

Original Research Article

Thyroid disorders, epidemiology and outcome among patients in South Western region: Southern Saudi Arabia

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ABSTRACT

Background: Thyroid gland may have a group of a medical condition that affects its main function. The thyroid gland is located at the front of the neck and produces thyroid hormones. The released hormones go through the blood to many body organs for regulating their function, meaning that it is an endocrine organ. These hormones normally act in the body to regulate energy use, infant development, and childhood development. The study aimed to assess the epidemiology of thyroid disorders among cases in the south-western region, Saudi Arabia, and to assess the reporting quality for these cases data.

Methods: A retrospective record based descriptive approach was used through reviewing medical records of all cases that were admitted and diagnosed as thyroid related disorders for different indications in the main hospital (king Khalid Hospital) during the period from January 2018 to January 2020. Data extracted through pre-structured questionnaire including patient's bio-clinical data, preoperative radiological and laboratory investigations. Also, laryngoscope pre and post operatively was reviewed to record findings.

Results: The study included 405 cases with thyroid disorders whose ages ranged from 15 to 71 years old with a mean age of 30.5 ± 10.6 years. Females were 82.7% of the included cases, and 83.8% were Saudi. Thyroid related symptoms were recorded for 1-2 years among 58.1% of the cases and for more than 5 years among 15.8%. Thyroid enlargement was recorded for 73.1% of the cases. The multinodular enlargement was recorded for 53.5% of the cases followed with diffuse thyroid enlargement (27.3%). Regarding the type of surgery undergone, total thyroidectomy was the most recorded followed with lobectomy.

Conclusions: The study revealed that the majority of the cases were females at middle age presented with benign lesions with Euthyroid status. The most important conclusion was the significant remarkable underreporting of the different clinical data for the cases with many missing items.

Keywords: Complications, Hypothyroidism, Hyperthyroidism, Outcome, Thyroid disorders, Thyroid surgery

INTRODUCTION

Thyroid disorders are a group of a medical condition that affects the function of the thyroid gland. The thyroid gland is located at the front of the neck and produces

thyroid hormones.¹ The released hormones go through the blood to many body organs for regulating their function, meaning that it is an endocrine organ.² These hormones normally act in the body to regulate energy use, infant development, and childhood development.³ There are five general types of thyroid disease, each with their own symptoms. These disorders can be presented simultaneously or together at once.⁴ The five groups include hypothyroidism (low function) caused by not having enough free thyroid hormone, hyperthyroidism (high function) caused by having too much free thyroid hormones, structural abnormalities mainly goitre (enlargement of the thyroid gland), tumors which can be benign (not cancerous) or cancerous, and abnormal thyroid function tests without any clinical symptoms (subclinical hypothyroidism or subclinical hyperthyroidism).⁴⁻⁷

Thyroid disorders are considered among the most prevalent medical conditions. Their manifestations vary considerably according to the area and are affected mainly by the availability of dietary iodine.^{8,9} Almost one-third of the world's population lives in areas of iodine deficiency.¹⁰ One of the most important risk factors is living in mountainous areas in South-East Asia, Latin America, and Central Africa.¹¹ Iodization programmes play a significant role in reducing goitre size and in preventing goitre development and cretinism in children.¹²

The limitations of epidemiological studies of thyroid disorders should therefore be borne in mind when considering the purported frequency of thyroid diseases in different communities. The main objective behind this research was to assess the epidemiology of the thyroid disorders among cases in south-western region, Saudi Arabia and to assess the reporting quality for these cases data.

METHODS

A retrospective record based descriptive approach was used through reviewing medical records of all cases that were admitted and diagnosed as thyroid related disorders for different indications in the main hospital (king Khalid Hospital) during the period from January 2018 to January 2020. Patients' files with complete clinical data, disease related data were included. Records with missing data were excluded. Data extracted through pre-structured questionnaire including patient's bio-clinical data, preoperative radiological and laboratory investigations. Also, laryngoscope pre, and post operatively was reviewed to record findings. Missing data or even if the approach was not done were also extracted. Data also included the type of surgery and post operative outcome.

Statistical analysis

After data were extracted, it was revised, coded and fed to statistical software IBM SPSS version 22(SPSS, Inc. Chicago, IL). All statistical analysis was done using two

tailed test. p value less than 0.05 was considered to be statistically significant. Descriptive analysis based on frequency and percent distribution was done for all variables including demographic data, clinical data, and surgery outcome.

