

The frequency of hypothyroidism in Saudi community-based hospital: A retrospective single centre study

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Abstract

Background and objective: Thyroid gland is one of the important organs in human body and the burden of thyroid diseases in the general population is enormous specially in females. To estimate retrospectively the frequency of hypothyroidism in Saudi community-based hospital.

Design: We analyzed retrospectively 3872 participants whom are between the age 12 to 105 years. All patients were from the population of the Primary health centre at King Fahad Armed Forces Hospital, Jeddah, Saudi Arabia. All data were collected on the basis of a review of electronic medical data. Patients with TSH above the normal range of TSH for our laboratory reference (4.2 MIU/L, history of hypothyroidism and taking thyroid replacement therapy were included. Patient who are pregnant were excluded.

Results: Out of the initial screening of 6023 subjects, 3872 subjects were included. There were 884 (22.8 %) male and 2988 (77.2 %) were female with mean age 44.1 ± 16.3. The mean and median TSH values were 4.4 ± 8.7 and 2.6 respectively. Among them we found 1125 (29.1%) cases with hypothyroidism. Among cases of hypothyroidism, there were 964 (85.7 %) cases were female and 161 (14.3 %) were male with male to female ratio of 1 to 6.0, $p < 0.0001$. Cases with hypothyroidism were nonsignificantly older than cases with no hypothyroidism, 44.9 ± 16.2 vs. 43.8 ± 16.4 respectively, $p = 0.06$. Hypothyroidism was more prevalent in the fifth decade (32%). Hypothyroidism was significantly more prevalent in females between the second to the sixth decades as compared to males. Male was nonsignificantly more prevalent than females in the eighth and ninth decades.

Conclusion: We conclude that despite the limitations of this hospital-based retrospective study, hypothyroidism is highly prevalent in cohort of Saudis. The majority of our patients with primary hypothyroidism were young and predominantly females. These two observations remain to be validated by population-based studies. In the absence of registry data, larger cooperative studies involving diverse population samples from multiple centers could help to provide further information on the true frequency nationally.

Introduction

Thyroid gland is one of the important organs in human body and the burden of thyroid diseases in the general population is enormous specially in females [1,2]. Thyroid dysfunctions have increased recently and are considered the commonest endocrine diseases [3]. Thyroid diseases can be classified according to the gland function into hypothyroidism and hyperthyroidism which can also be further classified into primary and secondary [4]. In primary hypothyroidism the defect is in the thyroid gland itself and the hypo activity of the gland, while secondary hypothyroidism is due to a defect in the posterior pituitary gland which secretes the thyroid stimulating hormone or TSH.

Several studies have been reported from different parts of the world showing the prevalence of hypothyroidism. The prevalence of spontaneous hypothyroidism is between 1-2%, and it is more common in older women and ten times more common in women than in men [5]. In the Whickham survey, the prevalence of newly diagnosed overt hypothyroidism was 3 per 1000 women [6]. The prevalence of previously diagnosed and treated hypothyroidism was 14 per 1000 women, increasing to 19 per 1000 women when possible but unproven

cases were included. The overall prevalence in men was less than 1 case per 1000. One third had been previously treated by surgery or radioiodine for thyrotoxicosis. Excluding iatrogenic causes, the prevalence of hypothyroidism was 10 per 1000 women, increasing to 15 per 1000. The mean age at diagnosis was 57 years. Other studies in Northern Europe, Japan and the USA have found the prevalence to range between 0.6 and 12 per 1000 women and between 1.3 and 4.0 per 1000 in men investigated. In the Colorado and NHANES III studies, the prevalence of newly diagnosed hypothyroidism was 4 per 1000 and 3 per 1000 respectively [7,8]. The prevalence and types of thyroid disorders were studied in Saudi Arabia [9-11]. Hypothyroidism was reported to be 47%.

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Epidemiological studies of thyroid dysfunction have limitations, for example the definition of overt hypothyroidism and subclinical hypothyroidism, the selection criteria of the sample used, the influence of age, sex, genetic and environmental factor and the different techniques used for the measurement of thyroid hormones and the relative paucity of incidence data [5]. The current study was conducted to find out the prevalence of hypothyroidism in a cohort of Saudi population.

