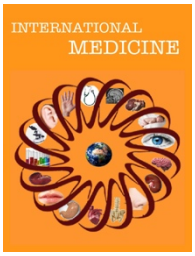
International Medicine 2019; 1(4): 204-210



International Medicine

https://www.theinternationalmedicine.com/

Original Article

Patterns of thyroid disorders in Qena population: a hospital-based descriptive study

Mai Elzahry

Department of Clinical Oncology and Nuclear Medicine, Faculty of Medicine, South Valley University, Qena, Egypt

Received: 19 May 2019 / Accepted: 06 July 2019

Abstract

Background: Data regarding iodine deficiency disorder in Upper Egypt is rare and even limited. In this study, we aim to determine the status of variable patterns of thyroid disorders and find out the relationship between some risk factors like gender, age, family history and the occurrence of thyroid disorders among Qena population referred to our nuclear medicine clinic from January 2011 to the end of December 2012.

Methods: A retrospective hospital-based descriptive and analytical study was conducted on patients referred to our nuclear medicine clinic who complained of various clinical features related to the thyroid gland. The study was performed using data collected from the registration unit in the nuclear medicine clinic.

Results: A total of 46 patients (9 men and 37 non-pregnant women) were included. The collected variables were sex, age, family history, menstrual status of females, thyroid-related complaints, history of thyroidectomy and I-131 therapy. 43.5% of the patients were highly affected by thyrotoxicosis, followed by hypothyroidism (26.1%), simple nodular goiter (SNG) (17.4%) and differentiated thyroid cancer (DTC) (13%). 80.4% of patients were female and 19.6% were male. The highest number of different thyroid diseases were reported in the age group of 20-49 years.

Conclusions: Different risk factors including sex, age, family history are highlighted in this study, but still the low levels of iodine in the soil and drinking water in Upper Egypt and bad nutrition are the most common factors that may cause goiter.

Keywords: Egypt, thyroid disorders, thyroid gland

Introduction

Thyroid dysfunction is one of the most common endocrine problems. It represents around 30% to 40% of the patients seen in an endocrine outpatient practice [1]. Almost one-third of the world's population locates in areas of iodine deficiency [2]. In iodine-deficient areas, thyroid disorders can vary from a small painless goiter (enlarged gland) that needs no treatment to life-threatening cancer [3].

Address for Correspondence: Mai Elzahry, Department of Clinical Oncology and Nuclear Medicine, Faculty of Medicine, South Valley University, Qena, 83523, Egypt. E-mail: mai.rifat@hotmail.com

DOI: 10.5455/im.49650

The most common thyroid problems are hyperthyroidism and hypothyroidism, which have been diagnosed in more than 110 countries all over the world [4]. The occurrence rate of thyroid problems is affected by several predictors, of which the iodine intake in the population may be important [5], it dominates mostly in areas with deficient iodine [6].

Thyroid disease is being highly assessed with greater awareness and one of the chronic diseases affecting females more than males [7]. It is reported that 10% of the women elder than 40 years old have a thyroid hormone deficiency as a result of autoimmune problems [8].

Egypt is a country made up of two isolated land areas: Upper Egypt and Lower Egypt. Upper Egypt is Southern Egypt, closer to the source of the Nile [9]. Qena is a city located in Upper Egypt, situated on the east side of the Nile. The people of Qena suffer from different thyroid dysfunction problems with a high rate of iodine deficiency disorder. According to our initial data, this is the first study that has been done since the establishment of our department in January 2010.

Our objective is to observe the status of different patterns of thyroid disorders and to detect the relationship between some risk factors like gender, age, family history, bad nutrition and the occurrence of thyroid disorders among Qena population referred to our clinic from January 2011 to the end of December 2012.

Methods

Patients

This hospital-based descriptive and analytical study was performed using data collected from the registration unit in the Department of Clinical Oncology and Nuclear Medicine, Qena University Hospital, between January 2011 and December 2012.

