

# Prevalence of Hypothyroid Disease in Saudi Primary Care

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Received: February 5, 2018. Accepted: February, 10, 2018; Published: March 1, 2018

**Citation:** Almustafa B. et al. Prevalence of Hypothyroid Disease in Saudi Primary Care. *World Family Medicine*. 2018; 16(3):8-11. DOI: 10.5742/MEWFM.2018.93297

## Abstract

**Background:** Thyroid dysfunction is a major public health problem. However, its burden in Saudi primary care has not been studied.

**Objectives:** To find out the prevalence of hypothyroid among the patients who attended the Qatif-3 primary health care (PHC) center, Qatif, Saudi Arabia.

**Materials and Methods:** A primary-care based study was undertaken by using the data which was retrieved from the thyroid function tests, which included T4 and TSH, of individuals  $\geq 15$  years old from the laboratory registers maintained in Qatif-3 PHC Center, from 1st September, 2014 to 30th August, 2016. Descriptive statistics and analysis were done using SPSS version 20 software.

**Results:** The total number of adult cases was 75, which included 13 males (17.3%). The prevalence of hypothyroid (TSH  $\geq 5.5$   $\mu\text{U/ml}$ ) was 0.7%. A higher prevalence of 2.5% and 1.5% was observed in the subjects whose ages were 45-60 years and above 60 years, respectively with no significant difference ( $p = .076$ ). The incidence was 18 (17 per thousand of adult population) per year. The mean age of first presentation was 44.9 (SD 13.6) years. The median TSH level at presentation was 7.3  $\mu\text{U/ml}$ .

**Conclusion:** Females and people of mid ages were more vulnerable to hypothyroid in this population. Hypothyroidism and subclinical hypothyroidism were common in Saudi primary care. PHC providers must be aware about its early detection and management.

**Key words:** TSH, Hypothyroidism, Saudi Arabia, Primary Care, Epidemiology, Burden

## Introduction

Hypothyroidism is one of the most common endocrine disorders seen worldwide (1). Hypothyroidism presents in different stages of dysfunction, subclinical (SCHypo) and overt status (OvHypo). They usually present, in primary care, with nonspecific symptoms. Hashimoto's thyroiditis is the commonest cause whereas hypopituitarism and developmental abnormalities are much less common (3).

The prevalence of OvHypo in Europe is about 4-5% (2), while the prevalence of SCHypo is about 4-15% (1). In the United States, studies showed 0.4% prevalence of OvHypo, while 4.3-8.5% prevalence of SCHypo (3,4).

Studies of elderly persons above age of 60 years have shown a higher prevalence of raised serum TSH in this age group, above 10% of the subjects (1,5),

The most common cause of thyroid disorders is iodine deficiency and literature shows that almost one-third of the world's population lives in an area of iodine deficiency (Zimmermann, 2009). In 2004, however, a WHO assessment of global iodine status classified Saudi Arabia as having 'optimal' iodine nutrition. (6)

Regionally, a recent systematic review showed the prevalence of subclinical hypothyroid as 2.3% - 6.18%, while overt hypothyroid varied from 1.12% up to 47.34% (7).

In Saudi Arabia, studies in primary care are very limited, while none are found in the general population. In Albaha region, south-west, high-altitude area, Ahmed reported 40.8% prevalence of high TSH  $>4 \mu\text{U/mL}$  (8). In Riyadh, a study in a tertiary hospital showed a prevalence of 15.5% of hypothyroidism among non-endocrine females above age of 20 years (9). Bahammam studied TSH in patients referred to a sleep disorder center. He found a prevalence of high TSH in 11.5% of obstructive sleep apnea (OSA) patients, while in 5.4% of non-OSA patients (10).

Qatif-3 Primary Health Care (PHC) Center is located in Qatif, at the eastern shore of Saudi Arabia. It is a very rich town of marine products, agriculture, oil and gas. It is not in an endemic region for goiter (4). The center is serving patients free of charge for all inhabitants.