Methods

We analyzed retrospectively 3872 participants whom are between the age 12 to 105 years. All patients were from the population of the Primary health centre at King Fahad Armed Forces Hospital, Jeddah, Saudi Arabia. All data were collected on the basis of a review of electronic medical data. Patients with TSH above the normal range of TSH for our laboratory reference, history of hypothyroidism and taking thyroid replacement therapy were included. Patient who are pregnant were excluded. The study designed to investigate hypothyroid by estimation of Thyrotropin level (TSH) among Saudi adult males and females to determine the prevalence hypothyroidisms in studies population in order to compare the result to other population worldwide. The reference range values of TSH 0.22-4.2 MIU/L, Free T4 12.0-22.0 pmol/L, the total number of cohorts were separated on basis of age values into eight groups: < 20 years, 20-29 years, 30-39 years, 40-49 years, 50-59 years, 60-69 years, 70-79 years and ≥ 80 years.

Statistical analysis

Continuous variables were described using means and Standard Deviations. Univariate analysis of baseline demography both between groups, were accomplished using unpaired t-test and nonparametric and Chi square test were used for categorical data comparison. *P* value < 0.05 indicates significance. The statistical analysis was conducted with SPSS version 22.0 for Windows.

Results

Out of the initial screening of 6023 subjects, 3872 subjects were included. There were 884 (22.8 %) male and 2988 (77.2 %) were female with mean age 44.1 ± 16.3 (Table 1). The mean and median TSH values were 4.4 ± 8.7 and 2.6 respectively. Among them we found 1125 (29.1%) cases with hypothyroidism. Among cases of hypothyroidism, there were 964 (85.7 %) cases were female and 161 (14.3 %) were male with male to female ratio of 1 to 6.0, $p < 0.0001$. Cases with hypothyroidism were nonsignificantly older than cases with no hypothyroidism, 44.9 ± 16.2 vs. 43.8 ± 16.4 respectively, $p = 0.06$. Hypothyroidism was more prevalent in the fifth decade (32%) (Figure 1A). Hypothyroidism was significantly more prevalent in females between the second to the sixth decades as compared to males (Figure 1B). Male was nonsignificantly more prevalent than females in the eighth and ninth decades (Figure 1B).

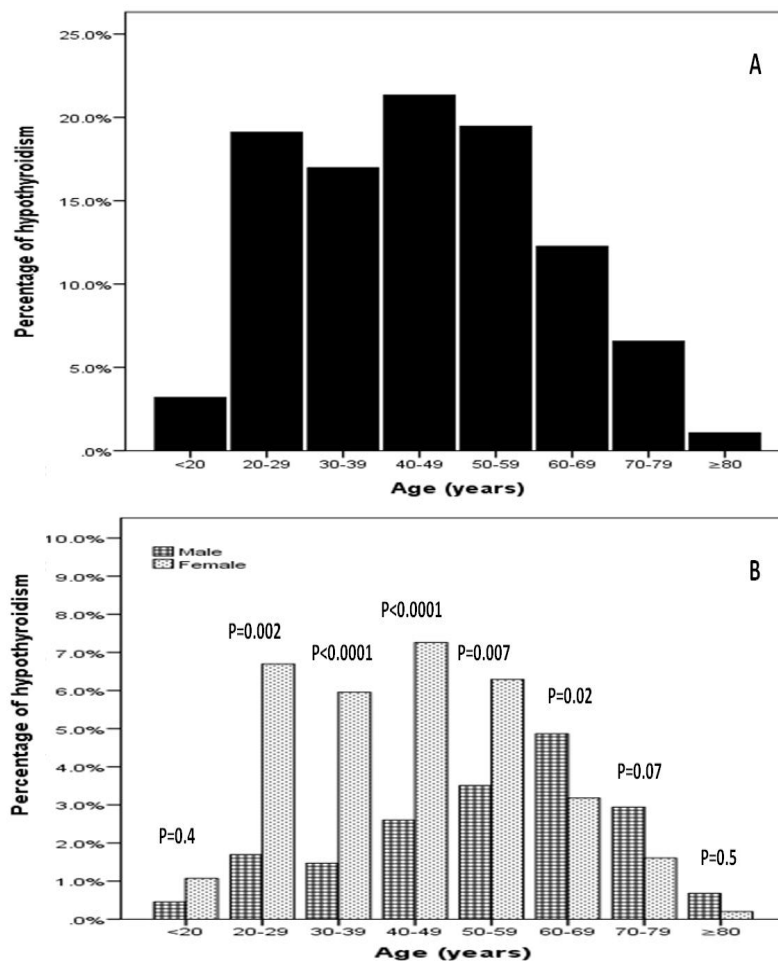


Figure 1A and 1B. Age category groups and the frequency of hypothyroidism and in correlation to gender

Table 1. Base line characteristic and comparison between patients with and without hypothyroidism