Thyroid function tests including free triiodothyronine (FT3), free thyroxine (FT4) and thyroid stimulating hormone (TSH), neck ultrasonography (U/S) and thyroid biopsy if existed were reported from each patient.

Statistical analysis

SPSS for windows version 16 was used for all data entry and analysis. Demographic variables were presented using descriptive statistics. The Chi-square test was used for the comparison between two variables. Fisher's test was done in the cell counted less than 5. Pearson's correlation was used to observe the relationships between two variables to assess its strength. The *p*-value <0.05 was accepted to be statistically significant.

Ethical Standards

This study was conducted in accordance with the Declaration of Helsinki. Informed consent from each patient for participation in the study was taken. Ethical approval for the study was taken from the Ethical Review Committee of Faculty of Medicine, Qena University Hospital, South Valley University.

Results

A total of 46 cases (9 men and 37 non-pregnant females), their age range (19-78 years, mean±SD=43.5±14.3), was included in this retrospective study from Qena and its nearby villages who attended the nuclear medicine clinic, complained of painless/painful swelling of the neck moved with swallowing associated with different thyroid symptoms.

The collected variables were age, sex, family history of any thyroid diseases, menstrual status of females, presence or absence of any neck complaint (C/O), full physical neck examination (including presence of any palpable neck mass, scars of thyroidectomy), history of previous I-131 therapy as described in Table 1.

Figure 1 shows the distribution of thyroid dysfunction in the studied population. The people were highly affected by thyrotoxicosis (43.5%), followed by hypothyroidism (26.1%), simple nodular goiter (SNG) (17.4%) and differentiated thyroid cancer (DTC) (13%).

Figure 2 expresses the frequency of thyroid dysfunction among females and males. Females were highly affected by SNG (100%), followed by thyrotoxicosis (75%).

91.7% of females were affected by hypothyroidism, while 66.7% affected by DTC, with no statistical significance between them (p>0.05) as shown in Table 2.

Table 3 expresses the mean age of men and women in each thyroid disorder. As shown in this table, the lowest and the highest mean ages occurred in patients with toxic goiter and thyroid cancer were 40.45±12.7 and 49.83±17.9, respectively. There was a significant difference between the mean age of men and women in patients with thyroid cancer (p=0.040). A box plot for age in each thyroid disorder is shown in Figure 3.

Table 1. Demographic characteristics

Age (years)		
Mean±SD	43.5±14.3	
Range	19-78	
Sex	n	%
Male	9/46	19.6
Female (single/married)	(6/31) 37/46	80.4
Family history		
Present	10	21.7
Absent	36	78.3
Menstrual status among females		
Premenopausal	29/37	78.4
Postmenopausal	8/37	21.6
Complaint		
Present	39/46	84.8
Absent	7/46	15.2
Clinical examination		
Palpable mass	19/46	41.3
Un-palpable neck	27/46	58.7
Sub/near total/total thyroidectomy		
Operative	14/46	30.4
Non-operative	32/46	96.6
I-131 therapy		
Present	12	26.1
Absent	34	73.9

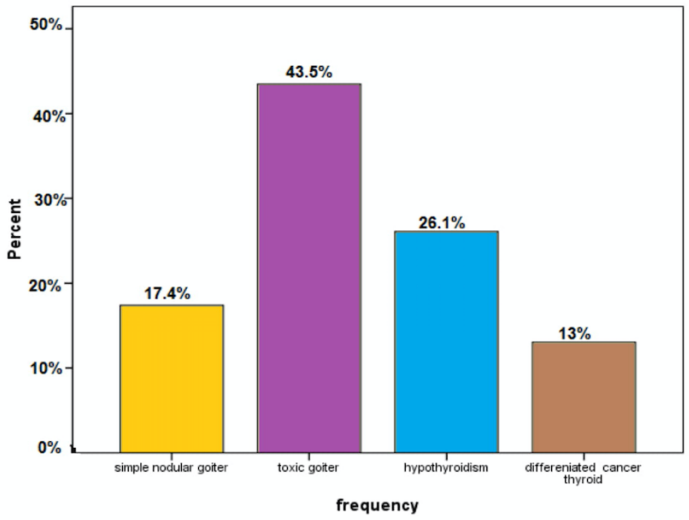


Figure 1. Frequency of different thyroid diseases in the study population.

