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Short Communication

Epidemiologic and Diagnostic Pattern of Thyroid Gland Cancer Patients in Douala and Yaounde: A Cross Sectional Study

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Abstract

Background: Thyroid cancer is the most pervasive endocrine cancer worldwide. Nodular goiter occupies and represents an important part of thyroid pathologies and 7 – 15% are said to be malignant. In the past 3 decades, there has been an increase in the number of people diagnosed with thyroid gland cancer. In this light, we initiated a study to give us a clearer view on the epidemiologic, diagnostic profile and predictors of thyroid cancer patients in our context.

Objective: The aim of this study was to describe the epidemiologic and diagnostic aspects of thyroid gland cancer patients in ENT departments.

Method: We carried out a cross sectional study with retrospective data collection from the years 2015 to 2021. This study went on within a period of 7 months (from November 2021 to May 2022). We included participants with thyroid masses who consulted in ENT departments of five hospitals in Yaounde and Douala: University Teaching Hospital Yaounde (CHUY), General Hospital Yaounde, National Insurance Hospital, General Hospital Douala, Laquintinie Hospital Douala. We excluded participants with a history of cancer or known metastasis. We equally excluded participants with incomplete files. We collected socio-demographic data, clinical and paraclinical data, with the help of prepared questionnaire forms. Data obtained was entered into Epi-info 7.2.5 and analysed with SPSS version 23.0. We obtained ethical approval from the Ethical Committee Board of the Faculty of Medicine and Biomedical Sciences, University of Yaounde I.

Results: In our study, the prevalence of thyroid cancer among patients with a thyroid mass was found to be 14.2% (n=29) with a sex ratio of 1/5 (men/ women). The mean age for thyroid cancer patients was 44±13.12 years old and the age range was 24 – 83 years. All of the cancer patients (100%) were found euthyroid upon dosage of thyroid hormones. Among the cancer patients, 69% of them had a suspicious nodule at ultrasound, with 55.2% of them being from multinodular goiter and 13.8% being a suspicious solitary nodule. Of the participants diagnosed with thyroid gland cancer, n=15 (48.39%) had a dominant nodule of 4cm or greater. TI-RADS score in the thyroid gland cancer diagnosed participants in our study was a TI-RADS score of four and greater in 72.4% (n=21) of cases. 27.6% (n=8) of thyroid cancer patients had a score of TI-RADS 3 at ultrasound. The most common histology of thyroid gland cancer was papillary cancer with a prevalence of 72.4%. Follicular cancer had a prevalence of 10.3%. Mixed (papillary/ follicular) cancer had a prevalence of 10.3%. Medullary cancer had a prevalence of 3.4% and anaplastic cancer, a prevalence of 3.4% as well. There was a significant association between thyroid cancer and having a suspicious nodule at ultrasound examination.

Conclusion: Thyroid gland cancer represents a non-negligible portion of thyroid masses in ENT departments.

Keywords: Thyroid cancer; epidemiology; Yaounde; Douala

Introduction

Thyroid cancer is the most pervasive endocrine cancer in the world [1], while thyroid masses occupy and represent an important part of thyroid pathologies. In the last 3 decades, there has been a noticeable increase in the number of people diagnosed with thyroid gland cancer [2]. In a Global Health Data Exchange study, data from 195 countries showed that globally there were 95 030 incident cases of thyroid gland cancer and 22 070 deaths in 1990 as compared to 255 490 incident cases and 41 240 deaths in 2017 [1]. In Africa, a study carried out in Togo showed thyroid gland cancer to have a prevalence of 1.1% among all other cancers [3]. In South Africa a six year retrospective study showed a prevalence of 11.1% of cancers among thyroid masses [4]. Similarly in another study carried out in the Democratic Republic of Congo from 2005 to 2019, the prevalence of thyroid gland cancer, after a multicentre cross-sectional study of 594 patients operated on for a thyroid mass was estimated to be 20% [5]. In Cameroon, a retrospective study carried out at the Douala General hospital showed a 23% prevalence of thyroid gland cancer among patients with a thyroid mass [6]. Early diagnosis is essential in the management and follow up of thyroid gland cancer patients and is associated with better prognosis. However, few studies are available in our setting which describe the characteristic profile of patients associated with thyroid gland cancer in multiple health facilities. It is in light of this gap lacking in data, and the general rising trend of thyroid gland cancer incidence, that we decided to carry out a study with the aim of mapping out the epidemiologic and diagnostic pattern of thyroid gland cancer patients in Yaounde and Douala. But also to identify possible predicting factors of malignancy among patients bearing a thyroid gland nodule in ENT departments of those two cities.

