Geographic distribution of thyroid carcinoma in different districts of Bangladesh- Single Center Experience

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ABSTRACT

Introduction: Thyroid carcinoma is one of the predominant endocrine malignancies. There are limited studies worldwide regarding the distribution of thyroid carcinoma in different areas of a country.

Objective: The study was aimed at evaluating the distribution of thyroid carcinoma in different districts of Bangladesh.

Materials and Methods: This was a retrospective observational study that included 100 thyroid carcinoma patients who came to INMAS, Dhaka, for radioiodine ablation after total thyroidectomy. The study period was from January 2022 to May 2022. Patients were selected according to the inclusion and exclusion criteria.

Results: Out of a total of 100 patients, 72 patients were female and 28 patients were male. The age range was 15-63 years, with the mean age being 37 ± 8.4 years.

There are a total of 8 divisions in Bangladesh: Dhaka, Chattogram, Barisal, Khulna, Rajshahi, Rangpur, Mymensingh, and Sylhet. Out of a total of 100 patients, Chattogram division had 42 patients, Dhaka division had 26 patients, Barisal division had 10 patients, Khulna division had 9 patients, Rajshahi division had 3 patients, Rangpur division had 3 patients, Mymensingh division had 5 patients, and Sylhet division had 2 patients. Out of a total of 42 patients in the Chattogram division, Brahmanbaria had 16 patients (the highest among all districts of Bangladesh); Comilla had 12 patients; Noakhali had 6 patients; Chadpur, Feni, and Lakshmipur each had 2 patients; and Chattogram & Cox's Bazar each had 1 patient.

Conclusion: Thyroid carcinoma was predominant in the Chattogram division, and among all districts of Bangladesh, Brahmanbaria was highest and next highest was the Comilla district. However, further large-scale and multicenter studies are needed to find out more specific distribution and etiology of thyroid carcinoma in different districts of Bangladesh.

Keywords: Thyroid carcinoma, geographic distribution, Bangladesh, different district.

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INTRODUCTION

Thyroid malignancy is increasing globally day by day (1, 10). Worldwide, there are limited studies regarding the distribution of thyroid carcinoma in different areas of different countries. Thyroid carcinoma incidence has been increasing in many countries, whereas mortality has been falling in some due to better survival and screening facilities (2).

Thyroid carcinoma is one of the most common endocrine malignancies (3, 4). This is the ninth most common carcinoma in both sexes and the fifth most common carcinoma in women in the world. Studies in Australia and the United States confirmed the increasing trend of thyroid carcinoma, and the increase is exponential (5, 6, 18). The highest rate of mortality due to thyroid carcinoma occurs in Asia, and it has the highest burden of the disease (18).

Thyroid carcinoma is now considered an important public health concern in much of the world during the past few decades. Increasing use of diagnostic imaging and fine-needle aspiration biopsy has led to greater opportunities for detection and diagnosis of latent, mostly small, thyroid carcinomas that are not detected through symptoms or palpation (3).

Carcinoma incidence and mortality are rapidly growing worldwide. The reasons are complex but seem to be both aging and rapid growth of the population, as well as changes in the prevalence and distribution of the risk factors causing the raised incidence of all kinds of neoplasms, several of which are associated with

socioeconomic development (4, 9, 17). Carcinoma is one of the leading causes of death worldwide. The current status of cancer burden in individual countries and regions is necessary to inform local cancer control strategies (8).

The study was aimed to evaluate the distribution of thyroid carcinoma in different districts of Bangladesh. To the best of the knowledge, there was no previous study conducted to find out the district wise distribution of thyroid carcinoma in Bangladesh.

PATIENTS AND METHODS

Study design: Retrospective cross-sectional observational study.

Study population: 100 thyroid carcinoma patients who came to INMAS, Dhaka for I^{131} radioiodine ablation after total thyroidectomy.

Study period: January 2022 to May 2022.

Inclusion criteria: Patients who stay almost permanently in a specific residence.

Exclusion criteria:

i) patients who had history of migration for a long period of time in life.

ii) patients with undifferentiated thyroid carcinoma.

RESULTS

Out of total 100 patients, 72 patients were female and 28 patients were male. Age range were 15-63 years with mean age was 37 ± 8.4 years.