RESULTS

The study included 405 cases with thyroid disorders whose ages ranged from 15 to 71 years old with a mean age of 30.5±10.6 years. Females were 82.7% of the included cases, and 83.8% were Saudi. An exact of 88.8% of the cases were from Najran which is the main city. Thyroid related symptoms were recorded for 1-2 years among 58.1% of the cases and for more than 5 years among 15.8% of the cases. A family history of thyroid disorders was recorded for 3.2% of the cases and 2.6% of them had positive family history for thyroid cancer. About 42% of the included cases were free of any other co-morbidity but the most recorded was diabetes mellitus (22.1%) followed with hypertension (14.7%) while 6.6% were diabetic and hypertensive. History of neck radiation was recorded among 2 cases only (Table 1).

Table 1: Bio demographic data of patients with thyroid disorders in South-western, Saudi Arabia.

Bio-demographic data	No.	Percent
Age in years	<20 years	13 3.2%
	20-	195 48.4%
	40-	170 42.2%
	60+	25 6.2%
Gender	Male	70 17.3%
	Female	334 82.7%
Residence	Najran	333 88.8%
	Out of Najran	42 11.2%
Nationality	Saudi	332 83.8%
	Non Saudi	64 16.2%
Duration of symptoms (years)	1-2	147 58.1%
	3-4	66 26.1%
	5+	40 15.8%
Family history of thyroid disorder	No	152 96.8%
	Yes	5 3.2%
Family history of thyroid cancer	No	152 97.4%
	Yes	4 2.6%
Co morbidity	None	57 41.9%
	DM	30 22.1%
	HTN	20 14.7%
	Bronchial asthma	7 5.1%
	Renal	1 0.7%
	Hyperthyroidism	1 0.7%
	Hypothyroidism	3 2.2%
	Others	8 5.9%
	DM and HTN	9 6.6%
History of neck radiation	No	140 98.6%
	Yes	2 1.4%

With regard to clinical data of thyroid disorder among the cases (Table 2), thyroid enlargement was recorded for 73.1% of the cases. The multinodular enlargement was recorded for 53.5% of the cases followed with diffuse thyroid enlargement (27.3%). Exact of 53.7% of the cases were at Euthyroid status while 36.8% had hypothyroidism. Fine needle aspiration was done for 380 cases and benign tissue were recorded among 45.6% of these cases while 22.8% had Thyroiditis according to FNA. Chest X-ray was normal among 16% of the cases, while it was not done for 80.5% of the included patients. Also, chest CT was not done for 89.4% of the cases and among those who undergone CT, it was normal for 3.5%, and Retrosternal extension was recorded for 5 cases while it was unremarkable for 4 cases.

Table 2: Thyroid clinical data of patients with thyroid disorders in South-western, Saudi Arabia.

Clinical data		No.	Percent
Clinical Thyroid enlargement	No	108	26.9%
	Yes	293	73.1%
Type of enlargement	Solitary Nodule	54	19.1%
	Multi-nodular	151	53.5%
	Diffuse	77	27.3%
Thyroid function	Hypothyroid	120	36.8%
	Euthyroid	175	53.7%
	Hyperthyroid	31	9.5%
Fine needle aspiration	US guided	380	100.0%
FNA findings	Benign	164	45.6%
	Follicular neoplasm	39	10.8%
	Others	33	9.2%
	Papillary cancer	42	11.7%
	Thyroiditis	82	22.8%
Chest X ray	Normal CXR	37	16.0%
	Not done	186	80.5%
	Retrosternal extension	4	1.7%
	Tracheal deviation	4	1.7%
Chest CT	Not done	202	89.4%
	Normal	8	3.5%
	Both thyroid lobes enlarge and isthmus	1	0.4%
	Lymph nodes	3	1.3%
	Multiple nodule and calcification and hypoglossal cyst	1	0.4%
	Retrosternal extension	5	2.2%
	Soft tissue mass lesion within isthmus and left thyroid lobe	1	0.4%
	Tracheal deviation	1	0.4%
	Unremarkable	4	1.8%

Table 3 illustrates that pre-operative Ca level was low among 8.4% of the cases and not done for 28% of the patients. As for TSH, it was low among 6.3% of the cases, high among 26.6% while not done for 6.5% of the cases. Considering T4, it was low among 19.4% of the cases and high for 2.9% and not done for 7.3% of the cases. Also, T3 was low among 6.6% of the cases and high for 5% while not done for 16.2% of the patients. Thyroid globulin was high among 6.5% and not done for 84% of the included patients while after one month, it was high among 1.5% of the cases which nearly the same after one year (2 cases only). Pre-operative Indirect Laryngoscopy showed that focal cords were normal among 25.1% of the cases, and only one case had a paralysed cord, while it was not done for 74.5% of the cases.

