at 62.5%.Multinodular goitre was the most prevalent non-neoplastic lesion (44.35%) and was most commonly diagnosed in individuals between the second and fifth decades of life, with females being predominantly affected. Colloid goitre followed as the second most common condition (27.08%), also showing a female bias. Histological features of these lesions included variable follicular structures filled with colloid and encased in fibrous capsules.

Hashimoto thyroiditis constituted 13.54% of non-neoplastic cases, exclusively affecting females aged 23 to 68, with peak incidence in the second to fourth decades. Specimens revealed follicular destruction, lymphocytic infiltration, and prominent germinal centers.Thyroglossal cysts were found in 3 cases, primarily during the first decade of life, with histology showing ciliated epithelial lining and embedded thyroid follicles. Diffuse toxic goitre appeared in only one case, marked by follicular epithelial hyperplasia, papillary infoldings, and scalloped colloid. De Quervain thyroiditis was documented in a single 50-year-old female, displaying follicular disruption, colloid loss, and a dense inflammatory infiltrate with giant cells.Papillary carcinoma was the leading malignant neoplasm (90% of malignant cases), followed by single cases of follicular and medullary carcinoma. Malignancies were most commonly diagnosed between the second and fifth decades, with a clear female predominance. Follicular adenoma was the most frequent benign neoplasm (77.78%), and borderline tumors included NIFTP and FT-UMP, collectively comprising 9.37% of neoplastic cases.

Benign Neoplastic Lesion: Follicular Adenoma

In this study, follicular adenoma was the most common benign thyroid neoplasm, identified in seven cases and accounting for 23.33% of all neoplastic lesions. These cases were predominantly diagnosed in young adults during their second and third decades of life, with a strong female predominance (six females, one male). The lesions typically appeared as solitary, encapsulated nodules measuring 2–4 cm, with a tan to pale brown cut surface and a prominent bulge. Microscopic evaluation revealed a well-defined capsule with varying follicular patterns most commonly microfollicular (57.16%), followed by normofollicular (28.56%) and macrofollicular (14.28%). The follicular cells ranged from cuboidal to flattened, showing moderate eosinophilic cytoplasm and nuclei with coarse chromatin. Colloid content varied, being scant in three cases and moderate in three others.

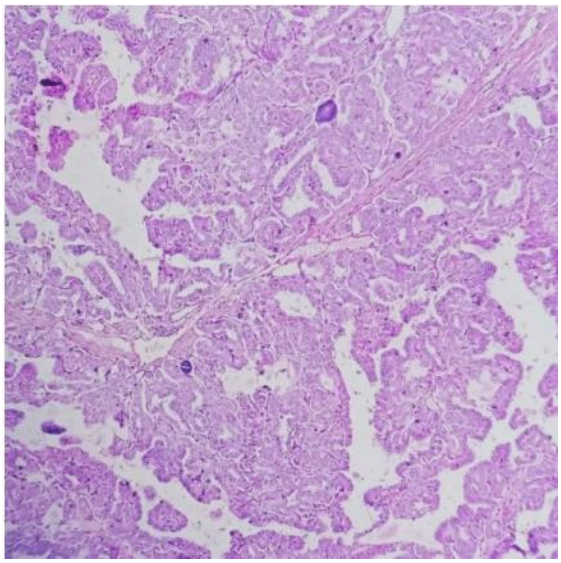
Oncocytic Adenoma

Two cases of oncocytic adenoma were identified in female patients aged 23 and 52. These tumors exhibited characteristic mahogany brown coloration, often with a central scar, and were composed predominantly of oncocytic cells with granular eosinophilic cytoplasm and prominent nucleoli. Although encapsulated or well-circumscribed, evidence of capsular or vascular invasion was ambiguous, and no features typical of papillary thyroid carcinoma (PTC) nuclei were present. Additionally, two cases of non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP) were documented one in a 24-year-old

female and the other in a 21-year-old male both lacking capsular or vascular invasion. Malignant thyroid neoplasms accounted for 12.5% of all lesions, totaling 20 cases. Papillary thyroid carcinoma (PTC) was the most common malignancy, comprising 18 cases, including 12 classical and 6 variant subtypes. A single case each of follicular and medullary carcinoma was noted. The majority of malignant cases (77.78%) were diagnosed between the second and fourth decades of life, with a pronounced female predominance (16 females, 2 males).

