



## ORIGINAL ARTICLE

# Spectrum of thyroid nodules in a tertiary care center in the Kingdom of Bahrain

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### Abstract

**Background:** This study investigates and analyses the thyroid nodules in Bahrain, and correlates the diagnosis of cytopathology with a subsequent excision histopathology.

**Materials & Methods:** We conducted a retrospective study for all thyroid cases diagnosed at the Salmaniya Medical Complex during a 7-year period (January 2013 to December 2019).

**Results:** A total of 1218 thyroid nodules were diagnosed during the study period. Among them, 1,037 (85%) of the patients were females and 181 were males (15%), with an average age of 48.2 years. Surgical excision was performed on 263 out of 1,037 (25%) of the cases.

**Conclusions:** The study revealed that the prevalence of thyroid nodules is higher among females. The most common nodules are benign multinodular goiters. A statistically significant correlation was observed between fine needle aspiration cytology (FNA) and surgical excision of the thyroid nodule.

**Keywords:** Thyroid, FNA, thyroid nodules, cytology, excision

### Introduction

Thyroid nodules are common in up to 60% of the worldwide. Most thyroid nodules are asymptomatic. Palpable thyroid nodules occur in 4-7 % of the population.<sup>1</sup> However, the widespread use of ultrasonography imaging has triggered an approximately 19-68 % increase in the number of incidental thyroid nodules found.<sup>1-6</sup> As about 10-15% of all palpable nodules are found to be malignant, the main objective of evaluating thyroid nodules is to exclude the diagnosis of a malignancy.<sup>7-10</sup> The high prevalence of thyroid nodules makes evidence-based strategies necessary for its exact

diagnosis, risk stratification, treatment and follow up.<sup>11,12</sup>

Thyroid nodules are usually benign. However, thyroid cancer is one of the most common endocrine malignancies; it is listed as the seventh most common cancer affecting women and as the fifteenth most common cancer experienced by men.<sup>7,13</sup>

Thyroid nodules occur five times more frequently in females than in males.<sup>7</sup> The prevalence increases with age. Methods for evaluating thyroid nodules include the thyroid palpation exam, serum thyroid

stimulating hormone (TSH) test, ultrasonography, and fine needle aspiration (FNA).<sup>14,15</sup>

FNA is the most accurate and cost-effective method for evaluating thyroid nodules. It is the procedure of choice for identifying patients who require surgical excision.<sup>12</sup> It is a noninvasive and inexpensive assessment that should be performed on all patients with suspected of having a thyroid nodule to confirm the presence of the nodule, to assess suspicious sonographic findings and to exclude the presence of additional nodules and lymphadenopathy.

**Materials & methods**

For this retrospective study, we searched the electronic records of the Pathology at Salmaniya Medical Complex, Ministry of Health, in Bahrain for all thyroid cases diagnosed during the period January 2013 through December 2019. The records were analyzed in accordance with The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC).<sup>16</sup> The data were entered into a Microsoft Excel form and analyzed using SPSS (20th ed., IBM Corp. released 2011. IBM SPSS Statistics for Windows, version 20.0. Ethical approval was obtained from Salmaniya Medical Complex Institutional Review Board.

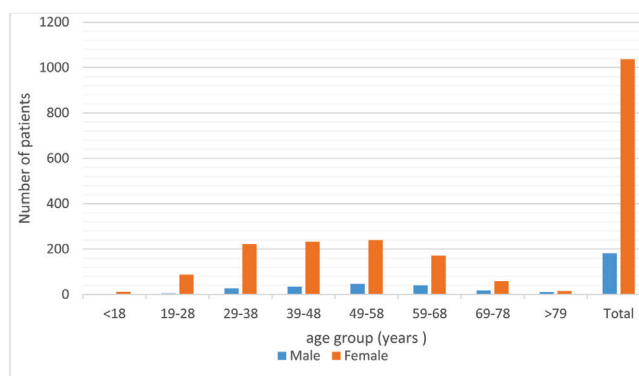
**Results**

The search yielded a total of 1218 patients diagnosed with thyroid nodules diagnosed at the Salmaniya Medical Complex between January 1, 2013, and December 31, 2019. Of them, 1,037 (85%) were females and 181 (15%) were males. Their ages ranged from 9 to 97 years with an average age of 48.2 years old, Patients’ age demographics were as follows: 14 patients (1%) were 18 years old or younger; 91 (7%) were aged 19-28; 249 (21%) were between 29-38 years old; 267 (22%) were between 39- 48; 286 (24%) were aged 49-58; 211 (17%) were 59-68; and 75 (6%) were aged 69-78. Twenty-five (2%) were age 79 and older. The most common age group of the patients diagnosed with thyroid

nodules in this study sample was 49-58 years for both females and males (see Table 1 and Figure 1).

