



## Pattern of Differentiated Thyroid Carcinoma and Their Management Plan

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### Abstract

**Background:** Carcinoma of the thyroid gland is an uncommon cancer, 0.6% and 1.6% of all cases of malignant neoplasms in men and women respectively. But is the most common malignancy in the endocrine system. This study aimed to analyze the pattern of differentiated thyroid carcinoma and its management plan. **Material & Methods:** This cross-sectional observational study was conducted at the Department of Otolaryngology, Rajshahi Medical College Hospital, Rajshahi, and Department of Otolaryngology Bangabandhu Sheikh Mujib Medical University (BSMMU), from July 2011 to Jun 2012. A total of 40 patients were selected as study subjects by simple random sampling technique. A descriptive analysis of data was carried out by using a statistical package for social science (SPSS) 22.0 for Windows. **Results:** The highest number of cases were found in the 3rd and 5th decade of life in papillary and follicular carcinoma respectively. The male-to-female ratio was 1:2.5 in papillary, and 1:5 in follicular carcinoma, with a majority (55.0%) from rural areas. Most of the cases (35, 87.5%) suffered from papillary carcinoma, followed by (5, 12.5%) follicular carcinoma. The commonest symptom for seeking medical admission was swelling in the neck (Lymph node swelling included), which was present in 39 (97.5%) cases. Symptoms of distant metastasis and dyspnoea were present in 3 (7.5%) and 1 (2.5%) case respectively. Through FNAC 38 (95.0%) cases were diagnosed or suspected preoperatively. **Conclusions:** The majority of the patients present in the 3rd and 5th decade of life in papillary and follicular carcinoma respectively, with a female preponderance. Moreover, papillary carcinoma is more common than follicular carcinoma, which commonly presents with unilateral tumors. Concerning the symptoms, swelling of the neck (including lymph node swelling) is the most common feature. It can be emphasized that nodal metastasis needs total thyroidectomy, and neck dissection with radio-iodine ablation. Distant metastasis needs total thyroidectomy, surgical resection of the metastatic mass, radio-iodine ablation (if the radio-iodine scan is positive), and/or radiotherapy with thyroxine.

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## INTRODUCTION

Thyroid nodules are more common in women and increase in frequency with age. Though thyroid nodules are common, malignancy is uncommon, and the most common way to present as a solitary thyroid nodule.<sup>[1]</sup> Thyroid neoplasms represent almost 95% of all endocrine tumors, relatively uncommon and accounting for approximately 2.5% of all malignancies.<sup>[2]</sup> Malignant thyroid tumors can originate from any of the cellular components of the gland: Follicular and parafollicular cells, lymphoid cells, and stromal cells. The vast majority are the follicular cell neoplasms of which Papillary thyroid carcinoma (PTC) and Follicular thyroid carcinoma (FTC) are the commonest, collectively called Differentiated thyroid carcinoma (DTC).<sup>[1]</sup> FTC occurs more commonly in areas of endemic goiter than PTC.<sup>[2]</sup> Exposure to ionizing radiation, endemic goiter, prolonged TSH stimulation, and high iodine intake are important in the causation of thyroid malignancy.<sup>[1,2]</sup> The presence of a solitary thyroid nodule is also a risk factor for malignancy. The incidence of malignancy within a clinically apparent solitary thyroid nodule is approximately 10%.<sup>[1]</sup> The reported incidence of carcinoma in solitary nodules varies from 2-20%.<sup>[3,4]</sup> Lymph node metastasis carries an important prognostic value.<sup>[5]</sup> In DTC, lymph node metastasis was more common in papillary (35%) than follicular carcinoma (12.5%), but distant metastasis was more common in follicular (12.5%) than papillary carcinoma (3.70%).<sup>[6]</sup> DTC comprises approximately 90% of all thyroid cancers and carries an excellent long-term prognosis.<sup>[7]</sup> Recent studies have confirmed the incidence of nodal metastasis in PTC ranging from 60-