Papillary Thyroid Carcinoma

The study detailed the morphological features of various thyroid malignancies, highlighting notable variation in lesion size from as large as 12 × 8 × 6 cm to as small as 3 × 2 × 1 cm. Among papillary carcinoma cases, 91.67% exhibited complex, branching papillae with fibrovascular cores, and one showed a nested growth pattern. Additional patterns observed included trabecular, microfollicular, and normofollicular arrangements. Follicular cells ranged from cuboidal to columnar with eosinophilic to amphophilic cytoplasm, and nuclei displayed hallmark features of papillary carcinoma such as nuclear clearing, grooves, overlapping, and occasional psammoma bodies. One case of follicular carcinoma (5% of malignant lesions) was diagnosed in a 59-year-old female, presenting as a well-encapsulated nodule with microfollicular architecture, coarse chromatin, and evident capsular invasion without nodal or extrathyroidal spread. Additionally, a single case of medullary carcinoma was reported in a 38-year-old male, characterized by a firm, gritty mass lacking a capsule and composed of spindle-shaped cells arranged in nests, sheets, and trabeculae. Uniform nuclei, sparse mitoses, and frequent calcifications with amyloid deposits were hallmark features.



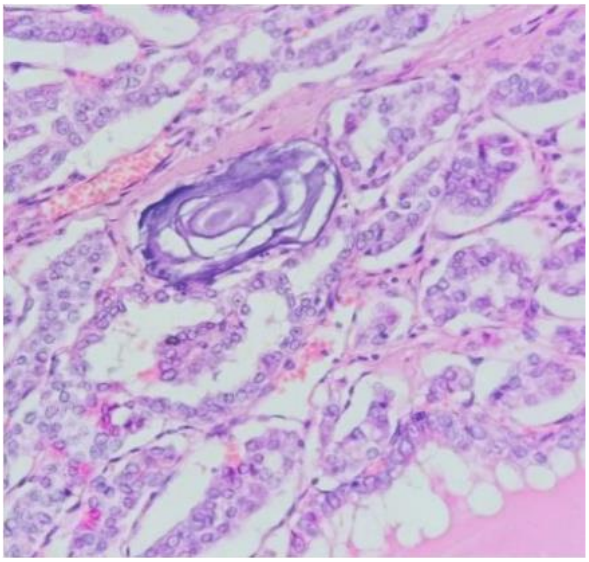
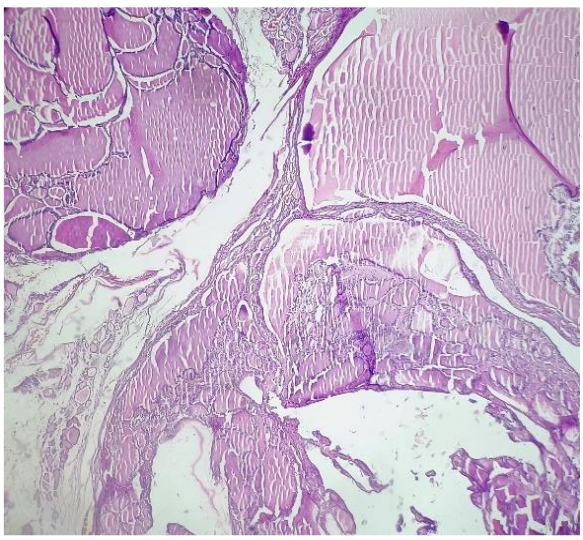


Fig 1: H&E, 10x: Papillary thyroid carcinoma – Papillary pattern with calcification
Fig 2: H&E, 40x: Papillary thyroid carcinoma – Psammoma body (PTC)



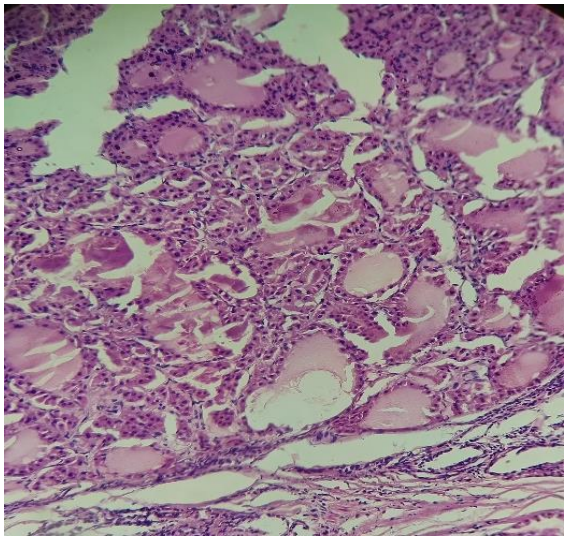


Fig 3: H&E,10X: Multinodular goitre – Nodule separated by thin capsule comprising of variable sized dilated follicles with flattened to hyperplastic epithelium.
Fig 4: H&E,10X: Colloid goitre – Variable sized dilated follicles filled with colloid lined by flattened epithelial cells.