The purpose of this study was to estimate the prevalence of hypothyroid cases, identified among Qatif-3 PHC center's attendants.

Knowledge of the prevalence will help in planning for appropriate training for care providers, in addition to better estimation of the need for logistics, laboratory tests and medications. It may stimulate further etiological and epidemiological studies.

## Methodology

This was a cross-sectional epidemiological study conducted in Qatif-3 PHC Center, Saudi Arabia. Primary outcome measure of the study was the prevalence of hypothyroidism assessed by measurement of thyroid hormones.

Subjects were identified from the laboratory registers maintained in Qatif-3 PHC Center, from 1st Nov, 2012 to 30th Aug, 2016. Patients having thyroid function tests (T4 and TSH) done were selected. Medical records of all selected patients were reviewed. Inclusion criteria included individuals  $\geq 15$  years old with no prior history of hypothyroid, TSH  $\geq 3.5 \mu\text{U/mL}$  and no missing demographics.

Based on previous thyroid history and current thyroid stimulation hormone test results, participants were classified using the following definitions: Hypothyroid: Serum-free thyroxine (FT4)  $<0.90 \text{ ng/dL}$  and thyroid stimulation hormone (TSH)  $>5.0 \mu\text{U/mL}$ , Subclinical hypothyroidism: Normal serum FT4 and TSH  $>5.50 \mu\text{U/mL}$ , and Prior hypothyroidism.

The population of the catchment areas among years of the study was traced from the official census reports of the Ministry of Health in Qatif.

Descriptive statistics and analysis were done using the SPSS version 23 software. The prevalence of hypothyroidism was estimated as counts and percentages. A Chi-square test was used to assess difference in the prevalence of hypothyroidism, among different age groups and gender categories. ANOVA test was used to compare mean of TSH among different age and gender groups.

## Results

The total number of adult cases enrolled was 145, from 1st September, 2014 to 30th August, 2016. It included 23 males (15.9%). Fourteen were excluded being not inhabitant of the catchment area or prior history of hypothyroid.

Out of the enrolled 145 subjects 122 (84.1%) were females. The mean age of the subjects, at their first presentation, was 45.5 ( $\pm 14.0$  SD), ranging from 15 to 83 years, as shown in Table 1 (next page).

The prevalence of hypothyroid (TSH  $\geq 5.5 \mu\text{U/ml}$ ) was 1.43% among the whole population, as shown in Table 2. However, a higher prevalence of 4.5% and 4.6% was observed in the subjects who were 45-60 years old and above 60 years old, respectively with no significant difference ( $p = 0.12$ ). The incidence was 36 cases per year (4 per thousand of adult population per year).

The median TSH level at presentation was 6.89  $\mu\text{U/ml}$ , as shown in Table 3. TSH  $\geq 10 \mu\text{U/ml}$  was found in 38 (26.8%) individuals.

The mean level of presenting TSH among different age groups is shown in Table 4, while that among patients younger and older than 45 years is shown in Table 5.

**Table 1: Age of presentation among sex**

Sex	Mean	N	Std. Deviation	Median	Minimum	Maximum
male	49.09	23	14.56931	52.0	21.00	67.00
female	44.85	122	13.85224	45.0	15.00	83.00
<b>Total</b>	<b>45.52</b>	<b>145</b>	<b>14.00303</b>	<b>45.0</b>	<b>15.00</b>	<b>83.00</b>

No significant difference in age presentation between male and female patients, ANOVA Test = 0.184.

**Table 2: Individuals presented with high TSH > 5.0 in Qatif-3 PHCC Sept 2014-Aug 2016**

Age Group	15-<45 *			45-<60			>60			Total		
	Pop	N	%	Pop	N	%	Pop	N	%	Pop	N	%
Total Adult M	4263	9	0.2%	512	6	1.2%	340	8	2.4%	5115	23	0.4%
Total Adult F	4182	59	1.4%	578	43	7.4%	275	20	7.3%	5035	122	2.4%
<b>Total Adult</b>	<b>8445</b>	<b>68</b>	<b>0.8%</b>	<b>1090</b>	<b>49</b>	<b>4.5%</b>	<b>615</b>	<b>28</b>	<b>4.6%</b>	<b>10150</b>	<b>145</b>	<b>1.4%</b>

\* Significant difference is noted between different age groups, Chi X2 p<0.001.

