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ORIGINAL ARTICLE

Incidence of Thyroid Cancer in Bahrain: A Retrospective Study

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Abstract

Background: Thyroid cancer is the most common endocrine malignancy. Its rising incidence is primarily attributed to the increased use of computed tomography (CT) and magnetic resonance imaging (MRI) performed for unrelated medical conditions. In this study, we aimed to examine two key aspects: first, the incidence of thyroid cancer in Bahrain, and second, the demographics, modes of presentation, histological subtypes, and treatment modalities among affected patients.

Methods: Data were retrospectively collected using the electronic files of patients diagnosed with thyroid cancer and discussed at the National Tumour Board (NTB) in Bahrain between 2019 and 2021. A total of 179 patients were included. Extracted parameters, where available, included: (a) Patient's demographics, (b) Risk factors, (c) Age of diagnosis, (d) Clinical presentation, (e) Tumour characteristics, (f) Stage of diagnosis, and (g) Treatments performed. IBM SPSS Statistics software was used for descriptive analysis.

Results: Thyroid cancer had an estimated average annual incidence rate of 4.01 new cases per 100,000 person-years, equivalent to approximately 0.004% of the population per year. The majority of cases occurred in Bahraini females, predominantly aged 35-64 years. Most patients had a body mass index of 25-29.9 and typically presented with asymptomatic neck swelling. Papillary thyroid carcinoma was the most common histological subtype. Most patients underwent total thyroidectomy as their primary treatment.

Conclusion: The study highlights the importance of early detection strategies. Further research is warranted to explore the impact of lifestyle factors and long-term treatment outcomes.

Keywords: Thyroid Cancer, Papillary, Incidence, Bahrain.

Introduction

Thyroid cancer is the most common malignancy diagnosed in the endocrine system and accounts for between 5% and 10% of thyroid nodules biopsied in endocrine services.[1] The incidence of thyroid cancer has increased over recent times because of increased use of computed tomography (CT) and magnetic resonance imaging (MRI) scans used in the management of other medical conditions, like pulmonary disease, and staging for numerous cancers.[2]

A study about the incidence of cancer among the Bahraini population from the years 1998-2002 found that the most common cancers among females were breast, lung, and thyroid cancer, which had a crude rate of 5.8 per 100,000. This study also showed that Bahraini females had a higher incidence rate of thyroid cancer in comparison to other Gulf Cooperation Council (GCC) countries. [3] Approximately 95% of malignant thyroid cancers are derived from follicular cells and are classified into well-differentiated, papillary or follicular lesions, and anaplastic thyroid cancer. Papillary thyroid cancer accounts for about 80% of cases, 15% follicular, and approximately 5% are anaplastic, which behaves aggressively and is invariably fatal. Another small percentage is derived from parafollicular cells (C cells) and is called medullary carcinoma. This can occur in isolation or as part of multiple endocrine neoplasia type 2 (MEN2).[4] The aetiology of papillary carcinoma of the thyroid is not well understood, although several risk factors increase the risk, such as obesity and radiation exposure.[5] In the years 2019 to 2021, the average population in Bahrain per year was approximately 1,486,775.[6]

This study aims to recognise the incidence of thyroid cancer in Bahrain from the years 2019-2021. The purpose of the study is to describe the demographics, modes of presentation, histological subtypes, and treatment options performed for these patients.

Materials and Methods

Study Design and Population

This is a retrospective, observational, cross-sectional study. Access to the electronic files (E-Files) of all patients diagnosed with thyroid cancer and discussed at the National Tumour Board from 2019 to 2021 was granted by the Bahrain Oncology Centre.

A total of 183 patients were extracted; however, four were found to have benign aetiologies on biopsy and did not fulfil our criteria. Hence, our population comprised 179 patients.

Data Collection

Data was extracted into a structured Excel sheet, which included the following parameters: (a) Patient's demographics (age, gender, nationality, and height/weight), (b) Risk factors (co-morbidities, smoking, alcohol, exposure to radiation, and family history), (c) Age of diagnosis, (d) Clinical presentation, (e) Tumour characteristics (histology, size, location, extension, focality, margins, lymph node involvement, lympho-vascular invasion), (f) Stage of diagnosis, (g) Metastasis, (h) TSH (pre-diagnosis), (i) Thyroglobulin (first result after surgery, and the result after 1 year of surgery), (j) Genetic mutations (if done), and (k) Treatments performed.

Since this study was based on a retrospective anonymised dataset, informed consent was waived.

Data Analysis

Descriptive analysis was performed using IBM SPSS Statistics software.

