Burden of hypothyroidism in the primary care population in Qatar

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Abstract

Hypothyroidism is a common condition which is often managed in primary care. There is considerable prevalence information on the condition in Europe and USA, however little is known about the prevalence in the Middle East, particularly in Qatar. The purpose of the study was to establish the burden of the disease in the primary care population in Qatar.

This observational study used electronic health data from primary care records of all adults registered with Primary Health Care Corporation (PHCC). Patients were identified as having hypothyroidism by using selected SNOMED CT codes. The prevalence of hypothyroidism was estimated at approximately 4.74%. The majority of hypothyroid patients (57.23%) were found to suffer with additional comorbidities. Given the ease of access to private health care, and those patients choosing to have health care outside the country, this may be an underrepresentation of the true prevalence.

Key words: hypothyroidism, primary care, Qatar

Introduction - Hypothyroidism

The hypothalamic pituitary axis controls the production of thyroxine from the thyroid gland. Thyroxine acts on almost all nucleated cells in the body and is essential for growth and energy metabolism [1]. Hypothyroidism can be difficult to detect as the symptoms are often nonspecific and insidious in onset. Symptoms include weight gain, fatigue, constipation, hair loss and cold intolerance [2].

The most common cause of hypothyroidism worldwide is iodine deficiency as over one billion of the world's population live in iodine deficient areas [3]. In the developed world, the commonest cause of hypothyroidism is autoimmune thyroid disease [4]. Thyroid disease can also be the result of destruction of the thyroid gland by radio-iodine treatment or thyroid surgery.

Prevalence of hypothyroidism

Investigating prevalence can be helpful in identifying trends in diseases which is particularly useful when comparing populations. Information on prevalence can help to establish the burden of the disease which is essential when allocating resources.

The prevalence of hypothyroidism ranges from 1% to 2% [5]. Hypothyroidism is ten times more common in women than in men [6] and affects Caucasian individuals more than Afro-Caribbean individuals [7]. The incidence of hypothyroidism is higher in the elderly population and can be as high as 7% in individuals aged between 85 and 89 years [8]. However TSH levels rise in relation to age and there is discussion around the need for age specific reference ranges.

Globally the prevalence of hypothyroidism varies considerably. This is attributed to both iodine deficiency as well as reduced reporting in many developing countries. The prevalence of hypothyroidism ranges between 0.2% - 5.3% in Europe [9] and 0.3% - 3.7% in the USA [10]. Studies conducted in India have shown significant variability in the rate of hypothyroidism depending on geographical location, with coastal regions having lower rates compared to inland areas. A population study of Cochin showed a prevalence of 3.9% compared to Kolkata which had a prevalence of 21% [11]. The extent of autoimmune thyroid disease in Africa remains unknown due to the limited number of studies as well as the underreporting of cases. However, the prevalence of a goitre varies from 1% - 90% depending on geographical location [12].

There is limited data on the prevalence of hypothyroidism in the middle east. The annual incidence of hypothyroidism in Iran was found to be 0.2% [13]. A study conducted in Libya found the prevalence of hypothyroidism to be 6.18% and in certain areas of Saudi Arabia the prevalence was reported to be 47% [14]. The presence of a goitre has been reported in many studies across Egypt, Algeria and Bahrain. At present there is no data on the burden of hypothyroidism in Qatar. This study will aim to investigate the burden of the disease in primary care in Qatar. Qatar is a country on the west coast of the Persian Gulf with a population of 2.7 million. Primary care physicians play a key role in the diagnosis and the management of hypothyroidism. PHCC provides primary health care services to the bulk of the population in Qatar.

Aim

At present there is no published data on the burden of hypothyroidism. The purpose of the study was to establish and describe the epidemiology of hypothyroidism in primary care in Qatar, focusing on those patients cared for by primary health care services (Primary Health Care Corporation, PHCC). This study aims to understand the burden of disease; the number of patients diagnosed with hypothyroidism as documented on the medical records as a consolidated problem. It also identified the number of patients prescribed treatment (thyroxine) and who are monitored (via blood tests).