**Table 3: Mean Level of presenting TSH among sex.**

Sex	Mean	N	Std. Deviation	Median	Minimum	Maximum
Male	11.78	21	20.44	6.17	5.05	100.00
Female	19.42	121	58.58	7.02	5.12	486.00
<b>Total</b>	<b>18.29</b>	<b>142</b>	<b>54.65</b>	<b>6.89</b>	<b>5.05</b>	<b>486.00</b>

No significant difference in level of presenting TSH between male and female patients, ANOVA Test p=0.556.

**Table 4: Mean Level of presenting TSH among age groups.**

Age Group	Mean	N	Std. Deviation	Median	Minimum	Maximum
15 -< 24.99	56.35	10	150.99	8.95	5.88	486.00
25 -< 34.99	9.40	30	4.24	7.96	5.38	24.91
35 -< 44.99	16.50	27	23.00	7.70	5.23	100.00
45 -< 54.99	17.03	35	37.84	6.65	5.05	226.80
55 -< 64.99	21.74	29	69.26	6.41	5.20	377.60
>65	7.24	11	2.69	6.64	5.12	15.00
<b>Total</b>	<b>18.29</b>	<b>142</b>	<b>54.65</b>	<b>6.89</b>	<b>5.05</b>	<b>486.00</b>

No significant difference in level of presenting TSH among age groups, ANOVA Test p=0.284.

**Table 5: Mean Level of presenting TSH among patients younger and older than 45 years**

Age Group	Mean	N	Std. Deviation	Median	Minimum	Maximum
15 -< 44.99	19.27	67	59.84	8.21	5.23	486.00
> 45	17.41	75	49.97	6.57	5.05	377.60
<b>Total</b>	<b>18.29</b>	<b>142</b>	<b>54.65</b>	<b>6.89</b>	<b>5.05</b>	<b>486.00</b>

No significant difference in level of presenting TSH among those younger and older than 45 years, ANOVA Test  $p=0.841$ .

## Discussion

The prevalence of hypothyroid spectrum noted in this study was 1.43%, which is less than the international figures. This may be due to the wider age group, the denominator used being whole catchment area population at age  $\geq 15$  years, the geographic location of Qatif near the seashore and the characteristics of the studied patients being symptomatic patients who presented in a general clinic.

The true prevalence may be much higher, due to the nature of the disease and its non specific presentation.

The prevalence of hypothyroid in females (2.4%) was six times that in males (0.4%). This difference between both genders is well expected and agreed with other studies.

A statistically significant difference is noted between those below 15 years of age and older groups. However, the difference is not significant between those at age group 45-60 years (4.5%), on one hand, and those older than 60 (4.6%), on the other hand. This calls for further study. It may reflect younger presentation of the disease, patient's behavior or doctor's inertia and disparity among older age groups.

Though no statistically significant difference was noted in level of TSH at presentation between different age groups, a decreasing trend in median level is noted, as the patient get older.

The TSH level  $>10 \mu\text{U/ml}$  was found in 26.8% of this study, in comparison to 43% by Akbar et al (11).

This study showed the expected burden of hypothyroid in primary care, based on the catchment population. This will greatly help the planners to estimate the expected load and prepare for logistics. In addition, it helps the medical educators, clinicians and auditors in evaluating their findings.

## Conclusion

Females and people of mid ages were more vulnerable to hypothyroid in this population. Hypothyroidism is common in Saudi primary care. PHC providers must be aware about its early detection and management.

## Acknowledgment

The authors acknowledge the valuable contribution of Ms. Elham Albannai, Ms. Zahra', Ms. Clerk, Dr. Ghadeer Aljishi, Mr. Radwan Almatwa'a and Dr. Majdi Altufaif.

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