Table 2. Gender distribution for each thyroid disorder

	Male	Female	Male/Female ratio	*p*-value
	n / %			
Simple nodular goiter	0	8/100	0	0.3
Toxic goiter	6/25	14/75	0.3	0.1
*Hypothyroidism	1/8.3	11/91.7	0.09	0.4
*Thyroid cancer	2/33.3	4/66.7	0.5	0.5

*Fisher's exact test was done for the cell counted less than 5, Statistically significant difference (p< 0.05).

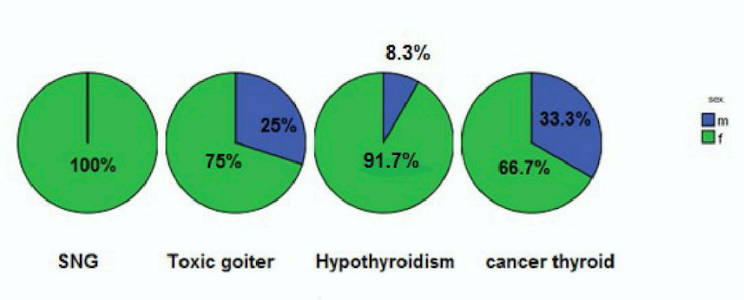


Figure 2. Gender distribution among different thyroid diseases.

Table 3. The mean age distribution by gender for each thyroid disorder

	Total mean age	Male mean age	Female mean age	*p*-value
Simple nodular goiter	47.12±19.3	-	47.12±19.3	-
Toxic goiter	40.45±12.7	45.17±11.1	38.43±13.3	0.429
Hypothyroidism	43.08±11.2	36	43.73±11.5	0.534
Thyroid cancer	49.83±17.9	69±12.7	40.25±10.8	0.040

Statistically significant difference (p< 0.05).

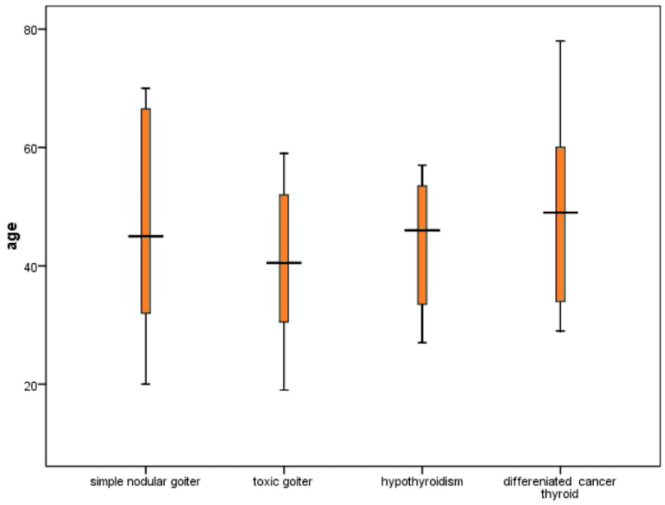


Figure 3. The box plot for age distribution in each thyroid disorder.

Table 4 shows the frequency of different thyroid disorders among menopausal and post-menopausal female patients. There was a significant difference between pre-menopausal and post-menopausal female patients having toxic goiter and hypothyroidism (p=0.003 and 0.035, respectively).

Figure 4 expresses the trend of different thyroid disorders between 2011 and 2012. Toxic goiter expressed high incidence (50%) through the year 2011, followed by SNG (23%), while in 2012, the incidence of hypothyroidism, as well as toxic goiter, expressed the same high incidence (35%). DTC expressed the lowest incidence of 7.8% during the year 2011, while through the year 2012, it expressed 20%, followed by SNG (10%).