65%.<sup>[5,8,9,10]</sup> Lymph node metastases in FTC occur less frequently but prefer to metastasize via veins to distant organs.<sup>[8,11]</sup> Metastasis in the central compartment is more common than in the ipsilateral and contralateral cervico-lateral compartments.<sup>[12]</sup> Regarding the level of involvement, the most frequently involved levels are ii (52%), iii (57%) and iv (41%).<sup>[13]</sup> There are several techniques to investigate thyroid carcinomas. About 80% of discrete swelling is "cold". Most nonfunctional / or "cold" nodules are benign but as many as 20% may be malignant. The principal benefit of isotope scanning is to identify metastasis or residual local disease after total thyroidectomy for follicular carcinoma. Whole-body scanning can also be used to demonstrate metastasis but the patient must have no normal functioning thyroid tissue when the isotope is given because thyroid cancer can only very rarely compete with normal thyroid tissue in the uptake of iodine. Moreover, an ultrasound helps measure tumor size, diagnosing multinodular goiters and excluding contralateral disease. Ultrasonography can also be used to evaluate complex cysts and can distinguish purely cystic nodules.<sup>[14,15]</sup> Increasing age, male gender, distant metastases, extrathyroidal spread, and large tumor size, have all been shown to be more consistently linked to a worse prognosis. In the last 5 years, the overall management approach for this relatively indolent cancer has become less aggressive. Although surgery and radioiodine ablation remain the mainstay of DTC therapy, the role of active surveillance is being explored.<sup>[16]</sup> This study aimed to assess the pattern of differentiated thyroid carcinoma and its management plan.

## OBJECTIVE

### General Objective

- To analyze the pattern of differentiated thyroid carcinoma and their management plan.

### Specific Objectives

- To know the age and sex distribution of the study subjects.
- To see the educational status and occupation of the respondents.
- To observe the distribution of type of malignancy.
- To assess the symptoms on admission to the hospital of differentiated thyroid carcinoma.
- To analyze the laterality of nodal involvement.
- To analyze overall metastasis.

## MATERIAL AND METHODS

This cross-sectional observational study was conducted at the Department of Otolaryngology, Rajshahi Medical College Hospital, Rajshahi, and Department of Otolaryngology Bangabandhu Sheikh Mujib Medical University (BSMMU), from July 2011 to June 2012. All the patients having carcinoma thyroid with or without metastasis were considered as the study population. A total of 40 patients were selected as study subjects by simple random sampling technique as per inclusion and exclusion criteria.

### Inclusion Criteria

- Patients with thyroid malignancy with or without metastasis.
- Both male and female patients.

- Patients who were willing to give consent.

### Exclusion Criteria

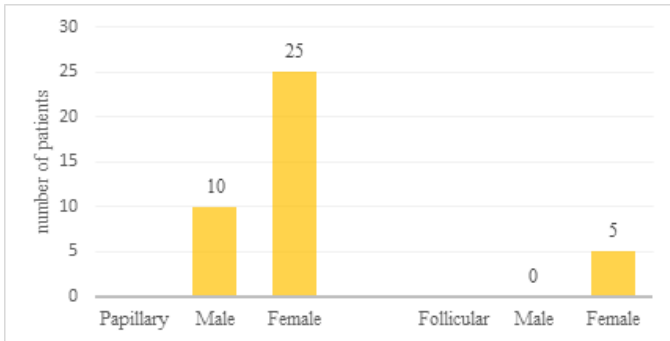
- Patients with thyroid disease, lymphoma, anaplastic and medullary carcinoma.
- Patients with associated co-morbidities like hypertension, diabetes, and bronchial asthma.
- Patients who did not give consent to participate in the study.

Patients undergo a thorough clinical examination of the ear, nose, throat, and head neck, including general examination, and important investigation. The findings of the clinical examination and results of the investigation have been recorded and plotted on the datasheet. Some data were collected from the patients by face-to-face interview. All data were collected using a pre-formed questionnaire. Collected data were analyzed using descriptive statistics. A descriptive analysis of data was carried out by using a statistical package for social science (SPSS) 22.0 for Windows. After analysis, the data were presented in tables and charts. Ethical clearance was taken from the ethical committee of BSMMU. Informed written consent was obtained from the participants.

