



REVIEW ARTICLE

GENERAL ASSESSMENT OF THYROID STIMULATING HORMONE (TSH) LEVELS AMONG PEOPLE LIVING IN SOUTH OF HEBRON, PALESTINE

*^{1,2}Nawaf RN Amro, ³Aya Halahleh, ³Ibtisam Abu Znaid and ^{4,5}Abbas Masalma

¹BSN. Department of Nursing, Faculty of Health Profession, Al Quds University, Palestine

²M.Sc. Candidate in Science of Nursing (MSN) At Al Zaytoonah University

³BSN. Department of Nursing, Faculty of Health Profession, Al Quds University, Palestine

⁴B.Sc. Department of Medical Laboratory Sciences, Faculty of Allied Health Sciences, Arab American University, Palestine

⁵M.Sc. Department of Biochemistry and Molecular Biology, Faculty of Medicine, Al-Quds University, Palestine

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ABSTRACT

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Introduction: Thyroid disease is a major health issue in the United States. Approximately 20 million Americans have been diagnosed or are being treated for thyroid disease. Abnormal thyroid function has important public health consequences. Suppressed thyroid stimulating hormone (TSH) levels have been associated with an increased risk of atrial fibrillation, premature atrial beats, and stroke, and all cause mortality. Furthermore, almost one-third of the world's population lives in areas of iodine deficiency, so iodine deficiency is the most common cause of hypothyroidism worldwide.

Methods: The research design was a retrospective study, 2015 and 2016 carried out among patients at Al Israa Medical Center, Dura city, West Bank, Palestine. A total of 540 patients was selected by using Convenience (purposive) sampling, which is a non-probability sampling method.

Results: A total of 540 patients screened for Thyroid-Stimulating Hormone (TSH) levels were enrolled. Out of the total 540 patients, there were 71 men (13.1 %) and 469 women (86.9 %), there were 537 adulthood (99.4%) and 3 adolescents (0.6%). Most of patients have normal level of TSH 467 (86.5%), there were 28 (5.2%) have hypothyroidism and 45(8.3%) have hyperthyroidism.

Conclusion: This study gives new information about prevalence of TSH level among patients presented in Al Israa medical Center in Palestine and gives some factors that contributed to decrease and increase the TSH level among patients.

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INTRODUCTION

The thyroid maintains metabolism and vital body functions. It is located in the anterior neck just below the larynx and is composed of two lobes that straddle the trachea. Thyroid disease is a main health issue in the United States. There are closely 20 million Americans have been diagnosed or are being treated for thyroid disease (Dunn & Turner, 2016). In addition, thyroid disorders are one of the most frequent pathologies found in the general population, but identifying thyroid disease can be clinically challenging because subclinical thyroid dysfunction and autoimmune thyroiditis are often asymptomatic and usually diagnosed biochemically. Abnormal thyroid function has important public health consequences.

*Corresponding author: ^{1,2}Nawaf RN Amro

¹BSN. Department of Nursing, Faculty of Health Profession, Al Quds University, Palestine

²M.Sc. Candidate in Science of Nursing (MSN) At Al Zaytoonah University.

Suppressed thyroid stimulating hormone (TSH) levels have been associated with an increased risk of atrial fibrillation, premature atrial beats, and stroke, and all of them can cause mortality (Parle, Maisonneuve, Sheppard, Boyle, & Franklyn, 2001; Sawin *et al.*, 1994; Sheu, Kang, Lin, & Lin, 2010). Moreover, suppressed TSH levels have been found to be associated with a decreased bone density (Ross, Neer, Ridgway, & Daniels, 1987). Hypothyroidism is considered as the second most common type of endocrine disorder affecting women of reproductive age, but it can also affect women across the lifespan. Hypothyroidism occurs when the thyroid gland does not make enough thyroid hormone (Dunn & Turner, 2016). In women, the risk of developing hypothyroidism increases with age and during pregnancy, the postpartum period, and menopause (Garber *et al.*, 2012). Most epidemiological surveys have reported the biochemical aspects of thyroid disorders, although with different results. The difficulties for determinations and their comparison arise from the variable definitions of disease state, the heterogeneity of the populations studied, the range of normality of biochemical

