

Prevalence of Thyroid Carcinoma in Patients Undergoing Thyroid Surgery

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Abstract:

The purpose of this study was to know the Prevalence of Thyroid Carcinoma in Patients Undergoing Thyroid Surgery. A prospective study was carried out between 2019 and 2023, focusing on surgical operations performed by a surgeon and their trainees. The research encompassed a cohort of 362 individuals who were referred for surgical intervention to address various thyroid pathologies. A total of 31 patients were excluded from the study on account of being diagnosed with malignancy (MNG) through fine-needle aspiration cytology (FNAC) or having a history of surgery. Subsequent to the surgical procedure, the residual cohort of 331 individuals underwent a thorough assessment to determine the existence of neoplastic growth via pathological examination. The prevalence of thyroid disorders was observed to be 85.2% in females and 14.8% in males. Furthermore, thyroid cancer was found to exhibit a higher incidence rate in females as compared to males, mainly at age group 29-39 years. The current results showed that multiple thyroid nodule was most prevalent than other types which is also showed in female than male.

In conclusion, the prevalence of thyroid disorders was most prevalent in female than male at age group 29-39 years and the MNG were most prevalent than another types.

Keywords: Thyroid, MNG, gender, Age.

Introduction:

The term "Incidental Thyroid Cancer" (ITC) refers to any malignant growth originating from the thyroid gland that was not identified in the course of a preoperative evaluation or a clinical checkup (1). Instead, it is detected by pathological examination of a surgical specimen removed for treatment of a benign illness, such as a hyperthyroidism, goiter, or a nodule in an unrelated location (2,3).

According to projections, by the year 2019, Invasive Cervical Cancer (ITC) is anticipated to rank as the third most prevalent form of cancer among females in the USA, following lung and the breast cancer (4-7). The incidence of these occurrences is higher in females. While the primary age range for onset is between 40 and 60 years, they may also manifest during childhood and adolescence (8, 9).

The prevalence of thyroid carcinoma (ITC) is not commonly observed in patients who have undergone surgery for benign thyroid disorders. The incidence rates of the phenomenon under consideration vary between 3% and 16%, depending on the case

selection criteria used (1, 2). However, certain series have reported higher incidence rates of 25-26% (2, 9).

Patients with a preexisting hyperthyroid condition, it has been observed that ITC may manifest. It has long been postulated that such patients are safeguarded against cancer due to the suppression of TSH hormone (1,2,10). Moreover, the rate of identifying intratubular germ cell neoplasia (ITC) through postmortem examination has been observed to exhibit a consistent upward trend, with an approximate surge from 6% in 2003 to 20% in 2012, as reported in literature (2, 9).

According to reports (1, 2, 7), the vast majority of detected lesions are microcarcinomas, more precisely papillary tumours measuring less than 1 cm in size. Numerous studies have established an increased risk of developing thyroid cancer, notably papillary thyroid carcinoma, as a consequence of Graves' illness, with some reporting rates as high as 18.3% (10-12). There is a growing body of evidence that suggests a correlation between lymphocytic or Hashimoto's thyroiditis and thyroid cancer (3, 12).

The utilisation of Total Thyroidectomy (TT) has been a subject of controversy for an extended period in the treatment of benign disease (MNG) (13, 14). However, an additional benefit of total thyroidectomy is the complete elimination of any remaining thyroid tissue, as reported in previous studies (14).

The purpose of this study was to know the Prevalence of Thyroid Carcinoma in Patients Undergoing Thyroid Surgery.

Materials and Methods:

This research looked forward, covering the years 2019 through 2023. The initial surgical procedures were performed by a singular surgeon and their trainees. Throughout this particular timeframe, a total of 362 individuals were directed for surgical intervention in order to address various forms of thyroid pathology. Fine needle aspiration cytology (FNAC) and ultrasonic results showed that 31 participants should be removed from the research owing to cytological evidence of MNG, or due to a history of surgery with histopathological findings indicating completion thyroidectomy. These patients were subsequently excluded from the study. The present study included the 331 patients who remained.

The entire cohort of patients (n=331) underwent preoperative ultrasound (U/S) examination to evaluate the size of the thyroid gland, presence of any abnormal nodules including their size, number, as well as location, identification of calcification as well as the vascularity of the nodules, and lymph node enlargement detection. In certain cases, involving retrosternal extension, neck as well as chest CT scans were employed for diagnostic purposes. All patients underwent Fine Needle Aspiration Cytology (FNAC) on the dominant nodules, which resulted in the diagnosis of benign disease in all cases.