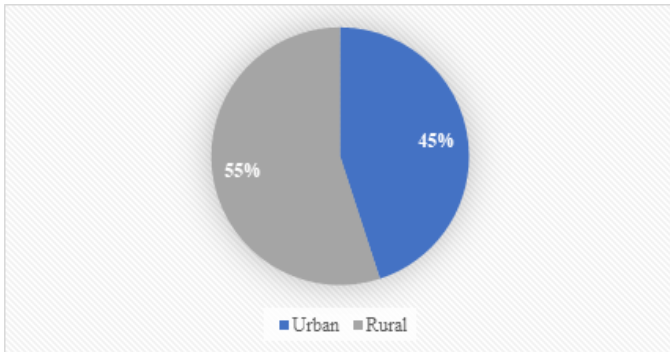
## RESULTS

Among the papillary carcinoma highest (62.86%) number of cases were found in 3rd decade. Among the follicular carcinoma highest (40%) were found in the 5th decade. The lowest age was 13 and the highest at 65 years of age. [Table 1]

Male to female ratio was 1:2.5 in papillary and 1:5 in follicular carcinoma. [Figure 1]

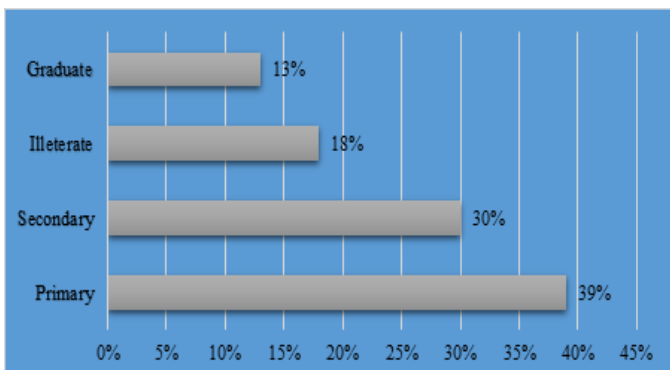


**Figure 1:** Sex distribution of the respondents according to type of thyroid carcinoma (N=40)



**Figure 2:** Distribution of patients according to residents (N=40)

In this series, 22 (55%) subjects resided in rural areas. [Figure 2]



**Figure 3:** Educational status of the study subjects (N=40)

In the present study, a majority (39.0%) of the patients had primary level education, followed by (30.0%) secondary level. [Figure 3]

In this study, a majority (35, 87.5%) of the patients suffered from papillary carcinoma, followed by (5,12.5%) follicular carcinoma. [Table 2]

In DTC majority of patients presented with a tumor size of 4cm or less and was Unilateral. [Table 3]

The commonest symptom for seeking medical admission was swelling in the neck (Lymph node swelling included), which was present in 39(97.5%) cases. Symptoms of distant metastasis and dyspnoea were present in 3(7.5%) and 1(2.5%) cases respectively. [Table 4]

FNAC was done in all 40 cases of DTC. Through FNAC 38 (95.0%) cases were diagnosed or suspected preoperatively. Malignancy was overlooked in 2 (5.0%) cases with false benign cytology. [Table 5]

2 patients with papillary carcinoma had both nodal and distant metastasis. No nodal metastasis was seen in follicular carcinoma. [Table 6]

In this study, hemithyroidectomy was done in 4 and 1 patient with papillary and follicular carcinoma respectively. Total thyroidectomy was done in 13 and 4 cases of papillary and follicular carcinoma respectively. 18 patients of papillary carcinoma underwent total thyroidectomy with neck dissection. [Table 7]

**Table 1:** Age distribution of differentiated carcinoma: (N=40)

Age (years)	Papillary (35 patients)		Follicular (5 patients)	
	n	%	n	%
11-20	3	8.57%	0	0.0%
21-30	22	62.86%	0	0.0%
31-40	3	8.57%	1	20.0%
41-50	2	5.71%	2	40.0%
51-60	5	14.29%	1	20.0%
61-70	0	0.0%	1	20.0%

**Table 2:** Distribution of the type of malignancy in DTC (N=40)

Type of malignancy	n	%
Papillary	35	87.5%
Follicular	5	12.5%
Total	40	100%

**Table 3:** Distribution of tumor size and laterality of DTC (N=40)

Types of DTC	Tumor size		Bilateral	Unilateral
	≤4cm	>4cm		
Papillary n=35	N=27	N=2	2	27
Follicular n=5	N=5	N=0	2	3
Total n=40	32	2	4(10%)	30(75%)