parameters, and the sensitivity of thyroid function tests used. For example, the introduction of assays for serum TSH sensitive enough to distinguish between normal and low concentrations allowed the identification of subjects with subclinical hyperthyroidism. Additional variables include genetic (Teumer *et al.*, 2011; Tomer, 2010) and environmental factors, such as iodine intake (Knudsen *et al.*, 2002; Laurberg *et al.*, 2010). Indeed, almost one-third of the world’s population lives in areas of iodine deficiency (Zimmermann, 2009).so iodine deficiency is the most common cause of hypothyroidism worldwide (Vanderpump, 2011). Moreover, the most common cause of hypothyroidism in the United States, Hashimoto’s thyroiditis, results from damage to the thyroid gland caused by chronic inflammation initiated and sustained by one’s own immune system (Zaletel & Gaberscek, 2011). Furthermore, overt hypothyroidism contributes to elevated serum LDL cholesterol levels and is a risk factor for coronary heart disease, heart failure, and atherosclerosis (Cappola & Ladenson, 2003; McQuade *et al.*, 2011). So, the American Thyroid Association recommends an initial screening for thyroid disease at age 35 years and every 5 years thereafter. Thyroid-stimulating hormone is highly sensitive to thyroid dysfunction and is used to evaluate thyroid disorders (Dunn & Turner, 2016). Accordingly, the purpose of our study is to assess the TSH levels among people living in the south of Hebron, west bank, Palestine presented to Al Israa medical center as it is considered as a central medical center in the region of south of Hebron.

Statistical analysis

After data collection, the data were reviewed, organized, tabulated and statistically analyzed using SPSS version 23 (Statistical Package for Scientific Studies). Descriptive statistics (e.g. Frequencies & descriptive) were used to analyze the data.

RESULTS

A total of 540 patients screened for Thyroid-Stimulating Hormone (TSH) levels were enrolled. Out of the total 540 patients, there were 71 men (13.1 %) and 469 women (86.9 %), there were 537 adulthood (99.4%) and 3 adolescents (0.6%). Most of patients have normal level of TSH 467 (86.5%), there were 28 (5.2%) have hypothyroidism and 45(8.3%) have hyperthyroidism. Mean±SEM levels of TSH in 540 subjects were observed to be 2.263±.149 (range: .02 – 54.50 mIU/ml). Men had mean value of 1.962± .291 (range: .11 – 17.10 mIU/ml) and women had 2.308±.166 (range: .02 – 54.50 mIU/ml). Table 3. If 0.4 mIU/ml and less was taken as cut off for hypothyroid stat, total 28 out of 540 subjects (5.2%) turned out to be low TSH level. In this group, 2 (2.8%) were men with mean levels of .22±.11 mlU/ml and 26 (5.5%) were women with mean of .16±.03 mlU/ml. However, it was observed that 467/540 (86.5%) subjects had Normal TSH levels.

Table 1. Socio-demographic variables

Variables	n=540	Percentages (%)
Age-group		
Adolescents	3	.6
Adulthood	537	99.4
Gender		
Male	71	13.1
Female	469	86.9
Results		
Hypothyroidism	28	5.2
Normal TSH Level	467	86.5
Hyperthyroidism	45	8.3

Table 2. Depicts Thyroid-Stimulating Hormone (TSH) levels and percentage of male and female studied

	Mean	Std. Error of Mean	Std. Deviation	Min	Max
Total results of all participants (n=540) n= 540 (All)	2.263	.1496	3.477	.02	54.50
Total results of Men participants (n=71) n= 71 (Men)	1.962	.29105	2.45242	.11	17.10
Total results of Women participants (n=469) n= 469 (Women)	2.308	.16658	3.60748	.02	54.50

MATERIALS AND METHODS

Study design and population

The research design is a retrospective study 2015 and 2016 carried out among patients presented to Al Israa Medical Center. The study population included all patients who are presented in Al Israa medical center which located in the Dura city, West Bank, Palestine. It was carried out over a period of eight months starting from Feb 2017 till September 2017. Patients were recruited from the laboratory records using convenience sampling.

Sample size

The sample size was selected by using Convenience (purposive) sampling, which is a non-probability sampling method and our study included 540 patients.

There were 65 males (91.5%) with Mean level 1.50±.09 and 402 females (85.7%) with mean level 1.69±.04. On the other hand, it was observed that 45/540 (8.3%) subjects had high TSH levels. There were 4 males (5.6%) with Mean level 10.43±2.60 and 41 females (8.7%) with mean level 9.71±1.41. Table 4. If 0.4 mIU/ml and less was taken as cut off for hypothyroid stat, total 28 out of 540 subjects (5.2%) turned out to be low TSH level. In this group, 0 (0%) were adolescent with mean levels of 0±0 mlU/ml and 28(5.2%) were adult with mean of .17±.02 mlU/ml.