Material and methods

Design and setting

This was a cross sectional observational study using primary care electronic health data from 876,991 patients over 27 health centres located across the country.

Data collection

The study population included all adults (aged over 18 years) registered at PHCC between 1st January 2018 to 30th September 2020. Data was managed and anonymised as per research committee protocols.

The search was conducted in order to ascertain the number of patients with a diagnostic code of hypothyroidism as documented as a consolidated problem by searching for SNOMED CT codes (Table 1). Information was collected on hypothyroid monitoring, whether the patient had a blood test and the level of the TSH, as well as the treatment of the condition by noting whether a prescription of thyroxine was issued. To assess the burden of long-term conditions on the study population, diagnostic data on comorbidities was recorded including whether the patient had hypertension, diabetes, cardiovascular disease, dyslipidaemia, asthma/COPD, cerebrovascular disease, cancer, CKD and obesity. Sociodemographic information on age, gender and nationality was obtained.

Data Analysis

All data were analysed using Microsoft Excel Version 16.4 [15] Basic descriptive statistics were used to identify age, gender and nationality amongst other variables of interest detailed in the appendix.

Results

PHCC has a total of 7,96,427 population above 18 years of age. The total number of patients suffering from hypothyroidism was 37,709 as identified by the SNOMED codes listed in Table 1. The estimated prevalence of the condition was 4.74%. The mean age of the population was 42.82 +/- 13.81 (range 18-108 years). 55.79% of patients with hypothyroidism were aged between 25-45 years. (Table 2) 82.82% of the patients were female (Table 3). Qatari nationals accounted for one third (12399) 32.88% of the patients in comparison to 67.12% (25310) which were identified as non-nationals (Table 4).

A significant proportion of hypothyroid patients (57.23%) were found to suffer with other comorbid conditions (Table 5 and Figure 1). Most commonly hypothyroid patients were documented to have dyslipidaemia (29.24%) followed by diabetes (27.07%), hypertension (24.09%) and obesity (19.58%). Around 24.52% of patients had one additional comorbidity (Table 6) and 3 patients had an additional 8 comorbidities (0.01%).

With regards to the management of hypothyroidism 75.75% of patients had received a prescription of thyroxine and over half (57.21%) of these patients had thyroxine issued in 2020 (Table 7). Around 60.44% of patients had bloods undertaken in 2020 and 5.25% had no documented bloods on records at all (Table 8). 67.3% of patients had bloods within the normal range (Table 9).