Methods

A cross-sectional study was carried out in ENT (ORL) departments of the five major teaching hospitals in the cities of Yaounde and Douala: University Teaching Hospital Yaounde (CHUY), General Hospital Yaounde, National insurance Hospital, General Hospital Douala, Laquintinie Hospital Douala. This study went on from November 2021 to May 2022. The recruitment period concerned January 2015 to December 2021. The target population was defined as patients diagnosed with thyroid gland cancer in Yaounde and Douala ENT departments.

Study population

We included all patients older than 15 years old, who had consulted in ENT departments and had surgery performed for a thyroid mass with the final histopathology results available in their files. We excluded patients with non-primary thyroid gland cancer. Using a pre-study prevalence estimated from a study published in 2020 carried out in Yaounde by Bola et al. (8.9%) [7], the minimum sample size (N) as determined by the Cochran´s formula,

Where Z is the confidence level at 95% with a standard value 1.96, e is the allowable error of 5%, while p is the estimated prevalence according to a similar study of 8.9%, was 125 participants.

Procedure

The first step was to constitute a research proposal which was approved by all the authors. Next, we had to obtain a research authorization from each of the hospitals in which we were going to recruit, and an ethical clearance from the Institutional Review Board of the Faculty of Medicine and Biomedical sciences of the University of Yaoundé I. All necessary information was obtained using a questionnaire prepared for the study. The data was collected from the patient files in the hospital archives and ENT departments and used to fill the questionnaire forms. Histology results after surgery were obtained from the patient files and from laboratories where they were performed. Additional information was obtained from the participants themselves by calling them individually, disclosing the aim and use of the study. After full disclosure, those that didn't express their consent were excluded from the study. The participants with a non-cancerous thyroid mass were used as the comparison group in an attempt to come up with possible predictors of thyroid gland cancer. The data was then introduced into Epi Info data base. The collected data was analysed using SPSS version 23 data analysis software to derive the desired variables and conclusions drawn from the results obtained. Data was then represented using tables and charts. Qualitative variables were presented as absolute numbers (frequency) and percentages while quantitative variables were presented as mean ± standard deviation or mean and interquartile. Confidentiality was assured by assigning codes for every participant and the codes were used to label all documentations.

Results

Of all the patient files with a thyroid mass that were found, 520 patients had had surgery performed. The number of cases during the major phases of data collection evolved as follows (Figure 1).

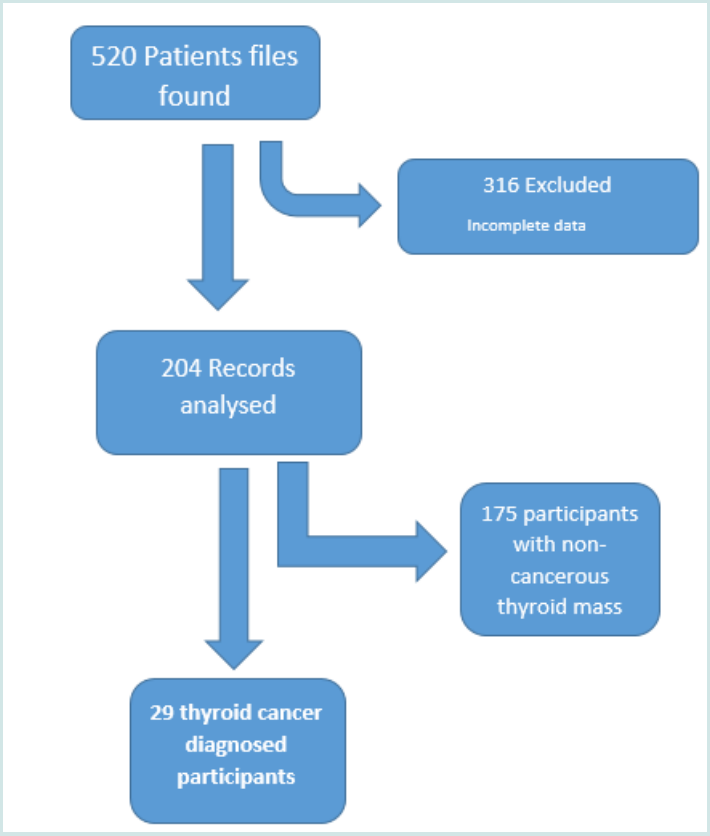

Figure 1: Participant flow diagram.