Table 4. Frequency of different thyroid diseases and menstrual status of females

Menstrual status	Premenopausal	Postmenopausal	*p*-value
n/total (%)	29/37 (78.4)	8/37 (21.6)	0.448
Simple nodular goiter	5/8 (62.5)	3/8 (37.5)	0.480
Toxic goiter	11/14 (78.5)	3/14 (21.5)	0.003
Hypothyroidism	9/11 (81.8)	2/11 (18.2)	0.035
Thyroid cancer	4/4 (100)	-	-

Statistically significant difference ($p < 0.05$).

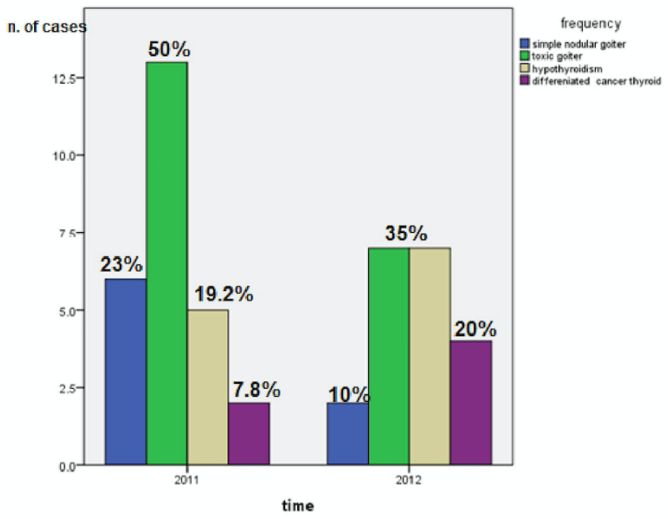


Figure 4. The trend of different thyroid diseases.

Table 5 expresses the strong relationship between gender and the occurrence of different thyroid diseases (r =1.1) rather than the other risk factors that showed a negligible correlation.

Table 5. The correlation between the incidence of different thyroid diseases and risk factors

Risk factor	Correlation coefficient factor (r)	R2*100
Sex	-1.1	121
Age	0.07	0.49
Family history	0.2	4
Menstrual history	-0.2	4
Marital status among females only	0.2	4

A correlation is not considered significant unless R2*100 ≥25.

Discussion

Thyroid disorders are the 2nd common endocrine problems after diabetes mellitus and usually present with enlargement of the thyroid gland or sometimes pain [10]. Hyperthyroidism and hypothyroidism are common conditions that have lifelong effects on health [11].

The incidence of variable types of thyroid problems differed between the studies. The distribution of variable thyroid diseases in this study shows that the most common thyroid problem is toxic goiter (43.5%), followed in decreasing order by hypothyroidism (26.1%), SNG (17.4%) and DTC (13%) with no thyroiditis cases reported at all. This finding is different from Salami et al who reported high incidence of simple goiter (58.9%), followed in decreasing order by toxic goiter (36.6%), malignancy (2.3%), hypothyroidism (1.7%) and thyroiditis (0.6%) [12]. The prevalence of malignancy and thyroiditis in this study is low compared to the results in other studies [13-15].

The incidence of thyroid diseases is found to be more incident in females than males [16], perhaps due to different metabolism of iodine during adolescent growth [17]. The female to male ratio in this study is 4.1:1 which is different from the findings of other studies (6:1) [18,19]. On the other hand, Deepthi et al reported similar findings with our study (3.6:1) [20].

The mean age of patients in this study is 43.5 with a range of 19–78 years. The patients with the age of 30–49 years have the highest incidence of thyroid disorders (45.6%). This is similar to the findings in other studies where the major cases were found in the group of 30–39 years and 31–40 years [21,22]. In this study, 65.2% of thyroid diseases are found in the age group of 20–49 years, which is nearly similar to another study by Tsegaye and Ergete who reported 85% of thyroid lesions were found in the age group of 20-59 years [23]. This confirms that thyroid diseases are not always common among the eldest population.