Results

Epidemiology

In the years 2019 to 2021, 179 patients who were diagnosed with thyroid cancer were discussed in the national tumour board in Bahrain. This accounts for an estimated average annual incidence rate of 4.01 new cases per 100,000 person-years (approximately 0.004%). The majority of the population were

females (n= 137, 76.5%), and Bahraini (n= 159, 88.8%). The age group had a unimodal distribution, with most patients aged 35–64 (n=119, 66.5%). A majority of the patients did not have a record of their weight and height in their E-files; however, for those who did, it was noted that most of the patients who were diagnosed with thyroid cancer had a body mass index (BMI) of 25 – 29.9 (n= 33, 18.4%). [Table 1 – 2]

Table 1: Patient demographics

Number of patients	179
Gender	
Male	42
Female	137
Nationality	
Bahraini	159
Non-Bahraini	20
Filipino	6
Iraqi	1
Pakistani	2
Lebanese	2
Indian	3
World (OTH)	1
Spanish	1
Chinese	2
Sri-Lankan	1
Moroccan	1
Age groups	
0-20	2
20-35	39
35-64	119
≥65	19
BMI	
<18.5	4
18.5-24.9	22
25-29.9	33
30-34.9	25
≥35	21

Table 2: Characteristics of the population

Variable	**Overall (n=179)**	**Males (n=42)**	**Females (n=137)**
Age	18 – 88 (46.04)	20 – 71 (47.64)	18 – 88 (49.27)
Height (cm)	146 – 188 (163.13)	156 – 188 (175.06) (12 patients did not have data recorded)	146 – 179 (159.83) (62 patients did not have data recorded)
Weight (kg)	35.5 – 190 (79.07)	61 – 147.6 (88.79) (6 patients did not have data recorded)	35.5 – 190 (77.34) (36 patients did not have data recorded)
Body fat	21.64 – 74.82 (41.27)	21.64 – 74.82 (41.76)	23.6 – 72.26 (41.13)
Body surface area (m^2)	1.23 – 2.66 (1.89)	1.65 - 2.66 (2.08) (12 patients did not have data recorded)	1.23 – 2.56 (1.81) (62 patients did not have data recorded)
BMI (kg/m^2)	15 – 54.2 (29.75)	18.5 – 54.2 (29.76) (12 patients did not have data recorded)	15 – 53.6 (30.16) (62 patients did not have data recorded)

Clinical presentation

The majority of patients presented with asymptomatic neck swelling (n=75, 41.9%). Most were incidentally found during screening for other diseases (n= 39, 21.8%). Others were found during screening for thyroid disease (n=21, 11.7%). Some patients presented with neck swelling associated with symptoms such as neck fullness, neck pain, dysphagia, and unintentional weight loss (m= 29, 16.2%). A few patients were symptomatic but without neck swelling (n=13, 7.3%). [Figure 1]

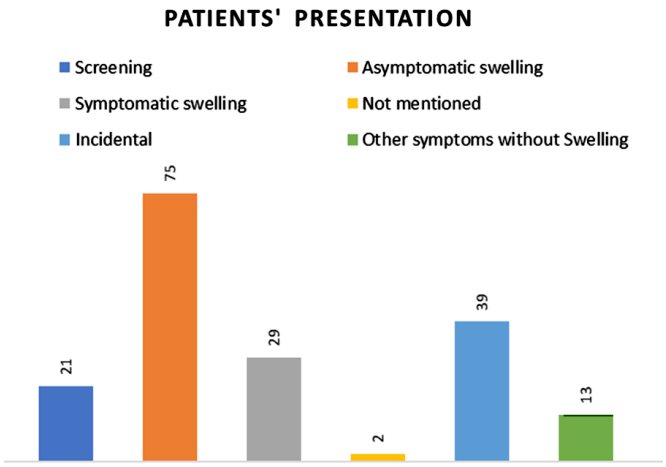

Figure 1: Patient's presentation

Histology and pathology

Different types of thyroid cancer were detected from the years 2019 – 2021, with papillary carcinoma being the most common histopathology of our population (n= 158, 88.3%).

Most of those diagnosed with papillary carcinoma were of an unspecified variant (n= 66, 41.8%). [Table 3]

Staging of cancer

The American Joint Committee on Cancer (AJCC) TNM Staging 8th Edition was used for the majority of our patients. They mainly had small tumours (T1) (n= 84, 46.9%), with inability to measure spread of cancer to the nearby lymph nodes (Nx) (n= 61, 34.1%) or spread to the nearby lymph nodes was detected (N1) (n= 60, 33.5%), and metastasis could not be evaluated (Mx) (n= 152, 84.9%).

