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Incidence of Hashimoto Thyroiditis Among Libyans: A Retrospective Epidemiological Study

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ABSTRACT

Background and aims. Hashimoto's disease is an autoimmune disorder in which the body produces antibodies that attack the thyroid gland, leading to chronic inflammation, destruction of the gland, and hypothyroidism. This study aimed to assess the epidemiology of this disease among Libyan patients. **Methods.** A cross-sectional retrospective study conducted from June 2012 to April 2020 in order to examine the anti TPO level among Libyan population. Data was collected from eastern and western part of Libya, and were analyzed from available sample for 244 apparently patients with thyroid disorders collected from different private clinic's laboratories. The analysis for serum anti-TPO was done by electrochemiluminescence protein binding assay (ECLIA) using Roche diagnostics and Cobas e411 analyzer. **Results.** The current results showed that females predominate the study, and most of them were in the age group of (>40) years old. About 49.18% of these cases were suffering from Hashimoto's disease (High ATPO level). The mean value of anti-TPO status among females was (0.5±2) nmol/L, while among males it was (0.45±3) nmol/L. Significantly, more women (81.66%) had Anti- TPO Above (34 IU/ml), compared to (18.33%) of male participants. **Conclusion.** Hashimoto disease is common among patients with thyroid dysfunction especially females. Our findings suggest that different interventional strategies are needed to reduce the chances of developing Hashimoto's and its associated negative health outcomes in Libya.

Keywords: Hashimoto thyroiditis, hypothyroidism, thyroid, Libya.

INTRODUCTION

Hashimoto thyroiditis is globally the most widespread autoimmune disorder that characterized by an extensive lymphocyte infiltration, fibrosis, and parenchymal atrophy, and its occurrence has been increased in the last decades [1,2]. Hashimoto thyroiditis denotes a typical organ-specific autoimmune condition, in which environmental and geographical factors induce the progress of the immune response against thyroid antigens in genetically vulnerable people [3].

The multifaceted interface between genetic and environmental factors also impacts the consequence of the disease, that usually proceeds from an underlying autoimmune disorder, highlighted by the production of anti-thyroid autoantibodies, followed by evident hypothyroidism, although its appearance can be even with temporary thyrotoxicosis [4].

Since there is increasing evidence that undiagnosed hypothyroidism is lethal, early detection of Hashimoto thyroiditis would be beneficial in predicting thyroid dysfunction. Precisely, it is well recognized that thyroid status assessment and treatment improves disease outcomes and prevent further decline in the thyroid functions [4]. Hence, the current study investigates the relative incidence of Hashimoto thyroiditis among Libyan populations.

METHODS

Study design and data collection

This was a retrospective cross-sectional, multi-centered epidemiological study conducted in three cities in Libya namely Tripoli, Benghazi, and Derna, from the period of January 2012 to April 2020.

These cities were chosen to ensure the involvement of various study population with respect to geographic distribution and socioeconomic characteristics. The study was approved by the scientific committee of department of Medical laboratories, University of Tripoli Alahlia, Janzur, Libya. All patient's data collected in this study were kept secured and confidential.

The main finding measure of the study was the occurrence of hypothyroidism evaluated by measurement of the level of thyroid peroxidase (ATPO) in the blood samples. All female or male aged more than 18 years, provided venous blood sample for laboratory investigations were included in the study. The exclusion criteria were; pregnant patient, patient with acute or chronic systemic diseases, and patient receiving medications that could affect with thyroid function tests.

Study sampling procedure

During the study period, participants underwent history assessment, physical examination, and laboratory testing. A certified laboratory conducted the biochemical and hematological investigations. Assays for thyroid peroxidase (ATPO) and anti -TPO antibodies were measured by the chemiluminescence protein binding assay using immunoassay analyzer (Roche Diagnostics and Cobas e411 analyzer, Switzerland). Diagnostic sensitivity of the kit used to quantify TSH, FT3, FT4 and anti-TPO antibodies was 0.010 μ IU/mL, 0.1 ng/mL, 0.3 μ g/dL and 5.0 IU/mL, respectively.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 22.0 (Armonk, NY: IBM Corp). The analysis was done on the set of all selected subjects in the study according to the study protocol. The prevalence of Hashimoto thyroiditis was presented as counts and percentages. Chi square test were used for categorical data comparison. P value < 0.05 indicates significance.