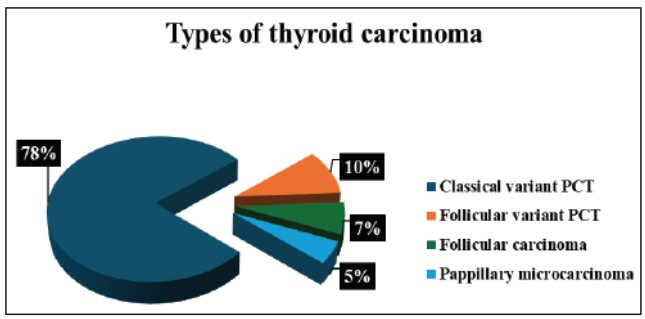

Figure 1: Distribution of patients according to types of thyroid carcinoma

Figure 1 shows that out of 100 patients, 78 had classical variant papillary thyroid carcinoma (PTC), 10 had follicular variant of papillary thyroid carcinoma (FVPTC), 7 had follicular thyroid carcinoma (FTC) and 5 had papillary microcarcinoma.

Table 1: Division wise distribution of thyroid patients (n=100) of Bangladesh attending INMAS, Dhaka

Divisions	Districts	Number of patients
Dhaka	13	26
Chattogram	11	42
Barishal	6	10
Khulna	10	9
Rajshahi	8	3
Rangpur	8	3
Mymensingh	4	5
Sylhet	4	2
Total	64	100

Table 2: Distribution of patients according to different districts of Chattogram division

Districts	Number of patients & percentage
Brahmanbaria	16 (38%)
Comilla	12 (28.5%)
Noakhali	6 (14.3%)
Chandpur	2 (4.8%
Feni	2 (4.8%)
Lakshmipur	2 (4.8%)
Chattogram	1 (2.4%)
Cox's Bazar	1 (2.4%)
Total	**42 (100%)**

Table 2 shows that of the total 42 patients of the Chattogram division, Brahmanbaria had the highest number of patients (16 patients, 38%), followed by Comilla (12 patients, 28.5%); Noakhali (6 patients, 14.3%); Chandpur, Feni, and Lakshmipur (each had 2 patients, 4.8%); and Chattogram and Cox's Bazar (each had 1 patient, 2.4%).

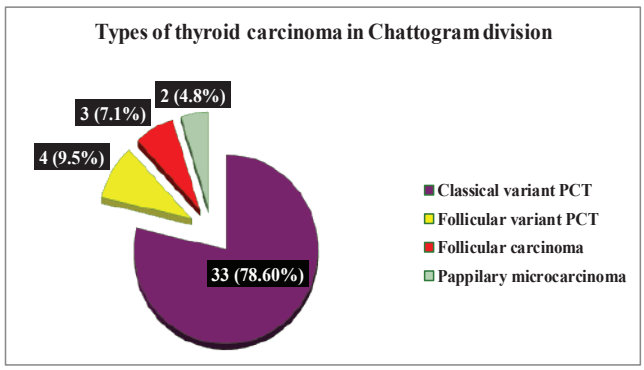

Figure 2: Distribution of patients in Chattogram division according to types of thyroid carcinoma

Figure 2 shows that of the 42 patients of Chattogram, 33 patients (78.6%) had classical variant papillary carcinoma, 4 (9.5%) had follicular variant papillary carcinoma, 3 (7.1%) had follicular carcinoma, and 2 (4.8%) had papillary microcarcinoma.

Table 3: Distribution of patients in Brahmanbaria according to types of thyroid carcinoma

Type of thyroid cancer	percentage
PCT (classical variant)	11 (68.7%)
PCT (follicular variant)	3 (18.7%)
FCT	1 (6.3%)
Papillary microcarcinoma	1 (6.3%)
Total	16 (100%)

Table 3 showing in Brahmanbaria, of total 16 patients, 11 patients (68.7%) had classical variant papillary carcinoma, 3 (18.7%) follicular variant papillary carcinoma, and in 1 patient (6.3%) each had follicular carcinoma and papillary microcarcinoma.

DISCUSSION

In the recent study, thyroid carcinoma was predominant in the Chattogram division, & among all districts of Bangladesh, Brahmanbaria was highest, and next highest was Comilla district. This raised pattern of thyroid carcinoma in the above specific areas of Bangladesh might be due to high iodine content in food and water as they are closer to sea level. Economy and environmental radiation also might be the considering factors. The decrease in water iodine concentration in high iodine areas in China from 2009 to 2020 caused a decrease in the incidence of thyroid carcinoma. Before and after water alteration, the incidence of the carcinoma was highest in areas with water iodine concentrations of 200–300 μg/L in high-iodine areas and suggested that monitoring the incidence of thyroid carcinoma in areas with high water iodine and optimization of the iodine intake by the population are recommended to reduce the incidence of the carcinoma (19). Thyroid carcinoma becomes the second most common cancer among women in Bahrain, Kuwait, Qatar, Saudi Arabia, Oman, and the UAE (7). Many people from Brahmanbaria, Comilla, Noakhali and Chandpur are emigrants in those countries and are living for several years. However, it did not clearly understand that environmental factors in middle east are linked to this increased number of the patients in those districts under Chattogram division and should be further evaluated in future.