**Table 4:** Symptoms on admission to hospital of differentiated thyroid carcinoma(N=40)

Symptoms	n	%
Swelling in the neck	39	97.5%
Dyspnea	1	2.5%
Symptoms of distant metastasis	3	7.5%

**Table 5:** Comparison of cytologic diagnosis of DTC (N=40)

FNAC finding	Papillary carcinoma	Follicular carcinoma	Total
Malignant	33	0	33
Suspicious	1	4	5
Goiter	1	1	2

**Table 6:** Overall metastasis in DTC (N=40)

Type of malignancy	n	Patients with metastasis (n)		
		Lymph node	Distant	Total
Papillary	35	18(51.43%)	2(5.71%)	18(51.43%)
Follicular	5	0	2(40%)	2(40%)

**Table 7:** Treatment offered for Differentiated thyroid carcinoma (N=40)

Types of Surgery	Papillary carcinoma	Follicular carcinoma	Total
Hemithyroidectomy	4	1	5
Total thyroidectomy	13	4	17
Total thyroidectomy with neck dissection	18	0	18

## DISCUSSION

In this series, the peak incidence of the disease is in the 3rd decade in papillary and the 5th decade in follicular carcinoma. One study done in Bangladesh reported that the highest number of patients present in the 4th decade both in papillary and follicular carcinoma.<sup>[17]</sup> Whereas in another study it is the 5th decade for papillary and the 6th decade for follicular carcinoma.<sup>[1]</sup> Among forty patients thirty were female and ten were male. Females are more commonly affected than males and the male-female overall ratio is 1:3, for papillary it is 1:2.5, and for follicular it is 1:5. In other series male-female ratio is 1:2.5,<sup>[18]</sup> and 1:1.6.<sup>[17]</sup> Regarding the histological type of differentiated thyroid carcinoma, 35 patients (87.5%) had papillary and 5 (12.5%) had follicular carcinoma in this series. Papillary type was more common than follicular type in differentiated thyroid carcinoma. Relative incidence in other studies is 73.33%,<sup>[19]</sup> 80%,<sup>[1]</sup> 60%,<sup>[20]</sup> 75.3%,<sup>[17]</sup> for papillary and 26.67%,<sup>[19]</sup> 10%,<sup>[1]</sup> 20%,<sup>[20]</sup> 24.62%.<sup>[17]</sup> FNAC findings show that its accuracy is 94.23% in papillary carcinoma (33 reported positive, 1 benign, and 1 suspicious), but FNAC cannot differentiate follicular adenoma and carcinoma. Which correlates with other literature.<sup>[20]</sup> Among 40 patients 20 had metastasis and more common in papillary carcinoma (90%). Lymph node metastasis was found in 18 patients (51.43%) and distant metastasis was found in 4 patients (10%). In this study four (10%) patients

were found with distant metastasis, of them two patients (5.71%) had papillary and two patients (40%) had follicular carcinoma., which correlates with a previous study that shows 2.27% for PTC and 25% for FTC.<sup>[19]</sup> This study also represents distant metastasis more common in follicular carcinoma (40%). The frequency of distant metastasis in other reported series was reported from 15%,<sup>[17]</sup> to 22%.<sup>[21]</sup> The surgical management of early papillary carcinoma is hemithyroidectomy. Some advocate total thyroidectomy.<sup>[1]</sup> Follicular carcinoma with a small tumor (less than 1 cm) with minimal invasion can be treated by conservative surgery,<sup>[1]</sup> though total thyroidectomy is done in many centers.<sup>[17]</sup> There are several reasons for total thyroidectomy. Most significantly, it appears to result in improved survival time.<sup>[22]</sup> In addition, total thyroidectomy improves the sensitivity and effectiveness of postoperative radio-iodine scanning and ablation to detect and treat metastatic disease. It also increases the sensitivity of serum thyroglobulin levels for the detection of occult metastasis. Finally, although multifocal disease is much less common in follicular than papillary thyroid carcinoma, total thyroidectomy eliminates tumor foci in the contralateral thyroid lobe, which had been reported in a study.<sup>[22]</sup> In this series, all patients with follicular carcinoma were treated by total thyroidectomy. Treatment offered for differentiated thyroid carcinoma is shown in Table. Low-risk patients with differentiated