RESULTS

Out of the initial screening of 387 subjects, 244 subjects were included. There were 48 (19.6%) male and 196 (80.4%) were female, with mean age 41.2 ± 11.2 (Table 1). The prevalence of thyroid dysfunction was 49.18%. Among the abnormal subjects, 98 (81.7%) were female and 22 (18.3%) were male. Females were nonsignificantly more predominant than males ($p=0.056$). There were statistically significant differences in the geographical distribution of Hashimoto's thyroiditis among the three cities, with the highest number of abnormal subjects were in Tripoli city ($p < 0.00001$).

Table 1. Demographic characteristics

Parameters	Total 244	Hashimoto Thyroiditis		P value
		Present 120	Absent 124	
Age (years)	41.2 ± 11.2	42.3 ± 10.1	40.1 ± 12.4	0.769
Gender				
- Male	48 (19.6%)	22 (18.3%)	26 (20.9%)	0.056
- Female	196 (80.4%)	98 (81.7%)	98 (79.1%)	

Location				
- Tripoli	119 (48.7%)	67 (55.8%)	52 (41.9%)	< 0.00001
- Benghazi	66 (27.1%)	16 (13.4)	50 (40.3%)	
- Derna	59 (24.2%)	37 (30.8%)	22 (17.8%)	

Table 2 represents the comparison of the anti TPO levels in male and females. The mean anti TPO level in females was higher than that in males, but it was not statistically significant.

Table 2. Comparison of Anti TPO levels in males and females.

Analysis	Female (Mean)	Male (Means)	P value
Anti TPO	0.5	0.45	0.147

DISCUSSION

Estimates of the incidence of thyroid disorders are based on systematic aspects, classifications of hypothyroidism, and community structure, which are observed by age, race and gender, making assessments between studies of limited worth. The occurrence and pattern of the thyroid dysfunction depends on ethnic, geographical and environmental factors, such as iodine consumption [5].

Hashimoto's prevalence in this study was 49.18%, which was in line with previously published work that reported the incidence of autoimmune thyroiditis to be 55% in monozygotic twins, compared with only 3% in dizygotic twins [6]. This finding proposes that the prevalence of this disorder was due to genetic factors, environmental and sex hormone impacts. Moreover, the incidence of Hashimoto's thyroiditis in several international studies reflects considerable variation [7].

In the current study, females were predominating the study, which was also consistent with recently published data stated that females were more commonly affected by autoimmune comorbidities with increasing age [8]. Although the results presented in the current study had already been described extensively in the literature, the current outcomes deliver novel evidence about the epidemiological distribution, and first to highlight that there are gender and geographical differences in the prevalence of this disease in Libya.

Hashimoto's thyroiditis is frequently linked with iodine deficiency. It was considered that iodine deficiency and hypothyroidism may occur due to the environmental factors and food behaviors [9]. In a study conducted by Niafar et al., revealed that hypothyroidism was common in the Iranian population, as 12.8% of the females and 4.7% of the males had hypothyroidism; nevertheless, most of them were slightly hypothyroid [10]. These facts are constant with the reports of the high incidence of hypothyroidism in other iodine-sufficient inhabitants [10]. Furthermore, in other developed countries, hypothyroidism tends to rise with age and it frequently present in females as well as in people with goiter [11]. Besides, hypothyroidism is the most frequent thyroid disorder in the adults and it is more common in older females [12]. However, the thyroid dysfunction in elderly people often goes unobserved, and the approaches for a precise diagnosis may be debated [13].

Hypothyroidism is typically autoimmune in origin, donating as either primary atrophic hypothyroidism or Hashimoto's thyroiditis, and infrequently can pituitary disorders result in secondary hypothyroidism [12]. Thus, the complete thyroid panel is desirable for correct diagnosis and evaluation of the thyroid function.

This study has some limitations, firstly, the detection of Hashimoto's thyroiditis was based on anti-TPO test i.e. a serum ATPO. It could be more strengthened if the total T4, T3, thyroglobulin, anti-thyroglobulin was performed. Moreover, since this study was a laboratory-based study, it may not represent the entire population. However, it has identified the burden of thyroid dysfunction in eastern and western parts of Libya in a simple way, and its results can be used as key data for future studies. This study has revealed the prevalence of thyroid dysfunction, but the pathogen remains unidentified.

CONCLUSION

This is the first study in Libya to measure the prevalence of Hashimoto's disease among Libyan population with the respect to geographical distribution. The findings of this study displayed that the disease is common and its risks among people is increased. Inadequate awareness on the incidence of this disease can lead to delayed treatment and subsequent thyroid deterioration and failure.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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