Table 3: Pre-operative investigations for patients with thyroid disorders in South-western, Saudi Arabia.

Pre-operative investigations		No.	Percent
Pre-operative Serum Calcium Level	Not done	90	28.0%
	Low	27	8.4%
	Normal	204	63.6%
Pre-operative Indirect Laryngoscopy	Not done	202	74.5%
	Normal focal cords	68	25.1%
	Paralysed focal cords	1	0.4%
Thyroid stimulating hormone (TSH)	Not done	25	6.5%
	low	24	6.3%
	High	102	26.6%
Thyroxin (T4)	Not done	28	7.3%
	low	74	19.4%
	High	11	2.9%
Triiodothyronine (T3)	Not done	61	16.2%
	low	25	6.6%
	High	19	5.0%
Thyroid globulin (TG) before surgery	Not done	221	84.0%
	low	5	1.9%
	High	17	6.5%
Thyroid globulin (TG) one month after surgery	Not done	245	93.5%
	low	5	1.9%
	High	4	1.5%
Thyroid globulin (TG) six months after surgery	Not done	8	3.1%
	low	7	2.7%
	High	3	1.1%
Thyroid globulin (TG) one year after surgery	Not done	1	0.4%
	low	249	95.4%
	High	10	3.8%

Regarding type of surgery undergone (Figure 1), total thyroidectomy was the most recorded (25.6% of the cases) followed with lobectomy (6.1%), hemithyroidectomy (4.7%), and subtotal resection (0.8%). About 60% of the cases were under follow-up with no surgery decision till study period and 2.5% of the patients refused the planned surgery.

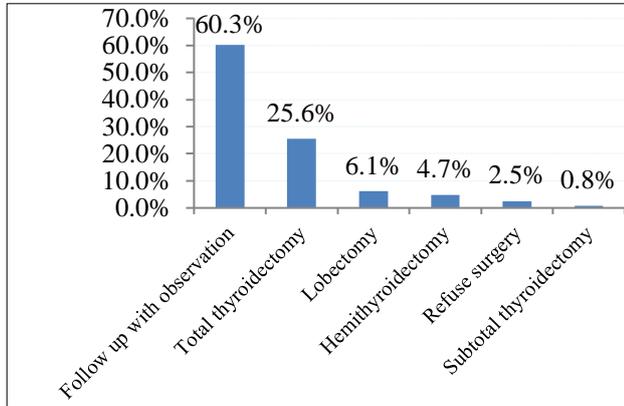


Figure 1: Type of surgery for patients with thyroid disorders in South-western, Saudi Arabia.

Table 4: Post-operative outcome for patients with thyroid disorders in South-western, Saudi Arabia.

Outcome	No.	Percent
Post-operative Indirect Laryngoscopy	Not done	191 78.9%
	Normal focal cords	45 18.6%
	Unilateral paralysis	2 0.8%
	Bilateral paralysis	4 1.7%
Post-operative voice change	Yes	10 5.2%
	No	181 94.8%
Post-operative serum calcium level	Not done	168 65.9%
	Low	39 15.3%
	Normal	48 18.8%
Histopathology	Not done	104 52.3%
	Adenoma	8 4.0%
	Benign goitre	7 3.5%
	Follicular adenoma	10 5.0%
	Follicular carcinoma	10 5.0%
	Hashimoto Thyroiditis	4 2.0%
	Hurthle cell carcinoma	2 1.0%
	Hyperplasia	4 2.0%
	Medullary carcinoma	1 0.5%
	Multinodular goitre	10 5.0%
	Papillary carcinoma	28 14.1%
	Thyroiditis with lymphoid infiltration	8 4.0%
	Others	3 1.5%

Table 4 demonstrates post-operative outcome recorded for the cases. Post-operative Indirect Laryngoscopy revealed that focal cords were normal for 18.6% of the cases and unilateral or bilateral paralysis was recorded among 6 cases while it was not done for 78.9% of the cases. Post-operative voice changes were recorded for 10 cases (5.2%) and Ca level was low among 15.3% of the cases. Histopathology for the cases revealed that papillary carcinoma was the most identified pathology (14.1%) followed with follicular adenoma (5%), follicular carcinoma (5%), Multinodular goitre (5%), and it was not done for 52.3% of the cases.