Frequency of Cancer

Over 500 patient files of patients operated upon for a thyroid mass were found. Among these, 204 were found to have final histology results. The frequency of cancer in this population was shown to be 14.2% (n= 29) as shown in the Table 1 below.

Table 1: Frequency of thyroid gland cancer.

Cancer	Frequency	Percentage (%)
Yes	29	14.20%
No	175	85.80%
Total	204	100%

Socio Demographic Characteristics of the Population

Age

The mean and median ages for the cancer positive population were: (mean; 47.4 ± 13.12) and those for the cancer negative population were (mean; 44.6 ± 13.67) with the ranges being 24 to 70 for the cancer positive population, and 15 to 86 for the cancer negative population. Among the 29 cancer patients, the most frequent age group was 41 – 60 years. The grouped ages of diagnosis for the thyroid cancer patients are represented in the Table 2 below.

Table 2: Grouped ages of diagnosis of cancer patients.

Age of diagnosis (grouped)	Frequency	Percentage (%)
<25	1	3.40%
25 - 40	8	27.60%
41 - 60	14	48.30%
>60	6	20.70%
Total	29	100%

Gender

The sex ratio among the cancer patients was 5/1 with predominance of the female gender, n= 24 (82.8%). Although not statistically significant, the male gender was more likely to develop thyroid gland cancer than the female gender.

Occupation

The majority of thyroid cancer patients had informal occupations as shown in the Table 3 below.

Table 3: Participant distribution according to sector of profession.

Total n (%)	Cancer		
	Yes (n= 29)	No (n= 175)	Total
Occupation Sector			
Formal	11 (37.9%)	45 (25.7%)	56 (27.5%)
Informal	18 (62.1%)	130 (74.3%)	148 (72.5%)
Total	29 (100%)	175 (100%)	204 (100%)

Clinical Characteristics (Personal Frequencies)

Presenting complains: Among the thyroid cancer patients, n=27 (93.1%) had as presenting complaint a thyroid mass at consultation, and two (6.8%) had dyspnea.

High blood pressure /Diabetes: None of the cancer patients were hypertensive nor diabetic.

BMI (Body Mass Index): 55.6% of the cancer patients had their BMI within 25-30, and 37% had their BMI greater than 30. There was a non-significant association between having a BMI greater than 30 and the likeliness of developing thyroid gland cancer.

Cassava inclusive diet: Patients with a cassava positive diet were shown to be more likely to develop thyroid cancer, as 93.1% of the cancer patients consumed cassava regularly. Nevertheless this association was non-significant.

Family history of thyroid cancer: None of the patients with diagnosis of thyroid cancer had a family history of thyroid cancer.

Family of goiter: Six thyroid cancer patients had a family history of goiter. Although non-significant, there was a positive association between family history of goiter and thyroid cancer.

Dysphonia and Dyspnea: Although not significant, it showed that patients who presented a dysphonia and dyspnea were more likely to develop thyroid gland cancer.

Solitary nodule: 0 cancer patients (34.5%) were found to have a solitary nodule at palpation during physical examination. Patients with a solitary nodule at physical examination were more likely to develop thyroid gland cancer than patients who had multiple nodules upon physical examination and the association was statistically significant.

Paraclinical Characteristics

Dosage of thyroid hormones

All 29 (100%) cancer patients in our study were found to be euthyroid upon dosage of thyroid hormone.

Suspicious dominant nodule at ultrasound

Among the cancer patients n=16 (55.2%) had multinodular goiter with a suspicious thyroid nodule at ultrasound while 13 (44.8%) had solitary suspicious nodules at ultrasound.

Size of dominant nodule at ultrasound

Among the cancer patients, n=14 (48.3%) had a thyroid nodule of 4 cm or greater (Table 4).

Table 4: Distribution of nodule size among cancer patients.

Variable	Frequency	Percentage (%)
Size of dominant nodule		
<2cm	6	20.60%
2 – 3.9cm	9	31.00%
4 – 5.9cm	12	41.40%
>6cm	2	6.90%
Total	29	100%

TI-RADS score

72.4% (n=21) of the patients who were diagnosed with a thyroid gland cancer after surgery had a TIRADS score of 4 or greater (Table 5).

Thyroid Cancer Histology

The most common histologic type of thyroid gland cancer was papillary cancer with 21 cases (72.4%). The distribution of thyroid gland cancer based on histology was as in the Table 6 below.