thyroid carcinoma were treated by hemithyroidectomy and postoperative thyroxine. All high-risk patients were treated by total thyroidectomy (with or without neck dissection) followed by radio-iodine ablation and thyroxine. The treatment of lymph node metastasis in differentiated thyroid carcinoma is also controversial. Some surgeons advocate expectant management with resection limited to palpable lymph node metastasis based on the view that nodal disease is clinically insignificant and unlikely to influence survival.<sup>[23,24,25]</sup> On the other hand are those surgeons, who recommend prophylactic modified neck dissection. For differentiated thyroid carcinoma because of a high frequency of occult nodal disease with reduced recurrence-free survival.<sup>[21]</sup> In the present series, nodal disease treatment is offered by total thyroidectomy, neck dissection, and postoperative radioiodine ablation. Therapeutic approaches to patients presenting with distant metastasis are essentially well defined; total thyroidectomy (with or without neck dissection), radio-iodine ablation (if radio-iodine scan positive) and/or radiotherapy,

## REFERENCES

1. Ness C, Duxbury B, Van Hove L, Halseth W, Tacl E. Approach to Solitary Thyroid Nodules in Adults. *S D Med.* 2022;75(12):569-572.
2. Holt EH. Current Evaluation of Thyroid Nodules. *Med Clin North Am.* 2021;105(6):1017-1031. doi: 10.1016/j.mcna.2021.06.006.
3. Kendall LW, Condon RE. Prediction of malignancy in solitary thyroid nodules. *Lancet.* 1969;1(7605):1071-3. doi: 10.1016/s0140-6736(69)91707-3.
4. Psarras A, Papadopoulos SN, Livadas D, Pharmakiotis AD, Koutras DA. The single thyroid nodule. *Br J Surg.* 1972;59(7):545-8. doi: 10.1002/bjs.1800590711.

surgical resection of metastatic mass (if possible) and postoperative thyroxine.

## Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

## CONCLUSIONS

The majority of the patients present in the 3rd and 5th decade of life in papillary and follicular carcinoma respectively, with a female preponderance. Moreover, papillary carcinoma is more common than follicular carcinoma, which commonly presents with unilateral tumors. Concerning the symptoms, swelling of the neck (including lymph node swelling) is the most common feature. It can be emphasized that nodal metastasis needs total thyroidectomy, and neck dissection with radio-iodine ablation. Distant metastasis needs total thyroidectomy, surgical resection of the metastatic mass, radio-iodine ablation (if the radio-iodine scan is positive), and/or radiotherapy with thyroxine.

5. Wada N, Duh QY, Sugino K, Iwasaki H, Kameyama K, Mimura T, et al. Lymph node metastasis from 259 papillary thyroid microcarcinomas: frequency, pattern of occurrence and recurrence, and optimal strategy for neck dissection. *Ann Surg.* 2003;237(3):399-407. doi: 10.1097/01.SLA.0000055273.58908.19.
6. Azim MA, Salam KS, Khan MK, Khan JA, Hussain MA, Kundu SC, Mostafa MG. Metastasis in differentiated thyroid carcinoma. *Mymensingh Med J.* 2010;19(4):497-503.
7. Shaha AR. Implications of prognostic factors and risk groups in the management of differentiated thyroid cancer. *Laryngoscope.* 2004;114(3):393-402. doi: 10.1097/00005537-200403000-00001.