DISCUSSION

Thyroid disorders are a public health problem globally. Disturbance at thyroid gland hormones can cause many disorders that range from a small goiter to life threatening diseases, including thyroid cancer. Both hyper and hypothyroidism can affect circulatory system through affecting cardiac output, cardiac contractility, blood pressure, vascular resistance and rhythm disturbance which can more cause heart failure, fibrillation, congestive heart failure and blood pressure.^{12,13}

The current study was conducted to assess the epidemiological pattern of thyroid disorder among cases admitted to the main hospital in the south-western region of Saudi Arabia. Also, to assess the radiological and laboratory profile for these cases, type of surgery, and clinical outcome. The study revealed that the majority of the cases aged 30 years or less and females. A family history of thyroid disorders or even cancers was unremarkable, while the majority of the cases were diagnosed within the last two years. Exposure to radiation especially on the neck region, was recorded among very few cases (only two cases). More than half of the cases had Multinodular enlargement but with Euthyroid status. Fine needle aspiration was done for nearly all cases, which revealed that the lesions were benign among nearly half of the cases, and this explains the Euthyroid status. Chest X-ray and CT were not done for many cases which is a drawback revealing that there was a problem and unplanned reporting for the admitted cases. This may be due to lack of specialists or even absent awareness for physicians about guidelines for managing thyroid disorders. Also, these cases with reported action for laboratory investigation, radiological assessment, or even reporting findings as not done or may be done but there is underreporting due to lack of efficient reporting and referral system. This was very clear regarding thyroid profile and hormonal assessment as not done was the dominant item for all. Regarding surgical intervention, total thyroidectomy was the trend for those who undergo surgery (one out of each four) while nearly two thirds of the cases were followed up with conservative therapy. Post operative pathology revealed that papillary carcinoma was the most identified pathology but recorded only among 14% of the cases as these findings were not reported for more than half of the cases. Post

operative complications and clinical outcomes were unremarkable among all cases but this is not the situation due to underreporting for the different clinical parameters for all cases.

A review was conducted by Al Shahrani AS, to present the aggregated burden, risk factors and prognosis of various thyroid diseases prevalent in Arab countries.¹⁴ The review reported that the prevalence of different types of thyroid disease ranged from 6.18 to 47.34%. In Saudi Arabia, a study was conducted 2014 by Albasri A to characterize the histopathological pattern of thyroid lesions among Saudi patients and to highlight the age and gender variations of these lesions as base line data.¹⁵ The study revealed that about 72.3% cases were found to be non-neoplastic and 27.7% cases were neoplastic. The non-neoplastic group included: colloid goiter, including both diffuse and nodular goiter (170 cases; 58.2%), nodular hyperplasia (28 cases; 9.6%), Hashimoto/chronic lymphocytic thyroiditis (12 cases; 4.1%), and Grave's disease (1 case; 0.3%). As for neoplastic lesions, there were 7 benign tumors and 74 malignant tumors. Among the benign tumors, 5 were follicular adenomas and 2 were Hurthle cell adenomas. Papillary carcinoma was the commonest malignant tumor accounting for 87.8% of all thyroid malignancies, followed by lymphoma, follicular carcinoma and medullary carcinoma. A second study was conducted in western region by Al-Maghrabi JA, to assess the frequency of different patterns of thyroid diseases as presented to pathology departments at King Abdul-Aziz University Hospital (KAUH) and King Faisal Specialty Hospital and Research centre (KFSHRC) over the period of twelve years.¹⁶ Non- neoplastic lesion constituted 58.5% of the recorded cases and Neoplastic was recorded for 41.5%. The non-neoplastic group includes: Multinodular Goiter (36.8%), hashimoto/chronic lymphocytic Thyroiditis (7.6%), single hyperplastic nodule (6%), Grave's disease (0.9%), miscellaneous (6.9%). The neoplastic group includes benign category represented by "Adenomas" and includes 94 cases (11% of all cases, and 26.8% of neoplastic cases) and the malignant category includes 256 cases, representing 30.3% of all studied cases and 73% of the neoplastic category. Two hundred and nine cases (81.6 % of malignant) were papillary carcinoma.

Regarding the long period selected for reviewing the cases and the adequate sample size, there was a lack of many important clinical data or even very important items recorded as not done which may be done but missing.

CONCLUSION

In conclusion, the study revealed that the majority of the cases were females at middle age presented with benign lesions with Euthyroid status. Surgical intervention was done for less than one third of the cases with minimal complications. The most important conclusion was the

significant remarkable underreporting of the different clinical data for the cases with many missing items.

Recommendations

A more precise, efficient reporting system should be initiated to have better conclusions regarding the medical condition. Also, physicians need to be trained for efficient reporting and referral with the application of the national guidelines for these cases.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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