The highest incidence of thyroid carcinoma was also in countries in North and Mid Wales, in which the risk was almost twice that in the rest of the country. Here, environmental and fallout radiation from rising atmospheric nuclear weapon tests were considered as risk factors (2).

Another study in India revealed Thiruvananthapuram had at least a fourfold higher incidence compared with other regions using data from the Population Based Cancer Registries for Thiruvananthapuram, Delhi, Mumbai, Bangalore, and Chennai. The study showed thyroid carcinoma incidence is rising in high-income countries and in regions with greater access to diagnostic tests such as thyroid ultrasonography and needle biopsies. Therefore, the rising rates of thyroid carcinoma seemed to be due to overdiagnosis. Obesity, smoking, family history of thyroid carcinoma, exposure to environmental ionizing radiation and toxins, and iodine-rich diet were also mentioned as risk factors (1).

The incidence of thyroid carcinoma has increased worldwide, with the greatest increase in incidence in South Korea. The annual age- and sex-standardized thyroid carcinoma incidence for 16 geographic regions between 2002 and 2012 were computed. The incidence of the disease increased from 10.6 cases per 100,000 people in 2002 to 73.6 cases per 100,000 people per year in 2012. In 2002, the geographic variation in thyroid carcinoma incidence was from 6.6 cases per 100,000 people in Busan to 17.9 cases per 100,000 people in Gwangju. The areas of higher rates were clustered in the southern region of the country. The authors pointed out that thyroid carcinoma screening was strongly associated with the raised incidence of thyroid carcinoma in South Korea (10).

The incidence of thyroid carcinoma has increased in many countries, including the United States within the past few decades. The rise in incidence seems to be

attributable both to the growing use of diagnostic imaging and fine-needle aspiration biopsy, which has led to enhanced detection and diagnosis of subclinical thyroid carcinoma (3).

In the countries with a high and very high human development index (HDI), the incidence of carcinoma in both sexes has been five times higher than in countries with a low or medium HDI mentioned by Maleki, Z., et al. The study showed an increasing trend in the incidence of thyroid carcinoma in most regions, especially in the Eastern Mediterranean, and the findings highlighted regional disparities in the burden of thyroid carcinoma and suggested that there may be a need to improve carcinoma surveillance and more equitable access to health services in regions with increasing trends in incidence and mortality (16).

Several investigators in their studies have suggested that over-diagnosis, or the increased ability to detect and diagnose small, indolent tumors that would never otherwise cause symptoms or require treatment, explains the increased incidence of thyroid carcinoma (6, 12-15).

The workup of incidental thyroid nodules detected on CT imaging for other diseases could be contributing to the increased diagnosis of small thyroid carcinoma that is usually not a routine test for thyroid pathology. The incidence of subcentimeter papillary carcinoma is growing at an exponential rate without significant change in mortality rate and suggested that an increase in CT scans may increase the detection of incidental thyroid carcinoma (11).

Some studies suggested that excess dietary iodine intake may be related to the occurrence of papillary thyroid carcinoma (23). Higher socioeconomic and educational status in a population may also increase thyroid carcinoma diagnosis rates and, thereby, increase the burden of the disease (20, 21). Kruger, E., et al. mentioned in their study that environmental factors such as exposure to several organic and inorganic chemical toxicants, radiation from nuclear weapons, fallout, or medical radiation poses a great threat to developing thyroid carcinoma (22).

CONCLUSION

Thyroid carcinoma is in a rising trend in some of the areas worldwide. It's high time to increase awareness of people about thyroid cancer-related environmental risk factors for the prevention of the rising trend. In the recent study, thyroid carcinoma was predominant in the Chattogram division, & among all districts of Bangladesh, Brahmanbaria was highest, and next highest was the Comilla district. This raised pattern of thyroid carcinoma in the above specific areas of Bangladesh might be due to high iodine content in food and water as they are closer to sea level and needs to be further evaluated. Economy and environmental radiation also might be the considering factors.

RECOMMENDATIONS

i) Further large scale and multicenter studies are recommended to find out more specific distribution and etiology of thyroid carcinoma in different districts of Bangladesh.

ii) As the high iodine content in food and water was the predominant factor in the study, measurement of serum iodine level of the study patients and iodine concentration in soil & water in the resident areas of the patients are further needed to confirm the fact.

CONFLICTS OF INTEREST

There is no conflict of interest among authors regarding the publication of the paper.

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