Thyroid function tests were conducted on a cohort of patients for diagnosed of hypothyroidism. Patients who presented with nodular thyroid and suppressed TSH, with or without overt raise of T3 and/or T4, were diagnosed with toxic nodular goiter (solitary or multinodular), these done by using kits purchased from Biolabo company.

Medical treatment was administered to all patients with thyrotoxicosis, and it was maintained until the day of the surgery in order to avert any thyroid crisis that may occur during the perioperative period. Patients diagnosed with hypothyroidism were administered thyroxine replacement therapy. The preoperative decision regarding the surgical procedure was made based on the individual surgeon's training and customary practice.

The surgical procedures carried out included total lobectomy with isthmusectomy, sub-total thyroidectomy, as well as total thyroidectomy.

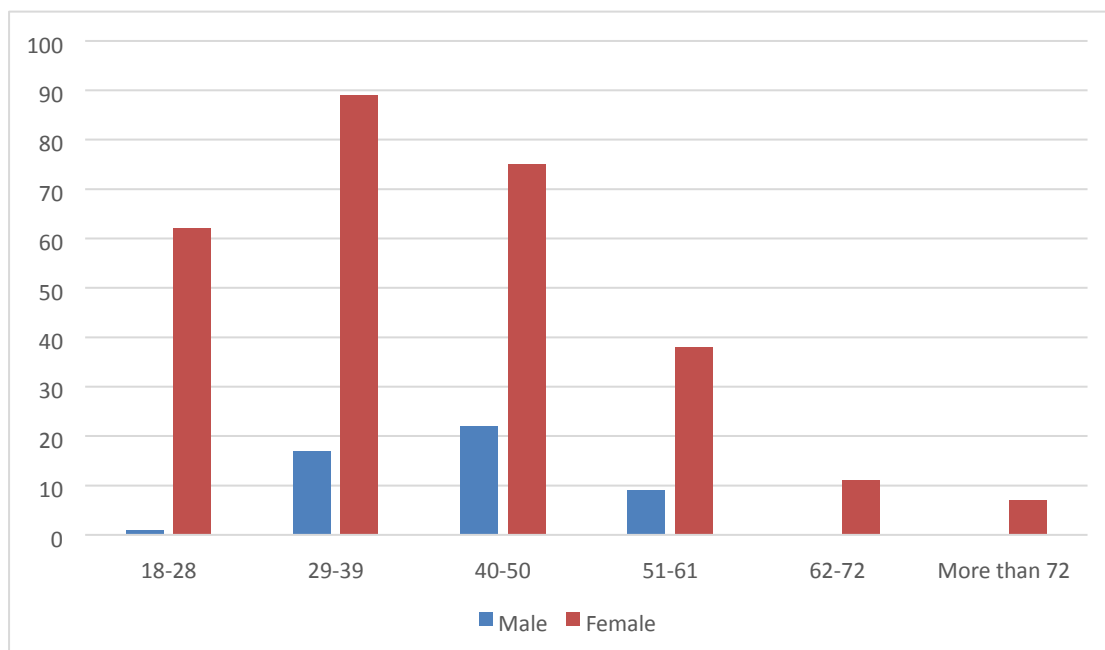
Statistical analysis was done by using SPSS software version 23.

Results:

The prevalence of thyroid disorders was observed to be 85.2% in females and 14.8% in males. Furthermore, thyroid cancer was found to exhibit a higher incidence rate in females as compared to males, mainly at age group 29-39 years (Table 1, Histogram 2).

Table 1, distribution of age and sex among a sample of 331 patients diagnosed with thyroid disorders.