DISCUSSION

Between January 2022 and December 2023, the Department of Pathology at Government Medical College, Kota examined 165 thyroidectomy specimens. Females made up a significant majority, constituting 84% of the cases, whereas males accounted for 16%. This gender disparity echoes patterns observed in earlier studies. For example, research conducted by M. Padmavathi[15] and colleagues on 211 thyroid specimens found 90.04% were female (190 cases), with males comprising only 9.95% (21 cases). Similarly, Haque WS et al reviewed 377 cases, with 79.84% being female (301 cases) and 20.15% male (76 cases), showing a comparable distribution. In terms of age demographics, the current study revealed that 87.27% of cases occurred in individuals aged between 11 and 60 years. The full age range spanned from 10 to 72 years, which is consistent with findings reported by Salama et al. in their analysis of 845 patients, whose ages ranged from 9 to 70 years.

Table 3: Comparative analysis of gender distribution

S. No.	Gender	M padmavathi et al[15](211 cases)	Haque WS et al (377 cases)	Letha padmon et al [16](476 cases)	Na et al (622 cases)	Martin et al (163 cases)	Present study (165 cases)
1.	Female	90.04%	79.84%	85.7%	86.1%	86.5%	84%
2.	Male	9.95%	20.15%	14.3%	13.9%	13.5%	16%

The highest prevalence of thyroid disorders was observed among individuals in their third to sixth decades of life (ages 21 to 60), accounting for 77% of the cases. This age-related trend is consistent with prior research conducted by A. Beigh et al[17], Tsegaye and Ergete[18], and Ijomone et al[19], who reported similar findings, with 84.31%, 79.16%, and 78.94% of cases respectively falling within the same age bracket.

Table 4: Comparative analysis of age distribution

Age group (Years)	V Prabha et al [9](n=100)	Ambreen Beigh et al[17] (n=282)	Tsegaye and Ergete[18] (n=780)	Present study (n=165)
1-10	0	0	0.1	0.6
11-20	7	8.82	9.7	4.86
21-30	26	27.45	30	24.24
31-40	33	25.49	30.7	20
41-50	17	20.10	17.36	27.86
51-60	11	11.27	7.7	10.31
61-70	6	5.39	3.8	10.90
71-80	0	1.47	0.5	1.23
81-90	0	0	0	0

Histological Patterns of Thyroid Lesions

In the current analysis of 165 thyroidectomy cases, 133 (80.62%) were identified as non-neoplastic, while the remaining 32 (19.38%) were neoplastic in nature. This distribution closely mirrors findings from earlier research. For example, Tsegaye and Ergete[18] observed that non-neoplastic lesions made up 78.79% of their sample, with neoplastic lesions representing 21.03%. Similarly, M. Padmavathi et al[15] reported that 70.1% of cases involved non-neoplastic lesions, whereas 29.9% were classified as neoplastic.

Table 5: Comparative analysis of histological patterns

Study	Non-neoplastic (%)	Neoplastic (%)	Benign Low Risk Malignant
Tsegaye and Ergete[18] (n=780)	78.79	21.03	60.90% 0 39.10%
Letha Padmom et al[16] (n=476)	70.1	29.9	22.2% 77.8%
V Prabha [9](n=100)	84	16	75% 25%
Koyuncuer et al[20] (n=1149)	86.94	13.05	47.33% 3.33% 49.33%
Present study (n=165)	80.62	19.38	28.13% 9.37 62.5%

Non-Neoplastic Lesions

In this study, multinodular goitre emerged as the most frequently observed non-neoplastic thyroid lesion, found in 57 cases (42.85% of all non-neoplastic cases). Colloid goitre was the second most common, noted in 36 cases (27.07%). Less frequent non-neoplastic conditions included adenomatous goitre, diffuse toxic goitre, and De Quervain thyroiditis, which were seen in 2 (1.50%), 1 (0.75%), and 1 (0.75%) case respectively.