Table 5: Distribution of TI-RADS score among cancer positive patients.

Variable	Cancer		
TI-RADS score	**Yes (%)**	**No (%)**	**TOTAL (%)**
1, 2, 3	8 (27.6%)	123 (78.3%)	131 (70.5%)
4	20 (69%)	34 (21.7%)	54 (29.0%)
5, 6	1 (3.4%)	0 (0%)	1 (0.5%)
TOTAL	29 (100%)	157 (100%)	186 (%)

Table 6: Frequency of the different histologic types of thyroid gland cancer.

Histology	Frequency	Percent
Papillary	21	72.40%
Follicular	3	10.30%
Mixed	3	10.30%
Anaplastic	1	3.40%
Medullary	1	3.40%
TOTAL	29	100%

Multivariable Analysis

Table 7: Summary table of all the variables.

Variable		Total (n%) Yes (n= 29) n (%)	Cancer No (n= 175) n (%)		OR	P value
Socio-demographic characteristics						
Age < 25	Yes	11 (5.4%)	1 (3.5%)	10 (5.7%)	0.6 [0.1 – 4.8]	0.5
	No	193 (94.6%)	28 (96.5%)	165 (94.3%)		
Gender	Male	22 (10.8%)	5 (17.2%)	17 (9.7%)	1.9 [0.7 – 5.7]	0.2
	Female	182 (89.2%)	24 (82.8%)	158 (90.3%)		
Occupation	Formal	16 (7.8%)	4 (13.8%)	12 (6.9%)	2.2 [0.6 – 7.3]	0.2
	Informal	188 (92.2%)	25 (86.2%)	163 (93.1%)		
Cassava consumption	Yes	161 (78.9%)	27 (93.1%)	161 (92.0%)	1.2 [0.3 – 5.5]	0.6
	No	14 (6.9%)	2 (6.9%)	14 (8.0%)		
Clinical characteristics Family history						
Cancer	Yes	1 (0.5%)	0 (0%)	1 (0.5%)	Undefined	0.9
	No	203 (95.5%)	29 (100%)	174 (99.5%)		
Thyroid mass	Yes	40 (19.6%)	6 (20.7%)	34 (19.4%)	1.0 [0.4 – 2.9]	0.5
	No	164 (80.4%)	23 (79.3%)	141 (80.6%)		
Visible thyroid mass	Yes	201 (98.6%)	28 (96.5%)	173(98.9%)	0.3 [0.02 – 3.68]	0.3
	No	3 (1.4%)	1 (3.5%)	2 (1.1%)		
Dysphonia	Yes	8 (4%)	2 (6.9%)	6 (9.7%)	0.7 [0.1 – 3.1]	0.5
	No	195 (96.0%)	27 (93.1%)	168 (90.3%)		
Dysphagia	Yes	20 (9.9%)	2 (6.9%)	18 (10.3%)	0.6 [0.1 – 2.9]	0.4
	No	183 (90.1%)	27 (93.1%)	156 (89.7%)		
Dyspnea	Yes	26 (14.2%)	4 (13.8%)	22 (12.6%)	1.1 [0.4 – 3.5]	0.5
	No	177 (85.8%)	25 (86.2%)	152 (87.4%)		

Multi nodular goiter*	Yes	165 (85.8%)	19 (65.5%)	146 (83.4%)	0.4 [0.2 – 0.9]	0.02*
	No	29 (14.2%)	10 (34.5%)	29 (16.6%)		
Solitary nodule*	Yes	25 (12.2%)	10 (34.5%)	25 (14.3%)	3.1 [1.3 – 7.5]	0.01*
	No	179 (87.8%)	19 (65.5%)	150 (85.7%)		
Euthyroid	Yes	192 (94.1%)	29 (100%)	163 (93.1%)	Undefined	0.1
	No	12 (5.9%)	0 (0%)	12 (6.9%)		
Nodule size >4cm	Yes	76 (37.4%)	15 (48.39%)	61 (35.47%)	1.7 [0.78 – 3.68]	0.17
	No	127 (62.6%)	16 (51.61%)	111 (64.52%)		
Solitary nodule at ultrasound*	Yes	9 (4.4%)	4 (13.8%)	5 (2.9%)	5.4 [1.3 – 21.6]	0.02*
	No	195 (95.6%)	25 (86.2%)	170 (97.1%)		
Dominant nodule at ultrasound*	Yes	60 (29.4%)	16 (55.1%)	44 (25.1%)	3.6 [1.6 – 8.2]	0.001*
	No	144 (70.6%)	13 (44.9%)	131 (74.9%)		

Table 8: Logistic regression.