During data collection, some patients were not staged according to the TNM scoring system (n=9, 5%). And those who were not operated, were not staged (n=2, 1.1%). [Table 4]

Table 3: Histopathology

Type	Papillary CA	Follicular CA	Medullary CA	Hurthle cell CA	Poorly differenti-ated CA	Mixed Papillary + Follicular	Mixed Papillary + Anaplastic	Insular	Unknown
Number	158	6	3	2	1	3	3	1	2

Papillary CA variants	Classic variant	Conventional variant	Papillary carcinoma Unspecified	Papillary microcarci-noma	Sclerosing variant	Follicular variant	Recurrent metastatic	Classic-follicular variant
Number	39	7	66	15	4	11	2	2
Papillary CA variants	Conven-tional -follicular variant	Conventional -sclerosing variant	Cystic variant	Encapsulated variant	Cribriform-morular variant	Classic-conventional variant	Columnar cell variant	Solid-tubercular variant
Number	1	2	1	1	1	4	1	2

CA: carcinoma

Table 4: TNM staging

T		N		M	
	Number of patients		**Number of patients**		**Number of patients**
1	84	**0**	43	**0**	12
2	4	**1**	60	**1**	3
3	34	**2**	1	**X**	152
4	3	**X**	61		
X	1	+	2		
a	1				
Stage IV not specified	7				
Recurrent Thyroid CA not specified	2				
Minimally invasive not specified	1				
Not operated	2				

Metastasis

Most of those who were diagnosed with thyroid cancer did not have any distant metastasis (n=170, 95%). Those who were diagnosed with metastasis had spread to the bone, lung, pharynx, pleura, and brain (n=9, 5%). [Figure 2]

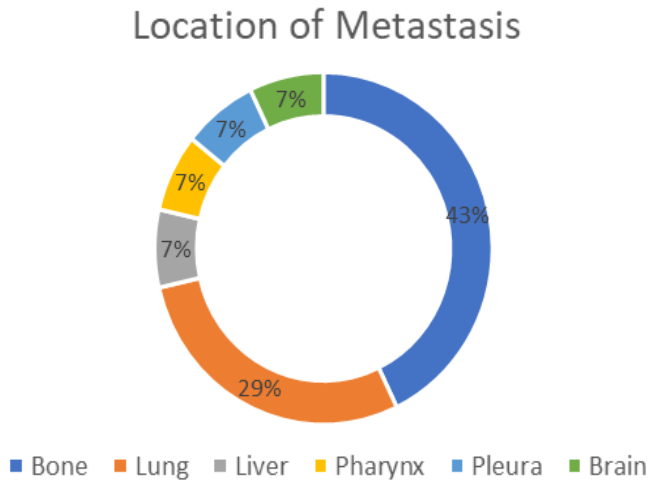

Figure 2: Location of metastasis

Type of treatment performed

Most of the patients in the data from 2019 – 2021 were treated with a total thyroidectomy with nodal dissection and radiotherapy (n=89, 49.7%). A minority did not receive any intervention (n=2, 1.1%). [Table 5]

Table 5: Treatment performed

Total thyroidectomy	**No other treatment**	**TT + ND**	**TT + ND + RT**	**TT + ND + RT + CT**	**TT + ND + CT**
147	46	5	89	5	2
Hemithyroidectomy	**No other treatment**	**HT + ND**	**HT + ND + RT**	**HT + ND + RT + CT**	
18	14	1	3	0	
Hemithyroidectomy with completion thyroidectomy	**No other treatment**	**HT with completion Thyroidectomy + ND**	**HT with completion Thyroidectomy + ND + RT**	**HT with completion Thyroidectomy + ND + RT + CT**	
10	6	0	4	0	
Surgery not done	**No other treatment**	**Radiotherapy**	**Ultrasound-guided alcohol ablation**		
4	2	1	1		

TT: *total thyroidectomy,* ***ND:*** *Nodal dissection,* ***RT:*** *Radiotherapy,* ***CT:*** *Chemotherapy,* ***HT:*** *Hemithyroidectomy*

Discussion

The incidence of thyroid cancer has shown a rising trend globally, with increased detection attributed to the widespread use of advanced imaging modalities.[7] There have been many reports from around the world on the incidence of thyroid cancer in different populations, but few from the Middle East, particularly the Kingdom of Bahrain. The data in our paper is from patients who were reviewed in the national tumour board from 2019 to 2021 with thyroid cancer in Bahrain. In this paper, we present data on thyroid cancer incidence, histopathology, and management.