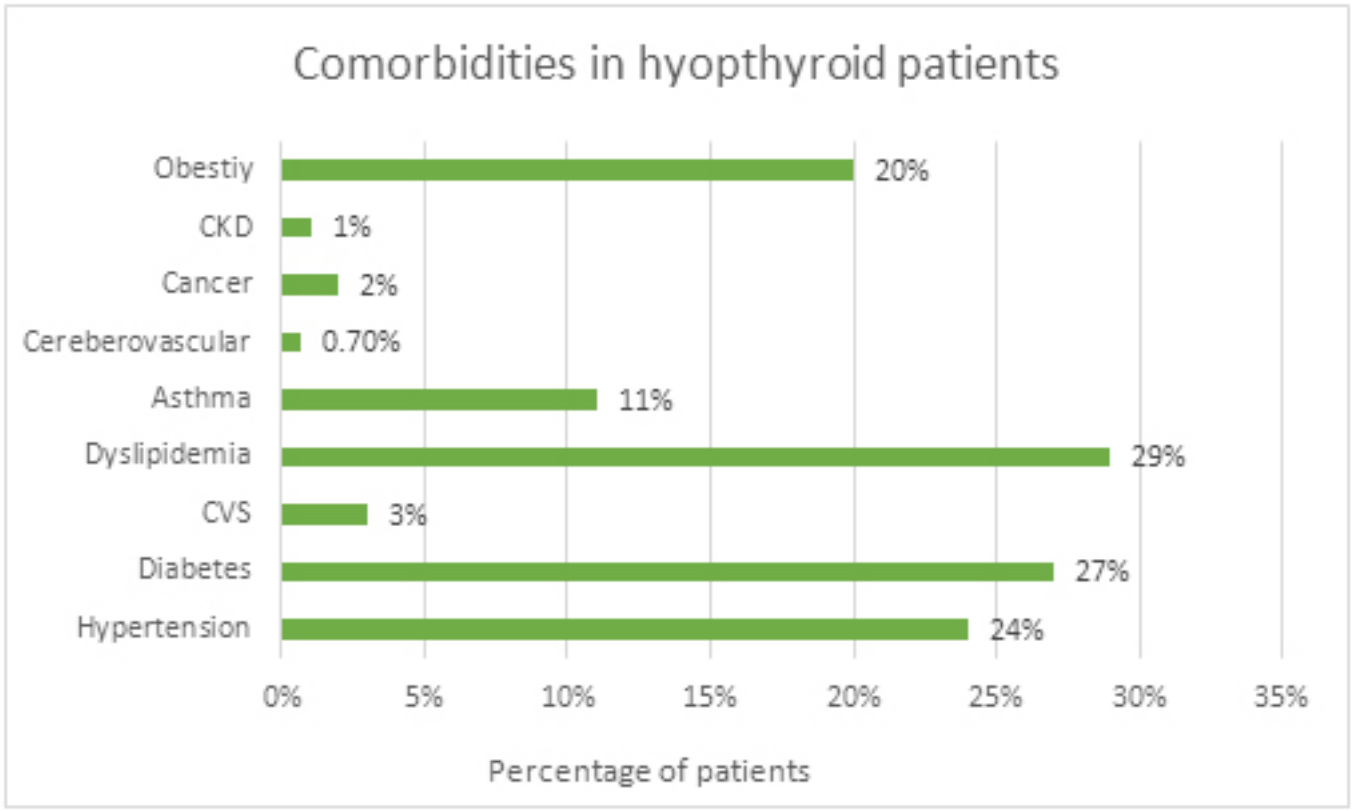

Figure 1: Comorbidities in hypothyroid patients

Table 1: Hypothyroidism SNOMED codes

SNOMED code	Number of patients
Acquired central hypothyroidism	24
Acquired hypothyroidism	1056
Autoimmune hypothyroidism	146
Borderline hypothyroidism	99
Central hypothyroidism	45
Compensated hypothyroidism	16
Congenital hypothyroidism	3
H/O: hypothyroidism	418
History of hypothyroidism	49
Hypothyroid	7036
Hypothyroid coma	2
Hypothyroid facies	1
Hypothyroid goitre acquired	7
Hypothyroid goitre acquired	1
Hypothyroid obesity	1
Hypothyroidism	21684
Hypothyroidism post-radioiodine therapy	1
Hypothyroidism unspecified	1
Hypothyroidism after surgery	10
Hypothyroidism due to Hashimoto thyroiditis	3
Hypothyroidism due to Hashimoto's thyroiditis	4
Hypothyroidism due to thyroid insensitivity to TSH	1
Hypothyroidism due to thyroiditis	1
Hypothyroidism following radioiodine therapy	6
Hypothyroidism in pregnancy	361
Hypothyroidism in pregnancy antepartum	4
Hypothyroidism with positive thyroid antibodies	3
Iatrogenic hypothyroidism	7
Idiopathic atrophic hypothyroidism	1
Post-ablative hypothyroidism	5
Postoperative hypothyroidism	5
Postsurgical hypothyroidism	27
Primary hypothyroidism	33
Secondary hypothyroidism	26
Severe hypothyroidism	2
Subclinical hypothyroidism	6589
Subclinical iodine deficiency hypothyroidism	31

