

# Incidence of Types of Thyroid Carcinoma in an Iodine-rich Area: Thoothukudi Southern Coastal City

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## Abstract

**Introduction:** Thyroid cancer is the most common malignancy in the human body. Thoothukudi being a coastal city in southern Tamil Nadu, an iodine-rich area, might have been expected to show a lower incidence of papillary carcinoma (PTC). Our study is to analyze the higher incidence of PTC and other types also.

**Aim:** To analyze the incidence of various types of thyroid malignancy in iodide-rich area like Thoothukudi.

**Materials and Methods:** A cross-sectional comparative study in patients with thyroid swelling whose fine needle aspiration cytology (FNAC) has revealed malignant results. FNAC and histopathological examination of biopsy was done.

**Results:** Out of the total 114 patients, 79.5% were females and 21.5% were males. The most common age group was 31-40 years 44.48%. The pathological classification with FNAC and biopsy revealed PTC the most common with 80 cases out of 114.

**Conclusion:** Among carcinoma thyroid PTC thyroid is the most common particularly even though in an iodine-rich area. Carcinoma thyroid has a higher prevalence among females rather than males. The highest number of the patients were seen in the age group of 30-40.

**Key words:** Thyroid, Carcinoma, Iodine rich area

## INTRODUCTION

Thyroid cancer is the most common malignancy in the human body. It accounts for 1% of all cancers. It shows a geographic variation in incidence, tumor type, and natural history. The number of new cases of thyroid cancer was 13.9 per 100,000 men and women per year. The number of deaths was 0.5 per 100,000 men and women per year. These rates are age-adjusted and based on 2009-2013 cases and deaths. Approximately, 1.1% of men and women will be diagnosed with thyroid cancer at some point during their lifetime,<sup>1</sup> based on 2010-2012 data. Thyroid malignancy

commonly presents clinically as either solitary thyroid nodule or multinodular goiter. Pre-operative diagnosis with fine needle aspiration cytology (FNAC) is useful to decide the management. Histopathological study is also used to confirm the diagnosis. This study was conducted in a tertiary care hospital, Thoothukudi Government Medical College Hospital, Thoothukudi. Thoothukudi being a coastal city in southern Tamil Nadu, the people here with their high dietary iodide intake, low thyroid weight, and low serum thyroid stimulating hormone (TSH) levels might have been expected to show a lower incidence of papillary carcinoma (PTC). However, there have been consistent reports of higher incidence of PTC in our area. Our study is to analyze the higher incidence of PTC and other types also. In recent years previously accepted link between thyroid cancer and endemic goiter "has been much disputed. Pendergrast *et al.*<sup>2</sup> found no difference in incidence of thyroid cancer in goitrous and non-goitrous areas in the U.S.A. or any evidence of reduction in incidence in goitrous areas subsequent to the introduction of

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iodized salt. In further reviews, the evidence is regarded as inconclusive, but a link is upheld between endemic goiter and associated follicular and anaplastic histological types of thyroid carcinoma. According to Thorvaldsson *et al.*,<sup>3</sup> the findings together with the known high relative frequency of follicular carcinoma and low frequency of PTC in areas of endemic goitre, lead to the suggestion that the incidence of PTC and follicular carcinoma are separately influenced by dietary iodide,<sup>4</sup> PTC being high in areas of high iodide intake and low in areas with low dietary iodide.

**Aim**

To analyze the incidence of various types of thyroid malignancy in an iodide rich area like Thoothukudi.

**MATERIALS AND METHODS**

A cross-sectional observational study was conducted in Department of General Surgery in Thoothukudi Government Medical College Hospital, Thoothukudi, an iodine-rich southern coastal city in South India. Patients with thyroid swelling whose FNAC has revealed malignant results are included while Patients with thyroid swelling due to other causes like colloid goiter or inflammatory disease are excluded. A detailed history is obtained from all the patients, and complete clinical examination was done. The data collected from the patients documented in a proforma. Age and sex are noted on each patient. Informed consent is obtained from all the patients. Pathological methods used are FNAC and histopathological examination of biopsy.

**RESULTS**

A total of 114 samples of patients with thyroid swelling who's FNAC have revealed malignant results. Out of the total 114 patients, 79.5% of the patients (91) were females and 21.5% of patients (23) were males. The sex ratio between male and female cases was 1:3.6 in favor of the females (Figure 1).

The average age of presentation was 40 years. We had patients as young as 19 years presenting as carcinoma thyroid and 70 years was the oldest age of presentation. The most common age group was 31-40 years with 39 patients about 44.48% of the total cases, followed by the age group 41-50 with 34.2% (Table 1).