In this study, 84.8% of the patients presented with neck pain which is a normal reflection of the high incidence of thyrotoxicosis. The other common symptoms were heat intolerance, general fatigue, excess sweating and a palpably enlarged thyroid gland that was the most common elicited sign in 41.3%. This finding is similar to Salami et al who reported the clinical diagnosis of toxic goiter was 36.6% of the study population [12].

The study conducted in 2011 in Libya reported the incidence of subclinical hypothyroidism as 2.3% [24]. The incidence of hypothyroidism was reported as 6.18% in Libya [25] and 47.34% in Saudi Arabia (Makkah region) [26] while in our study the incidence of hypothyroidism reported as 19.2% and 35% in 2011 and 2012, respectively. The incidence of goiter was reported by many studies conducted in Egypt, Algeria and Bahrain (25.25%, 86.0% and 1.7%, respectively) [27-29].

Goiter has multiple factors of origin. Variable risk factors were reviewed in this study including sex, age, family history, but still the low levels of iodine in the soil and drinking water in Upper Egypt with deficient seafoods as well as increased the consumption of goitrogenic substances that reduces thyroid hormone production through a variety of mechanisms are the dominant factors of goiter.

Conclusion

The incidence of thyroid disorders varies in different regions of Egypt with a high rate of these disorders reported in Upper Egypt. Variable risk factors including sex, age, family history and bad nutrition are emphasized in this study. Identified risk factors are potentially changeable. The deficient iodine levels in the soil as well as in water in Upper Egypt with deficient seafood are the most common factors that may cause goiter, seeking for emphasizing the important role of public health programs that are aimed at tackling such determinants. Further longitudinal studies on large population samples are warranted to detect the prognosis and predictors of this condition in Upper Egypt. On the other hand, early diagnosis and prevention of disease at the primary level should be practiced by educating the population.

Conflict of interest

There are no conflicts of interest.

Funding

There is no financial support.

References

1. Garmendia MA, Santos PS, Guillén GF, Galofré JC. The incidence and prevalence of thyroid dysfunction in Europe: a meta-analysis. J Clin Endocrinol Metab 2014;99:923-31.
2. Zimmermann MB, Jooste PL, Pandav CS. Iodine-deficiency disorders. Lancet 2008;372:1251-62.
3. Vanderpump MP. The epidemiology of thyroid diseases. In: Braverman LE, Utiger RD, editors. The thyroid: a fundamental and clinical text. Philadelphia: Lippincott-Raven; 2005:398-406.
4. Khan A, Khan MA, Akhtar S. Thyroid disorders, etiology and prevalence. J Med Sci 2002;2:89-94.
5. Canaris GJ, Manowitz NR, Mayor G, Ridgway EC. The Colorado thyroid disease prevalence study. Arch Intern Med 2000;160:526-34.