Table 2: Age of hypothyroid patients

Age	Total number of patients	Percentage
18-25	3225	8.55%
25-45	21039	55.79%
45-65	11184	29.66%
More than 65	2261	6%

Table 3: Prevalence by Gender

Gender	Total Number	Percentage
Female	31232	82.82%
Male	6475	17.17%
Not documented	2	-

Table 4: Qatari or Non-national

Nationality	Number of patients	Percentage
Qatari	12399	32.88%
Non-national	25310	67.12%

Table 5: Hypothyroidism and prevalence of comorbidities

Chronic condition	Total number of patients	Percentage
Hypertension	9085	24.09%
Diabetes	10208	27.07%
Cardiovascular disease	1272	3.37%
Dyslipidaemia	11027	29.24%
Asthma/COPD	4309	11.43%
Cerebrovascular disease	287	0.76%
Cancer	959	2.54%
CKD	748	1.98%
Obesity	7385	19.58%

Table 6: Hypothyroidism and number of additional comorbidities

1	9247	24.52%
2	5355	14.20%
3	3905	10.36%
4	2049	5.43%
5	772	2.05%
6	208	0.55%
7	40	0.11%
8	3	0.01%

Table 7: Patients with record of thyroxine prescription

Last record of TSH Year	Total number of patients	Percentage
2020	22793	60.44%
2019	10037	26.62%
2018	2902	7.70%
No recorded TSH	1978	5.25%

Table 8: Record of last TSH blood test

Last record of thyroxine year	Total number of patients	Percentage
2020	21573	57.21%
2019	4694	12.45%
2018	1302	3.45%
2017	994	2.64%
None recorded	9146	24.25%

Table 9: TSH within reference range

TSH level	Total number of patients	Percentage of patients
Less than 0.4	2487	6.96%
Between 0.4-5.3	24048	67.30%
More than 5.3	9196	25.74%
Total patients with bloods recorded	35731	

TSH reference range 0.4 mIU/L - 5.3mIU/L

Table 10: Thyroxine prescribing in subclinical hypothyroidism

	Prescription of thyroxine	No prescription of thyroxine
	28563	9146
Patients identified as having subclinical hypothyroidism	2393	4196

Discussion

Prevalence of thyroid disease is 27% according to a recent multimorbidity study from Qatar [16]. The estimated prevalence of hypothyroidism of 4.74% is similar to figures reported globally. Hypothyroidism, like many autoimmune conditions has a female preponderance and the data collected was in keeping with this, as female patients accounted for 82.82% of the patients (Table 3).

Over half (57.23%) of the patients with hypothyroidism suffered with additional comorbidities. Although there are established links between autoimmune conditions themselves, these conditions were not the subject of investigation in this particular study. Some conditions such as obesity and consequently dyslipidaemia are likely to be linked to hypothyroidism through the mechanism of action of an underactive thyroid gland.

Almost a quarter of patients (24.25%) who had a diagnosis of hypothyroidism had no thyroxine prescription (Table 7), however almost half of these patients had a diagnosis of subclinical hypothyroidism (Table 10) and this would be in keeping with the management of subclinical hypothyroidism. There is varying clinical practice around the management of subclinical hypothyroidism and indeed 36.31% (2,393) of such patients were prescribed thyroxine. This specific cohort of patients with a diagnosis of subclinical hypothyroidism and a prescription of thyroxine may also include those patients who progress to overt hypothyroidism in which the records have not been updated.

Conclusion

Hypothyroidism is a common condition affecting approximately 4.74% of the patients cared for by PHCC. It is likely that the management and monitoring of the condition is underrepresented in PHCC, firstly due to the ease of access of private practice in the country but also due to the large native foreign population who access health care in their home countries. There was a significant increase in the number of blood tests and thyroxine prescriptions issued in 2020 compared to the year previous (360% increase). This could be reflective of the travel restrictions imposed during the covid-19 pandemic. Given that the majority of hypothyroidism patients have concurrent health conditions, it is important for practitioners to manage the care of such patients in a holistic manner.

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