The pathological classification with FNAC and biopsy revealed PTC the most common with 80 cases out of 114, follicular carcinoma next with 23 out of 114, anaplastic carcinoma 1 out of 114, and medullary carcinoma 10 (Figure 2 and Table 2).

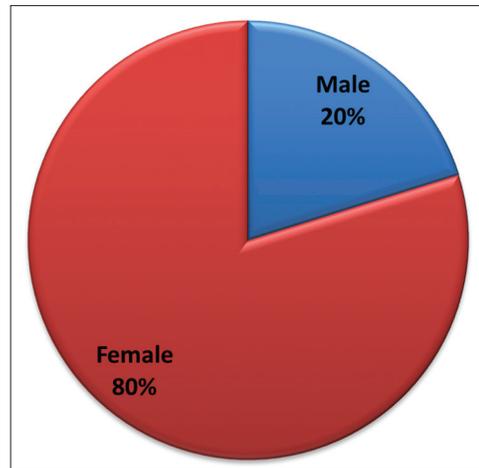


Figure 1: Incidence of thyroid carcinoma distributed in gender

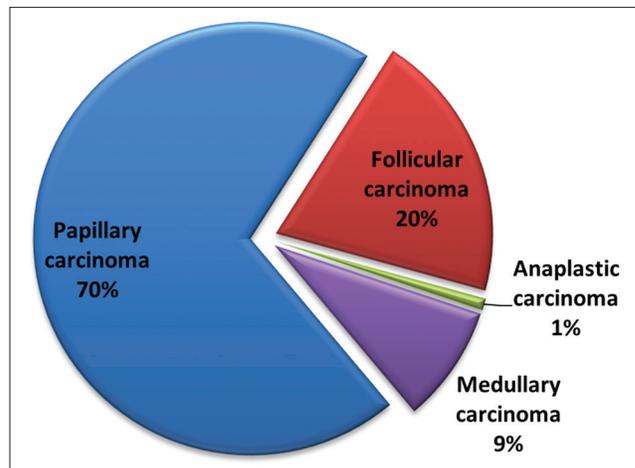


Figure 2: Pathological incidence of carcinoma thyroid

**Table 1: Distribution of carcinoma thyroid patients in age groups**

Age group	Number of patients	Male	Female
11-20	2	0	2
21-30	25	5	20
31-40	39	10	29
41-50	30	5	25
51-60	13	3	10
>61	5	0	5

**Table 2: Pathological classification of carcinoma thyroid**

Age	PTC	Follicular carcinoma	Anaplastic carcinoma	Medullary carcinoma
11-20	2	-	-	-
21-30	20	4	-	1
31-40	30	5	-	4
41-50	20	5	-	5
51-60	5	8	-	-
>61	3	1	1	-

PTC: Papillary carcinoma

## DISCUSSION

PTC is the most common form of well-differentiated thyroid cancer, and the most common form of thyroid cancer to result from exposure to radiation. Fine-needle aspiration biopsy (FNAB)<sup>5-7</sup> is considered the best first-line diagnostic procedure for a thyroid nodule. A comparison of the incidence of the different histological types of thyroid Carcinoma in an area of high dietary iodide and an area of normal iodide intake has been made. In our study, the percentage of PTC among all carcinomas is 70.4%, and this is consistent with thyroid cancer in an iodide rich area. A histopathological study Williams *et al.*<sup>1</sup> a study conducted in Iceland and Northern Scotland where Iceland was the more iodine rich area and their study showed a result of PTC 71% among all carcinomas in Iceland and only 54% in northern Scotland. These findings together with the known high relative frequency of follicular carcinoma and low frequency of PTC in areas of endemic goiter,<sup>8,9</sup> lead to the suggestion that the incidence of PTC and follicular carcinoma are separately influenced by dietary iodide, PTC being high in areas of high iodide intake, and low in areas with low dietary iodide. According to Williams *et al.*,<sup>1</sup> the people of Iceland, with their high dietary iodide intake, low thyroid weight, and low serum TSH levels might have been expected to show a lower incidence of PTC. However, there are a number of observations which taken together with the observations reported here, support the suggestion that a high dietary intake of iodide may be associated with a high incidence of PTC of the thyroid.<sup>10,11</sup> This has drawn parallels in our study and has also consolidated the same point of view.

## CONCLUSION

Among carcinoma thyroid PTC thyroid is the most common which correlates with literature. On the basis of classification according to sex, carcinoma thyroid has a higher prevalence among females rather than males. PTC showed a higher incidence even though the area under study is an iodine-rich area.

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