Neoplastic lesions represented 19.38% of the total thyroidectomy cases analyzed. Of these, benign tumors accounted for 9 cases (28.13%), borderline lesions categorized as NIFTP and FT-UMP under the 2017 WHO thyroid tumor classification were observed in 3 cases (9.37%), and malignant tumors comprised 20 cases (62.5%). Previous literature reports the prevalence of neoplastic thyroid conditions ranging from 16% to 32%. Among the benign neoplastic cases in this study, follicular adenoma was predominant, occurring in 7 cases (77.78%), followed by oncocytic adenoma in 2 cases (22.22%). In comparison, L. Padmom et al[16] identified benign adenomas in 3.99% of all cases and in 33.3% of neoplastic lesions, with 89.47% of those being follicular adenomas. Studies by M. Padmavathi[15] and V. Prabha[9] also reported that all benign neoplasms were follicular adenomas.Borderline neoplasms accounted for 9.37% of neoplastic cases in this study. Similarly, Koyuncueret al[20] reported borderline thyroid tumors in 3.33% of cases.Malignant neoplasms were present in 12.12% of all cases and constituted 62.5% of the neoplastic group. This aligns with data from A. Beigh (72.55%), L. Padmom[16] (66.6%), and Ijomone[19] and Tsegaye[18] (47.61% each). Papillary carcinoma emerged as the leading malignancy, accounting for 90% of the malignant tumors and 12.12% of all cases. This was consistent with findings by L. Padmom et al[16], who reported papillary carcinoma in 94.73% of malignant cases and 7.56% of overall cases. Follicular carcinoma and medullary carcinoma followed, each representing 0.6% of the cases in this study, which corresponds with findings by M. Padmavathi et al (0.94% follicular carcinoma and 0.47% medullary carcinoma).

Table 6: Comparative analysis of malignant neoplasm

Malignant neoplasm	M Padamavathi et al [15](n=211)	Ambreen Beigh et al[17] (n=282)	Letha Padmom et al[16] (n=476)	Present study (n=165)
PTC	75.51%	85.14%	94.73%	90%
FC	4.08%	9.45%	2.63%	5%
MC	2.04%	5.40%	-	5%

In this study, the majority of thyroid malignancies were observed among individuals in their second to fifth decades of life (ages 21–60), accounting for 85% of all malignant cases. This age distribution closely resembles the findings of Ambreen Beigh et al[17]., who documented 84.45% of malignancies within the same age range. The youngest affected individual was a 22-year-old female, while the oldest was a 69-year-old female, both diagnosed with papillary carcinoma. Notably, thyroid cancer was more prevalent among female patients.

Comparison of Histomorphology of Various Thyroid Lesions In Present Study With Other Studies

Multinodular Goitre

In this study, multinodular goitre emerged as the most prevalent non-neoplastic thyroid lesion, comprising 59 cases (44.35%). Previous investigations have also identified this condition as common, with reported incidences of 37.2% (M. Padmavathi et al[15]), 55.4% (L. Padmom et al[16]), 67.93% (Bukhari et al[21]), and 58.2% (Albasri et al[22]). Patient ages ranged from 15 to 72 years, with 80.70% occurring in the 20–59 year age group. This age distribution aligns with findings from Tsegaye and Ergete, who recorded 79% in the same range. A gender bias was noted, with 82.45% (47 cases) affecting females and only 17.54% (10 cases) found in males, similar to the 82% female and 18% male distribution reported by Tsegaye and Ergete.

Colloid Goitre

Colloid goitre ranked as the second most frequent non-neoplastic lesion in this study, constituting 36 cases (27.07%). Comparative studies revealed varied frequencies, such as 16.9% (M. Padmavathi et al[15]) and 45% (J. Mahadani et al). Patient ages ranged from 26 to 71 years, with the majority (88.88%) between 20 and 59 years old. Female predominance was again evident, with 86.11% (31 cases) versus 13.88% (5 cases) in males. J. Mahadani et al similarly reported a higher female incidence: 72.22% female and 27.78% male.

Hashimoto's Thyroiditis

Hashimoto's thyroiditis was the third most frequently diagnosed non-neoplastic lesion, comprising 10.90% of total cases and 13.53% of the non-neoplastic group. All affected patients in this study were female, echoing observations by L. Padmom et al[16], who found the condition in 9% of cases all among women. Ages spanned from 23 to 68 years, with a notable concentration (66.67%) in the 30–49 year age group.