8. Čolović Z, Ivanišević P, Bulat C, Barić A, Kontić M, Punda H, et al. Treatment Approach to Follicular Thyroid Carcinoma Tumor Thrombus in the Internal Jugular Vein and Brachiocephalic Vein. *Acta Clin Croat.* 2020;59(Suppl 1):149-152. doi: 10.20471/acc.2020.59.s1.20.
9. Roh JL, Park JY, Park CI. Total thyroidectomy plus neck dissection in differentiated papillary thyroid carcinoma patients: pattern of nodal metastasis, morbidity, recurrence, and postoperative levels of serum parathyroid hormone. *Ann Surg.* 2007;245(4):604-10. doi: 10.1097/01.sla.0000250451.59685.67.
10. Ito Y, Jikuzono T, Higashiyama T, Asahi S, Tomoda C, Takamura Y, et al. Clinical significance of lymph node metastasis of thyroid papillary carcinoma located in one lobe. *World J Surg.* 2006;30(10):1821-8. doi: 10.1007/s00268-006-0211-5.
11. Shaha AR, Shah JP, Loree TR. Patterns of nodal and distant metastasis based on histologic varieties in differentiated carcinoma of the thyroid. *Am J Surg.* 1996;172(6):692-4. doi: 10.1016/s0002-9610(96)00310-8.
12. Goropoulos A, Karamoshos K, Christodoulou A, Ntitsias T, Paulou K, Samaras A, et al. Value of the cervical compartments in the surgical treatment of papillary thyroid carcinoma. *World J Surg.* 2004;28(12):1275-81. doi: 10.1007/s00268-004-7643-6.
13. Patron V, Bedfert C, Le Clech G, Aubry K, Jegoux F. Pattern of lateral neck metastases in N0 papillary thyroid carcinoma. *BMC Cancer.* 2011;11:8. doi: 10.1186/1471-2407-11-8.
14. Seifert P, Freesmeyer M. Preoperative diagnostics in differentiated thyroid carcinoma. *Nuklearmedizin.* 2017;56(6):201-210. English. doi: 10.3413/Nukmed-0924-17-08.
15. Lin JH, Chiang FY, Lee KW, Ho KY, Kuo WR. The role of neck ultrasonography in thyroid cancer. *Am J Otolaryngol.* 2009;30(5):324-6. doi: 10.1016/j.amjoto.2008.07.003.
16. Stewart LA, Kuo JH. Advancements in the treatment of differentiated thyroid cancer. *Ther Adv Endocrinol Metab.* 2021;12:20420188211000251. doi: 10.1177/20420188211000251.
17. Alauddin M, Joarder AH. Management of thyroid carcinoma-an experience in Bangladesh. *Indian J Otolaryngol Head Neck Surg.* 2004;56(3):201-5. doi: 10.1007/BF02974350.
18. Tarafder KH, Rahman SH, Hossain MA, Alauddin M, Islam MA, Hadi IA. Outcome of management of differentiated thyroid carcinoma. *Mymensingh Med J.* 2007;16(2 Suppl):S46-52.
19. Sinha NK, Alam MM, Akaiduzzaman DGM, Alauddin MA. A pattern of metastasis in differentiated thyroid carcinoma. *Bangladesh J Otorhinolaryngol.* 2009;15(2):60-68.
20. Byeon HK, Holsinger FC, Tufano RP, Chung HJ, Kim WS, Koh YW, et al. Robotic total thyroidectomy with modified radical neck dissection via unilateral retroauricular approach. *Ann Surg Oncol.* 2014;21(12):3872-5. doi: 10.1245/s10434-014-3896-y.
21. Shaha AR, Shah JP, Loree TR. Differentiated thyroid cancer presenting initially with distant metastasis. *Am J Surg.* 1997;174(5):474-6. doi: 10.1016/s0002-9610(97)00158-x.
22. Emerick GT, Duh QY, Siperstein AE, Burrow GN, Clark OH. Diagnosis, treatment, and outcome of follicular thyroid carcinoma. *Cancer.* 1993;72(11):3287-95.
23. Bononi M, Tocchi A, Cangemi V, Vecchione A, Giovagnoli MR, De Cesare A, et al. Lymph node dissection in papillary or follicular thyroid carcinoma. *Anticancer Res.* 2004;24(4):2439-42.
24. Mc. Gregor GI, Luman A, Jackson SM. Lymphatic metastasis from well-differentiated thyroid cancer. *Am J Surg.* 1985; 149:610-12.
25. Hamming JF, van de Velde CJ, Goslings BM, Fleuren GJ, Hermans J, Delemarre JF, et al. Preoperative diagnosis and treatment of metastases to the regional lymph nodes in papillary carcinoma of the thyroid gland. *Surg Gynecol Obstet.* 1989;169(2):107-14.

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