Term	Odds Ratio	95%	C.I.	Coefficient	S.E.	Z-Statistic	P-Value
Solitary nodule at physical exam (True/False)	2.5684	0.9613	6.8621	0.9433	0.5014	1.8812	0.0599
Solitary nodule (TI-RADS=4 or >4) (True/False)	7.0826	1.4749	34.0109	1.9576	0.8005	2.4454	0.0145
Dominant Nodule MNG (TI-RADS=4 or >4) (True/False)	5.109	2.0866	12.5094	1.631	0.4569	3.5699	0.0004
CONSTANT	*	*	*	-2.8252	0.371	-7.615	0

A step-by-step logistic regression was performed in order to bring out the possible independent predictors of thyroid gland cancer among patients presenting a thyroid mass (Tables 7 & 8).

Probable predictors (Statistically significant)

a) Suspicious dominant nodule in multinodular goiter at ultrasound (TI-RADS =4 and greater).

b) Suspicious solitary nodule at ultrasound (TI-RADS=4 and greater).

Discussion

The aim of our study was to get a clear picture of the epidemiologic and diagnostic profile of thyroid gland cancer patients. This comprised firstly of finding the prevalence of thyroid cancer among patients in ENT departments who had had surgery performed for a thyroid mass. Then we tried to look for possible clinical and/or paraclinical predictors that can help clinicians to be prepared for the management of such patients.

Limits of the study

It was a retrospective recruitment, so we had some issues to get proper information from medical files in different ENT departments. They do not have proper archives units and most of the files were empty. To address that issue, we decided to select only the files which were complete but also to call by phone all the patients in order to obtain proper information but also to seek for consent. Despite those issues, we were able to get sufficient data and draw some conclusions. We had a total of 204 participants in our study from which we found 29 thyroid cancer cases. All had had thyroid surgery performed on them for a thyroid tumour between the years 2015 and 2022.

Prevalence of thyroid gland cancer

The frequency of thyroid cancer found was 14.2% (n=29) among 204 patients. This ties with the general values in literature which estimate thyroid cancer frequency among thyroid nodules at 7 - 15% [8], this figure is quite similar to the prevalence found by Touati and al in 2015 in Morocco (12.57%) [9]. But lower than the value found by Bukasa Kakamba and al in Congo (20%) [5] and in Douala by Linwa and al (23%) [6] but is greater than that found in the study by Bola Siafa and et al. (8.9%) in CHU Yaounde [7]. There are indeed some discrepancies among those Africans papers concerning the prevalence of thyroid cancer, the prevalence will always differ according to the design of the study and the case definition, but we will still remain within 7 and 15% as it is written in the literature.

Socio-demographic features

Age and sex ratio

The mean age for thyroid cancer patients was 47.4±13.1 (p=0.2) and a sex ratio of 5/1 in favour of women. The study from Linwa [6] in Douala showed a mean age of 46.8±13.9 years and a sex ratio of 5.9/1 in favour of women also, which correlates with our study [6]. Thyroid gland cancer are more common in women no matter the study. Most cancers in our study occurred as from the age of 40 (68.9%). This was close to the study carried out in Congo by Bukasa Kakamba and al, which showed 62% of cancer patients at 40 years of age and above [5]. The south African' study by Bhuiyan and Machowski from 2003 to 2008 showed 90% of patients with cancer 40 years of age and greater [4]. The thyroid gland cancer is a

middle age cancer, usually diagnosed around the forties especially in low to middle income countries. Cassava inclusive diets were shown to be non-significantly associated with thyroid gland cancer. 93.1% of thyroid cancer patients (n=27) were seen to have a cassava inclusive diet. This goes contrary to the results obtained by Clero. which showed that cassava consumption was significantly associated with a decreased risk of thyroid cancer [10].

Body Mass Index

In our study, we found a non-significant association between thyroid gland cancer and obesity with n=10 (34.5%) patients having a BMI of 30 and greater. According to a case control study carried out in Korea, a significant association exists between a greater BMI and thyroid gland cancer [11]. This correlation was most likely more accurate because of the design of the study; in our research such association is really difficult to be established.