Globally, age-standardised incidence in 2020 was approximately 10.1/100,000 (0.0001%) in females and 3.1/100,000 (0.00003%) (in men, with wide geographic variability; our average annual rate of 4.01/100,000 (0.00004%) sits below high-incidence settings but within ranges reported for several countries in the region.[8] In neighbouring Gulf Cooperation Council (GCC) countries, Saudi Arabia reports higher age-standardised incidence rates and a similar predominance.[9] The relationship between gender and thyroid cancer has been recognised for a long time. Thyroid cancer is 2.9 times more common in females than in males.[10] The actual mechanism remains speculative, but it is thought to involve oestrogen binding to the ERβ receptor, stimulating thyroid cell proliferation and suppressing apoptosis.[11]

Among females with cancer between 1998 and 2011 in Bahrain, thyroid cancer came in fourth place as the most common cancer. This was demonstrated by a study conducted in 2016 about the incidence and mortality of cancer in the Kingdom of Bahrain.[12] This higher incidence of thyroid cancer in women is also seen in our cohort of patients in Bahrain. It reflects all thyroid cancer studies from across the world. This increase over the past few years in thyroid cancer rates has been greater in women than men, and this is universally found in countries like Italy, France, the Republic of Korea, Canada, the United States of America, and many more.[13]

Histologically, our papillary thyroid carcinoma proportion aligns with the reported worldwide distribution (around 80–90%).[14]

A potential risk factor for thyroid cancer is obesity.[15] A study done in 2011 by Kitahara *et al*., demonstrated that overweight and obese subjects compared to normal weight subjects presented a higher risk of developing thyroid cancer (HR=1.2: 95% confidence interval CI=1.04-1.38 and HR=1.53: 95% CI=1.31-1.79, respectively) The author of this study also looked at anthropometric parameters and demonstrated that a waist circumference (over 102 cm in men and 88 cm in women) increased the risk of thyroid cancer in men (HR=1.79; 95% CI=1.05-2.26) and women (HR=1.54; 95% CI=1.05-2.26). This increased risk in men has not been observed in many other studies.

In our cohort of patients, we had records of BMI available in 105 out of 179 patients (58.66%) with thyroid cancer. In those patients with recorded BMIs, the mean BMI was 30.16 in women and 29.76 in men. We also analysed body fat composition (body fat%) and body surface area (BSA m^2) as shown in Table 2. However, because our study was retrospective, data were collected at the time of treatment, which limits the accuracy of BMI as a risk factor.

As observed in our patients, most have undergone a total thyroidectomy. 147 of 179 underwent a total thyroidectomy, and 10 patients underwent a completion thyroidectomy, accounting for approximately 87.7% of the study population. A study by Hartl from 2020 has favoured the use of a hemithyroidectomy rather than a total thyroidectomy to avoid postoperative complications such as recurrent laryngeal nerve damage, hematoma, or hypocalcaemia. However, recurrence may still occur in the contralateral lobe, and a completion thyroidectomy may be required in 30-50% of cases.[16] The 2015 American Thyroid Association Management Guidelines state that total thyroidectomy is mandatory in Papillary Thyroid Carcinoma in large tumours (>4 cm), invasive, or

metastatic disease. As for small tumours (1-4 cm) and without nodal disease, either a thyroidectomy or lobectomy is acceptable, depending on risk factors and the surgeon's preference. Finally, for tumours ≤1 cm without nodal disease, lobectomy alone is sufficient.[17]

Overall, the comparisons between local and worldwide thyroid cancer profiles in terms of rising detection and female predominance, but with moderate overall incidence, imply the following. First, early detection pathways should be established to evaluate clinically significant nodules while maintaining access to ultrasound-guided assessment and cytology. Second, public health can focus on women aged 35-64, ensuring thyroid awareness in non-communicable disease programs. Finally, treatment planning should align operative choice with risk-stratified guidelines to balance oncologic control against procedure-related morbidity.

Conclusion

In conclusion, this study has shown that between 2019 and 2021, thyroid cancer in Bahrain had an estimated average annual incidence rate of 4.01 new cases per 100,000 person-years (0.004%). It was more prevalent among Bahraini females, with the majority aged 35-64 years. Many patients were overweight, with body mass indices of 25-29.9. The most common presentation was a neck swelling, but they were asymptomatic. Papillary thyroid carcinoma was the most common histological pathology. And finally, the patients were mainly treated with a total thyroidectomy with nodal dissection and radiotherapy.

These findings highlight the need to strengthen early detection strategies and improve public awareness of thyroid disease. Integration of thyroid health surveillance within broader public health initiatives targeting non-communicable diseases may be warranted. Furthermore, the predominance of total thyroidectomy underscores the importance of developing surgical guidelines to balance oncologic outcomes with postoperative morbidity.

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None.

Conflict of interests

All authors declare no conflict of interest.

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