Thyroglossal Cyst

Three cases of thyroglossal cyst were recorded in the present study, accounting for 1.81% of total cases. These numbers are consistent with M. Padmavathi et al[15], who noted a prevalence of 1.4%. The affected individuals included two males (ages 12 and 48) and one female (age 10).

Diffuse Toxic Goitre (Graves' disease)

Only one case of Graves' disease was identified, comprising 0.6% of the study population. The patient was a 39-year-old male. This result closely matches the 0.7% prevalence reported by M. Padmavathi et al[15].

Neoplastic Lesions Overview

Follicular Adenoma

Follicular adenoma was the most frequently encountered benign neoplasm in this study, representing 4.24% of all thyroid cases and 21.87% (7 cases) of neoplastic lesions. A notable female predominance was observed, with a female-to-male ratio of 6:1. Comparable findings were reported by M. Padmavathi et al[15] and L. Padmom et al[16], where follicular adenomas constituted 22.2% and 29.8% of neoplastic cases, respectively.

Oncocytic Adenoma

Only two cases of oncocytic adenoma were diagnosed, both in female patients aged 23 and 52 years. These accounted for 1.21% of all cases and 6.25% of neoplastic lesions. Similar findings were documented by A. Beigh et al, who noted oncocytic adenomas in 5.88% of neoplastic cases.

- Borderline (Low-Risk) Tumors

Three cases were categorized as low-risk neoplasms:
- **Non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP)** was identified in two patients (a 21-year-old male and a 24-year-old female), representing 1.21% of overall cases and 6.25% of neoplastic lesions.
- **Follicular tumor of uncertain malignant potential (FT-UMP)** was diagnosed in a 40-year-old female, making up 0.6% of total cases and 3.13% of neoplastic cases.

These findings align with observations by M. Padmavathi et al, who reported FT-UMP in 3.2% of neoplastic lesions.

- Malignant Neoplasms

Papillary Carcinoma

Papillary carcinoma emerged as the most prevalent malignancy, accounting for 56.25% (18 cases) of neoplastic lesions and 90% of malignant tumors. The peak age of presentation was between the second and fourth decades, comprising 77.78% of papillary cases. The youngest patient was a 22-year-old female and the oldest, a 69-year-old female. A female predominance was evident, with 16 cases in women and 2 in men.

Subtype breakdown of the 18 cases:
- Classical type: 12 cases (66.67%)
- Follicular variant: 5 cases (including one encapsulated)
- Tall cell variant: 1 case

Comparable results were observed in studies by:
- Padmavathi et al[15]: 58.73% of neoplastic lesions and 75.51% of malignancies
- Beigh et al: 61.7% of neoplastic cases and 85.4% of malignant tumors, with peak incidence in the second to fourth decades (72.22%)

All studies showed a clear female predominance.

Follicular Carcinoma

This malignancy was found in one patient a 59-year-old female representing 5% of the malignant group. Similar percentages were noted in prior research:
- Padmom et al[16]: 2.63%
- Padmavathi et al[16]: 4.08%
- Beigh et al: 9.45%

These studies emphasized its higher occurrence in iodine-deficient regions, female predominance, and age distribution favoring the fifth and sixth decades consistent with the current findings.

Medullary Carcinoma

One case of medullary carcinoma was diagnosed in a 38-year-old male, accounting for 5% of the malignant cases. Studies by:

- Padmavathi et al[16]: 2.04%
- Beigh et al: 5.40% also identified medullary carcinoma at similar rates. A. Beigh et al reported two cases occurring in the third decade, aligning with the current age pattern.

CONCLUSION

This study investigates the histomorphological patterns of thyroid lesions; primarily affecting individuals aged 10 to 70, with a notable predominance in females around Kota. Multinodular goitre was the most common lesion, followed by colloid goitre, while papillary carcinoma emerged as the leading malignant type. Although fine needle aspiration cytology offers preliminary insights, definitive diagnosis depends on detailed histopathological examination of thyroidectomy specimens, crucial even for non-neoplastic cases due to potential hidden malignancies. Treatment strategies are guided by morphological features such as tumor size, capsule presence, and vascular invasion, while immunohistochemical techniques aid in accurate classification. The study emphasizes the importance of adhering to WHO guidelines for uniform reporting and calls for continued research into the molecular mechanisms behind thyroid pathology to refine diagnosis, improve treatment, and enhance patient care.

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