Diagnosis

Fine needle aspiration cytology

None of the cancer patients did fine needle aspiration cytology (FNAC). This practice is not common in our setting, because most ENT surgeons are not used to it. In the study by Cairncross and Panieri on clinical, radiological and pathological correlation with pre-operative diagnosis of thyroid cancer, only 46.8% of FNAC were helpful [12]. In another study by MacCoy preoperative FNAC was read incorrectly as benign in 9 of 71 patients with cancer (13%) [13]. This practice needs to be implemented because it is cheap and may help to convince patients for the necessity of a more aggressive treatment.

Thyroid Ultrasonography and thyroid hormone

Among the cancer patients, 65.5% had multinodular goiters at physical examination while the rest of the cancer patients (34.5%) had solitary nodules at physical exam. All of the patients of our sample population had ultrasound performed. All of the cancer patients (100%) were found euthyroid upon dosage of thyroid hormones. Among the cancer patients, 69% of them had a suspicious nodule at ultrasound, with 55.2% of them being from multinodular goiter and 13.8% being a suspicious solitary nodule. Of the participants diagnosed with thyroid gland cancer, n=15 (48.39%) had a dominant nodule of 4 cm or greater. In the south African study by Bhuiyan and Machowski, only 2.2% of cancers were found in multinodular goiters [4]. The Ultrasonograhy is an essential exam when investigating a patient suffering from thyroid gland disease. TI-RADS score greater than or equal 4 is often associated with a thyroid cancer.

Histology

The most common histology of thyroid gland cancer was papillary cancer with a prevalence of 72.4%. Follicular cancer had a prevalence of 10.3%. Mixed (papillary/ follicular) cancer had a prevalence of 10.3%. Medullary cancer had a prevalence of 3.4% and anaplastic cancer, a prevalence of 3.4% as well. Our numbers are close to the literature which estimate papillary and follicular cancers make up about 90% of all thyroid cancers [8]. The study led by Ukekwe and al showed prevalence of 42.6% for papillary cancer, 37.7% for follicular cancer, 4.9% for medullary cancer, 4.9% for mixed (papillary/ follicular) cancer, 1.6% for mixed cancer and 3.3% for anaplastic cancer [14]. The big difference between the follicular cancer percentages is most likely because follicular cancer is more common in iodine deficient areas [15], and Southeastern Nigeria and its adjoining communities are in the iodine deficient zone of Nigeria [16].

Predictors

Having a suspicious thyroid nodule at ultrasound and having a suspicious dominant nodule in multinodular goiter at ultrasound could be considered taken as predictors in our study according to the results of the logistic regression mode used for this study. There was an association between having a dominant nodule >4cm and the likeliness of developing thyroid gland cancer but this association was not significant. Based on the study carried out by McCoy, the thyroid nodules >4cm should be considered for diagnostic.

Conclusion

With the aim of defining the epidemiologic and diagnostic pattern of thyroid cancer patients in our context, the following conclusion have been made:

a) In our study, the prevalence of thyroid cancer was found to be 14.2% among patients with a thyroid mass (n=29) and a sex ratio of 1/5 (men/ women).

b) The mean age for thyroid cancer patients was 44±13.12 years old.

c) 27 thyroid cancer patients (93.1%) had a thyroid mass as presenting complaint.

d) 34.5% (n=10) of thyroid cancer patients had a solitary nodule at physical exam, while 65.5% (n=19) had a multinodular goiter at physical exam.

e) All of the cancer patients (100%) were found euthyroid upon dosage of thyroid hormones.

f) Among the cancer patients, 69% of them had a suspicious nodule at ultrasound, with 55.2% of them being from multinodular goiter and 13.8% being a suspicious solitary nodule.

g) Of the participants diagnosed with thyroid gland cancer, n=15 (48.39%) had a dominant nodule of 4cm or greater.

h) TI-RADS score in the cancer gland cancer diagnosed participants in our study was a score ≥4 in 72.4% of cases.

i) The most common histology of thyroid gland cancer was papillary cancer with a prevalence of 72.4%. Follicular cancer had a prevalence of 10.3%. Mixed (papillary/ follicular) cancer had a prevalence of 10.3%. Medullary cancer had a prevalence of 3.4% and anaplastic cancer, a prevalence of 3.4% as well.

j) There was a significant association between thyroid cancer and having a suspicious nodule (TI-RADS ≥4) at ultrasound examination.

k) Although not statistically significant, there was a strong correlation between having a solitary nodule at the physical examination and having a thyroid gland cancer.

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