Age group (years)	Males	Females	Total	Percentages
18-28	1	62	63	19
29-39	17	89	106	32
40-50	22	75	97	29.3
51-61	9	38	47	14.3
62-72	0	11	11	3.3
More than 72	0	7	7	2.1
Total	49 (14.8%)	282 (85.2%)	331	100%

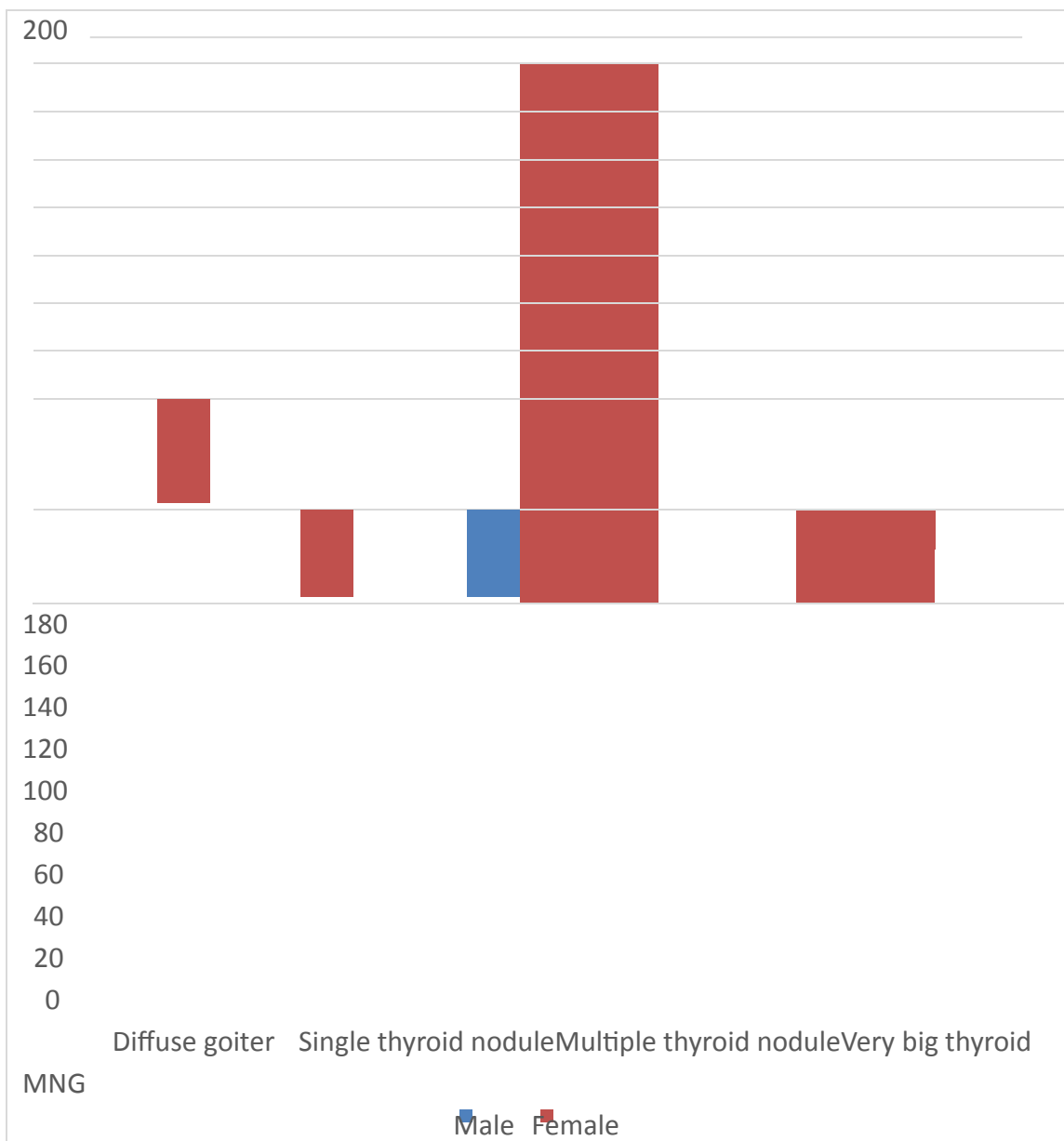


Histogram 1, distribution of age and sex among a sample of 331 patients diagnosed with thyroid disorders.

The current results showed that multiple thyroid nodule were most prevalent than other types which is also showed in female than male (Table 2, Histogram 2).

Table 2 presents the clinical findings of a sample of 331 patients diagnosed with thyroid disorders.

Age group (years)	Males	Females	Total	Percentages
Diffuse goiter	8	45	53	16
Single thyroid nodule	1	37	38	11.5
Multiple thyroid nodule	38	181	219	66.2
Very big thyroid MNG	2	19	21	6.3
Total	49	282	331	100%



Histogram 2 presents the clinical findings of a sample of 331 patients diagnosed with thyroid disorders.