6. Laurberg P, Bulow PI, Pedersen KM, Vestergaard H. Low incidence rate of overt hypothyroidism compared with hyperthyroidism in an area with moderately low iodine intake. Thyroid 1999;9:33-8.
7. Bose A, Sharma N, Hemvani N, Chitnis DS. A hospital based prevalence study on thyroid disorders in Malwa region of Central India. Int J Curr Microbiol App Sci 2015;4:604-11.
8. Carnell NE, Wilber JF. Primary hypothyroidism. In: Bardin CW, editor. Current therapy in endocrinology and metabolism. St. Louis: Mosby;1994.82-6.
9. El-Sayed N, Mahfouz A, Nofal L, Ismail H, Gad A, Abu Zeid H. Iodine deficiency disorders among school children in Upper Egypt: an epidemiologic study. J Trop Pediatr 1998;44:270-4.
10. Chalya PL, Rambau P, Mabula JB, Kanumba ES, Giiti G, Chandika AB, et al. Patterns and outcome of surgical treatment of goitres at Bugando Medical Centre in Northwestern Tanzania. Tanzan J Health Res 2011;13:1-10.
11. Hollowell JG, Staehling NW, Flanders WD, Hannon WH, Gunter EW, Spencer CA, et al. Serum TSH, T(4), and thyroid antibodies in the United States population (1988 to 1994): National Health and Nutrition Examination Survey (NHANES III). J Clin Endocrinol Metab 2002;87:489-99.
12. Salami BA, Odusan O, Ebili HO, Akintola PA. Spectrum and prevalence of thyroid diseases seen at a tertiary health facility in Sagamu, South-West Nigeria. Niger Postgrad Med J 2016;23:137-40.
13. Hussain N, Anwar M, Nadia N, Ali Z. Pattern of surgically treated thyroid disease in Karachi. Biomedica 2005;21:18-20.
14. Hill AG, Mwangi I, Wagana L. Thyroid disease in a rural Kenyan hospital. East Afr Med J 2004;81:631-3.
15. Solomon R, Iliasu Y, Mohammed AZ. Histopathological pattern of thyroid lesions in Kano, Nigeria: a 10-year retrospective review (2002-2011). Niger J Basic Clin Sci 2015;12:55-60.
16. Al Shahrani AS, El-Metwally A, Al-Surimi K, Salih BS, Saleh Y, Al-Shehri A, et al. The epidemiology of thyroid diseases in the Arab world: A systematic review. J. Public Health Epidemiol 2016;8;17-26.
17. Nggada HA, Ojo OS, Adelusola KO. A histopathological analysis of thyroid diseases in Ile-Ife, Nigeria. A review of 274 cases. Niger Postgrad Med J 2008;15:47-51.
18. MDIS/WHO. Global prevalence of iodine deficiency disorders. Micronutrient Deficiency Information System (MDIS) working paper No I. WHO; 1993. Geneva.
19. Nzegwu MA, Ezume ER, Njeze GE, Olusina DB, Ugochukwu. A histological update of thyroid lesions in Enugu Nigeria. A 5 year retrospective review. Asian J Exp Biol Sci 2010;1:430-3.
20. GovindanKutty D, Dhanya CS, Sajeeth CI. Prevalence of thyroid disorders in patients in two tertiary care hospitals at Palakkad: a prospective study. IOSR JPBS 2013;8:33-7.
21. Seleye FD, Numbere N, Etebu EN. Pathology of common diseases of the thyroid gland in Pot-Harcourt. Port Harcourt Med J 2009;3:312-17.
22. Abdulkareem FB, Banjo AA, Elesha SO. Histological review of thyroid lesions: a 13-year retrospective study (1989-2001). Niger Postgrad Med J 2005;12:210-14.
23. Tsegaye B, Ergete W. Histopathologic pattern of thyroid disease. East Afr Med J 2003;80:525-8.
24. Ghawil M, Tonutti E, Abusrewil S, Visentini D, Hadeed I, Miotti V, et al. Autoimmune thyroid disease in Libyan children and young adults with type 1 diabetes mellitus. Eur J Pediatr 2011;170:983-7.
25. Nouh AM, Eshnaf I, Basher MA. Prevalence of thyroid dysfunction and its effect on serum lipid profiles in a Murzok, Libya Population. Thyroid Sci 2008;3:1-6.
26. Lamfon HA. Thyroid disorders in Makkah, Saudi Arabia. Ozean J Appl Sci 2008;1:52-8.
27. Moosa K, Abdul WA, Al-Sayyad J, Baig B. National study on the prevalence of iodine deficiency disorders among schoolchildren 8-12 years of age in Bahrain. East Mediterr Health J 2001;7:609-16.
28. El-Mougi F, Abd-El-Ghaffar S, Fayek N, Mohammed M. Urinary iodine and other iodine deficiency indicators in a sample of schoolage children in Egypt. East Mediterr Health J 2004;10:863-70.
29. Henjum S, Barikmo I, Gjerlaug AK, Mohamed-Lehabib A, Oshaug A, Arne Strand T, et al. Endemic goitre and excessive iodine in urine and drinking water among Saharawi refugee children. Public Health Nutr 2010;13:1472-7.