**Table 1:** The age and gender distribution of 1218 patients with the thyroid nodules

Age Group(years)	M	F	Total
<18 years	2	12	14
19-28 years	4	87	91
29-38 years	27	222	249
39-48 years	35	232	267
49-58 years	46	240	286
59-68 years	40	171	211
69-78 years	17	58	75
>79 years	10	15	25

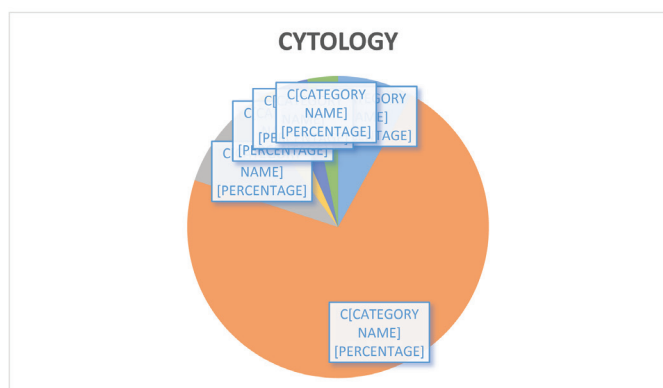


Total 181 1037 1218

**Figure 1:** The age and gender distribution of 1066 patients with thyroid nodules

Eighty-six patients (8%) were evaluated as nondiagnostic or unsatisfactory (Bethesda category I). Of the remaining patients’ thyroid nodule diagnoses, 767 (72%) were benign (Bethesda category II), 107 (10%) were atypia of indeterminate significance (Bethesda category III), 35 (3%) were follicular neoplasm or suspicious for a follicular neoplasm (Bethesda category IV), 36 (4%) were suspicious for malignancy (Bethesda category V), and 35 (3%) were malignant (Bethesda category VI) (See Figure 2 and Table 2). Of the 1,066 thyroid nodules, 263 (25%) were surgically excised, with an overall rate of malignancy of 33%. Histopathology reports were available for review for all cases.

**Figure 2:** Results of 1066 patients with thyroid nodules based on The Bethesda System for Reporting Thyroid Cytopathology



C1, C2, C3, C4, C5 and C6 correspond to Category 1, 2, 3, 4, 5, and 6.

Among the 263 nodules that were surgically excised,

156 (59%) cases involved total thyroidectomies, 57 (22%) cases involved a right lobectomy, and 50 (19%) cases involved a left lobectomy.

Out of the 767 nodules (72%) diagnosed as benign, surgical excision was performed in 117 cases, 14 cases of which received malignant diagnoses (12%).

A total of 36 cases (4%) were diagnosed as Bethesda V (suspicious for malignancy), in 24 of those cases, the nodules were surgically excised, 21 of which (87.5%) were found to be malignant.

Considering all thyroid nodule cases in this study, an excellent correlation was observed between the Bethesda cytology classification and subsequent excision (Table 2). Cases diagnosed as Bethesda 5 or 6 were all malignant (100%).

**Table 2:** Comparison between the Classification of Thyroid Nodules based on FNA cytology and Resected Specimens

FNA Bethesda Cytology Classification	Number of patients	MNG	FA	Hashimotos thyroiditis	Malignancy
I	86	19	3	-	2
II	767	78	11	14	14
III	107	18	7	5	15
IV	35	6	10	2	6
V	36	-	-	-	21
VI	35	-	-	-	28
	Total:1066				Total 263

MNG- Multinodular goiter; FA-Follicular adenoma

### Discussion

The incidence of thyroid nodules varies according to geographic area, gender, and age. Both benign and malignant thyroid nodules are common all over the world. In this study, we attempted to determine all thyroid nodules diagnosed in our center during a 7- year period, along with their histopathology and cytopathology correlation. A total of 1,218 FNA cases and 263 excisions were examined. Thyroid nodules were found to be more common in females than in males, with a female to male ratio of 6:1, which is comparable to the findings reported in published studies that showed definite female predominance.<sup>7,17-19</sup>

Our results demonstrate that the spectrum of thyroid nodules in the Kingdom of Bahrain mirrors those in other countries: that is, most thyroid nodules were benign for all age groups (77%). This percentage

correlated with the findings of other studies placing the proportion at 62%.<sup>20</sup>

In this research, of the 1,066 FNA cases, 107 (10%) were classified as atypia of undetermined significance. Compared to the percentage (10-30%) of atypia of undetermined significance reported in many published studies, our rate is acceptable.<sup>15</sup>

Molecular testing has been evolving as an especially useful test for informing decision-making regarding the management of thyroid nodules.<sup>12,22</sup> It has the potential to improve patient care, especially in the setting of indeterminate thyroid nodules, by helping to guide both the need for thyroid surgery and the extent to which it is needed. Our hospital has not yet established molecular testing for thyroid nodules.

We must acknowledge several limitations of our study, including the fact that it was a retrospective

study, and some of the patients were missing during follow-up, mainly because they went to other centers for their follow-up and surgeries.

## Conclusions

Thyroid nodules are common and were found predominantly in females, with most cases occurring in the 49–58-year age group. Most thyroid nodules are benign, and the majority do not need surgery. Fine needle aspiration (FNA) is the most accurate method for evaluating thyroid nodules. An excellent correlation was observed between the Bethesda cytology classification and subsequent surgical excision. Cases diagnosed as Bethesda 5 or 6 were all malignant (100%); these patients should be referred for surgery.

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## Conflicts of interest

The authors declare that they have no competing interest.

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