Ethical considerations

Permissions from AL Israa medical center director were acquired. The confidentiality of the results was completely secured by providing serial number for each participant at both collection and analysis process.

	Hypothyroidism		Normal TSH		Hyperthyroidism		Total	
	n (%)	Mean \pm SEM	Level n (%)	Mean \pm SEM	n (%)	Mean \pm SEM	Mean (%)	\pm SEM
Male	2 (2.8%)	.22 \pm .11	65 (91.5%)	1.50 \pm .09	4 (5.6%)	10.43 \pm 2.60	71 (13.1%)	1.96 \pm .29
Female	26 (5.5%)	.16 \pm .03	402 (85.7%)	1.69 \pm .04	41 (8.7%)	9.71 \pm 1.41	469 (86.9%)	2.31 \pm .17
Total	28 (5.2%)	.17 \pm .02	467 (86.5%)	1.67 \pm .04	45 (8.3%)	9.77 \pm 1.30	540 (100%)	2.26 \pm .15

	Hypothyroidism		Normal TSH level		Hyperthyroidism		Total	
	n (%)	Mean \pm SEM	n (%)	Mean \pm SEM	n (%)	Mean \pm SEM	n (%)	Mean \pm SEM
Adolescence	0 (0%)	0 \pm 0	3 (0.6%)	1.34 \pm .19	0 (0%)	0 \pm 0	3 (0.6%)	1.34 \pm .19
Adult	28 (5.2%)	.17 \pm .02	464 (86.4%)	1.67 \pm .04	45 (8.4%)	9.77 \pm 1.30	537 (99.4%)	2.27 \pm .15
Total	28 (5.2%)	.17 \pm .02	267 (86.5%)	1.67 \pm .04	45 (8.3%)	9.77 \pm 1.30	540 (100%)	2.26 \pm .15

DISCUSSION

This study give over view of prevalence of thyroid stimulating hormone among patients represent in Al Israa medical center, West Bank, Palestine. Samples of a total of 540 participants were analyzed. The overall of the prevalence of hypothyroidism in this study were 5.2% and also the prevalence of hyperthyroidism were 8.3% . Many studies support our results showed that the prevalence of hypothyroidism and hyperthyroidism were 4.7% and 2.4% respectively(Delitala *et al.*, 2014), other study revealed that the prevalence of elevated TSH levels was 9.5%, and the prevalence of decreased TSH levels was 2.2%(Canaris, Manowitz, Mayor, & Ridgway, 2000). In addition, there is a study shown a little bit high of prevalence of hypothyroidism, it was present in 10.8% of participants(Hak *et al.*, 2000). In details, (5.2%) were low TSH level. 2 (2.8%) were men with mean levels of .22 \pm .11 mIU/ml and 26 (5.5%) were women with mean of .16 \pm .03 mIU/ml. Moreover, it was observed that (8.3%) subjects had high TSH levels. There were 4 males (5.6%) with Mean level 10.43 \pm 2.60and 41 females (8.7%) with mean level 9.71 \pm 1.41.In literatures shown that hypothyroidism was 1.9% in men and 7.6% in women(Bindels *et al.*, 1999). Moreover, other study shown that the Women had thyroid deficiency (5.9%) more often than men (2.3%) (Sawin, Castelli, Hershman, McNamara, & Bacharach, 1985).

Recommendations

Monotherapy with levothyroxine is the standard for treating hypothyroidism, so women with hypothyroidism should be referred to an endocrinologist for the following: (a) difficulty maintaining a euthyroid state, (b) during pregnancy, (c) when planning to become pregnant, (d) cardiac disease, (e) presence of a nodule or other abnormal thyroid structural changes, (f) presence of other endocrine abnormalities such as pituitary and adrenal disorders, and (g) unusual causes of hypothyroidism related to malabsorption of levothyroxine (Garber *et al.*, 2012).

Limitation

The sample was smaller than we had expected to recruit and this is because some medical centers did not give permission to collect data from them.

Finally the budget was limited and played the main role to not take all of the medical centers in West Bank, Palestine.

Conclusion

This study gives new information about prevalence of TSH level among people living in the south of Hebron, Palestine. and gives some factors that contributed to decrease and increase the TSH level. Expanding education for population is essential to spread the Advantages of TSH related to health.

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