Discussion:

The thyroid defect is a condition that presents with subtle symptoms and requires close monitoring (14). Presently, the most prevalent clinical observation in the general population is the occurrence of thyroid swelling, with a prevalence rate of 4-7%. It holds the second position among females in Saudi Arabia (15).

Anomalous regulation of thyroid hormones is a primary etiological factor for these disorders. Given their significant impact on metabolism, mental health, and muscle strength, these hormones hold crucial importance (16).

A previous clinical study conducted in India revealed a high prevalence of thyroid abnormalities. Approximately 3.3 million adults were diagnosed with abnormalities in the TSH, T3, as well as T4 hormones. Of this population, 68% exhibited normal hormone levels while the remaining 32% were diagnosed with various thyroid

disorders, such as hyperthyroidism, thyroid nodules, goiter, thyroiditis, as well as thyroid cancer (17).

Thyroid disorders are classified into tumour and non-tumor diseases based on their morphology. The aetiology of these nodular manifestations is intricate and remains insufficiently investigated, as indicated by scholarly sources (18). The identification of both neoplastic and nonneoplastic lesions was observed during the diagnosis of thyroid disorder, with the purpose of verifying the presence of malignancy(11).

The majority of cases are non-neoplastic in nature, however, there are instances where malignancy is present and cannot be avoided. Efficient and economical screening methods such as fine-needle aspiration cytology (FNAC) and ultrasonography have been employed as dependable diagnostic tools for prompt identification of thyroid abnormalities. The potential for curability is underscored by the prevalence of the first line of treatment (19).

Upon confirmation, total thyroidectomy was selected as the primary surgical intervention for malignancy among various types of surgeries. This technique involved the complete removal of the malignant portion of the gland in order to decrease the likelihood of recurrence, as reported in previous studies (20).

Previous research has demonstrated that thyroid defects are correlated with age and gender. According to the survey conducted on global diseases, thyroid disorders were found to have the highest prevalence rate (21). Specifically, 25% of females and 0.6% of males were affected by this condition. Several studies have demonstrated that the incidence of thyroid disorders is more prevalent among females than males during middle age, as evidenced by research conducted between the ages of (2223).

The high prevalence of gender disparity in females may be attributed to the influence of oestrogen and progesterone. The research conducted in Iraq yielded findings indicating that the ratio of females to males diagnosed with hypothyroidism was 1.6:1 (24). In Yemen, a higher prevalence of thyroid cancer was observed in females compared to males, with rates of 90% and 89.7%, respectively (25).

According to reports, there is a positive correlation between age and the prevalence of thyroid disorders in both males and females. The study revealed a mean patient age of 49 years, with a maximum age of 60 years in males and 78 years in females. The studies have indicated that thyroid cancer is prevalent among elderly patients and can result in considerable morbidity if not addressed during the initial stages (26).

Prior to the surgical procedure, it is imperative to assess the clinical findings obtained through the utilisation of fine-needle aspiration cytology (FNAC) or ultrasonography to evaluate the thyroid gland. Our research has revealed that a majority of patients have been diagnosed with MNG. Solitary or multiple nodules can be examined in the swollen neck.

Regarding MNG, it has been observed that a single nodule exhibits clinical dominance in both size and function, surpassing all others (19). This phenomenon arises due to significant expansion and alterations in either the structure or operation of the thyroid gland (21). The data presented in our study is consistent with previous research

indicating that the prevalence of MNG is higher, approximately 4-7%, than other types of thyroid defects on a global scale (26).

Previous research has indicated that patients with MNG should undergo surgical intervention based on the prevalence and malignancy of the condition (27). All patients who were enrolled underwent a total thyroidectomy procedure to remove the malignancy that was detected during clinical examination. The confirmation of malignancy in the patients was achieved through the observation of histopathology reports.

Nodules may be classified into two categories: non-neoplastic, which encompasses inflammatory and hyperplastic nodules, and neoplastic, which encompasses benign and malignant nodules. Benign nodules comprise adenomas, whereas malignant nodules consist of carcinomas (specifically papillary and follicular). According to reports, PTC was predominantly detected in individuals who had been diagnosed with benign thyroid goiter (28).

Conclusion:

The prevalence of thyroid disorders was most prevalent in female than male at age group 29-39 years and the MNG were most prevalent than another types.

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