Parameters	Total 3872	Hypothyroidism		P value
		Present	Absent	
		1125 (29.1)	2747 (70.9)	
Age (years)	44.1 ± 16.3	44.9 ± 16.2	43.8 ± 16.4	0.06
Gender				
Male	884 (22.8)	161 (14.3)	723 (26.3)	< 0.0001
Female	2988 (77.2)	964 (85.7)	2024 (73.7)	
TSH (mIU/L)	4.4 ± 8.7	10.3 ± 14.6	2.1 ± 0.9	< 0.0001
FT4 (pmol/L)	15.0 ± 3.7	14.5 ± 3.2	15.5 ± 4.0	< 0.0001

Discussion

The current study revealed that out of 1125 patients (29.1%) had hypothyroidism, 884 (22.8%) male and 71 females was found to have hypothyroidism. It was documented by many authors that hypothyroidism is more common in females [6,12-16]. Diseases of the thyroid are of great importance because most are amenable to medical management. Patients with thyroid diseases usually presented by conditions associated with excessive release of thyroid hormones (hyperthyroidism), deficiency of the hormone (hypothyroidism), and mass lesions of the thyroid [17]. Hypothyroidism results from deficient production of the thyroid hormone or defects in thyroid hormone receptor activity [18]. A clinical and biochemical grading of primary hypothyroidism was introduced in 1970 but the suggested TSH values are no longer quoted in recently adapted versions of such grading [19-21]. A TSH level above 4.2 mU/L is considered as a primary hypothyroidism [22-24]. Hence, such TSH levels were used as criteria for inclusion in this study. The wide range of TSH values in patients with low FT4I is not unusual as observed in our patients [24].

The prevalence of hypothyroidism was 25.5% (116 over 454 patients), 94 woman (81.0%) and 22 men (19.0%) [25]. Another study done in India had 5360 participant, 2932 female, 2428 male, 1447 participant between 18 and 35year old, 1244 between 36 and 45-year-old, 1068 between 46 and 54-year-old and 1601 over 55-year-old had a lower prevalence of hypothyroidism (10.9%) in their study population [23]. Also, Velayutham K et al. [26] found in his study done in South India that the prevalence of hypothyroidism was 7.3% which is another lower prevalence than ours [26,27]. Another study done in Hail region, Saudi Arabia found that out of 175 patients, 98 cases (27 male and 71 female) was found to have hypothyroidism [28]. The prevalence of hypothyroidism was 6.18% in Libya and 47.34% in Saudi Arabia according to a study on the thyroid diseases in the Arab world [29].

Our findings also confirmed previous observations of the preponderance of females in patients with primary hypothyroidism [12-16]. Although relatively most of the study in this context have shown high frequencies of hypothyroidism among females, but our findings seemed to be relatively higher. However, this might be attributed to the fact that most of these studies. considered the thyroid neoplastic changes, which were ignored in the present study [11,30]. In a study of 309 cases of hypothyroidism seen at Al-Khobar, Saudi Arabia, 124 (90 Saudis and 34 non-Saudis) adult patients with spontaneous primary hypothyroidism satisfied the inclusion criteria for detailed analysis. Their male: female ratios for Saudis was 1:4.6 which lower than our observation [31].

Primary hypothyroidism occurs in all ages, but it is usually more prevalent, in both community- and hospital-based populations, in older people in their sixth and seventh decades [12,13,16,31]. In this study, the majority of Saudis were found to be relatively young at the

time of diagnosis. Reviewing the work by Schectman et al. [14] in a primary health care setting, a similar trend in age was noted, with most of their cases being in the fifth decade or younger. The young age of our patients may be a reflection of the age structure of the population where 76% of Saudis respectively are less than 35 years of age, and only 3% and 0.5% of Saudis are of greater than 65 and 75 years in age respectively [33].

We aimed to identify the frequency of hypothyroidism in patients in primary health care setting. Furthermore, due to the retrospective nature of this study, the observed population reflects a selected yet comprehensive group of patients rather than the general population. Our study could be limited by the question of clustering of cases within the study region and the effect that might have on our estimates, in addition, the current study population may appear limited in size and therefore may underestimate the true frequency of hypothyroidism in the general population. In addition, the study shares the limitations of all retrospective studies [34].

We conclude that despite the limitations of this hospital-based retrospective study, hypothyroidism is highly prevalent in cohort of Saudis. The majority of our patients with primary hypothyroidism were young and predominantly females. These two observations remain to be validated by population-based studies. In the absence of registry data, larger cooperative studies involving diverse population samples from multiple centers could help to provide further information on the true frequency nationally.

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Conflict of interests

The authors declare no conflict of interests.

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