

## Evaluation of Thyroperoxidase and TSH Receptor Autoantibodies in Thyroid Dysfunction Patients

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### ABSTRACT

Thyroid autoimmune disease is one of the most common disorders which are generally associated with existence of anti-thyroid peroxidase (TPO) in addition to ant thyroid stimulating hormone receptor (TSHR) antibodies, and anti-thyroglobulin (Tg). The present study was a cross-sectional one, conducted on (200) patients selected randomly from cases already diagnosed with thyroid disorder diseases by a specialized endocrinology center in AL-Basra city / Iraq. Where TPO test was performed for 127 of them, and TRAB test was conducted for the remaining 73 patients. The study showed that 74% of the cases that had a TPO test were positive, and 49% of the cases that had a TRAB test were also positive. The study also showed that the percentage of people with hypothyroidism was higher in those who had positive TPO results, in contrast to those who had positive TRAB results, where hyperthyroidism was the dominant disease.

**KEYWORDS:** Autoimmune thyroid disease, TPO test, TRAB test, Hypothyroidism Hyperthyroidism.

### ARTICLE DETAILS

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### INTRODUCTION

It's a fact that autoimmune diseases or (AD) includes a variety of considerable disorders results from inflammation of many organs that leads to construction of antibodies in contradiction of self-structures in addition to cytotoxic-action of T cells (Thiel et al. 2019). Thyroid autoimmune disease is one of the most common of these disorders while the information from multiple regions and countries were differ in reporting prevalence of the most frequent thyroid autoimmune disease but in somehow Graves' disease in addition to Hashimoto's thyroiditis considers as the commonest forms of it (Cooper and Stroehla 2003).

Autoimmune thyroid diseases are generally associated with existence of anti-thyroid peroxidase (TPO) in addition to anti-thyroglobulin (Tg) and anti-thyroid-stimulating hormone receptor (TSHR) antibodies (Marcocci and Marino 2005).

#### Thyroid Peroxidase:

Mainly, TPO which had been also termed microsomal antigens is a membrane-bound glycosylated enzyme associated with synthesized of thyroid hormone, stimulating the oxidation of iodine, tyrosine-residues iodination, and binding of iodotyrosines to create the Triiodothyronine (T3) and Thyroxine (T4) (McLachlan and Rapoport 1992).

In addition to other thyroid tests, thyroid peroxidase test helps to determine the cause of thyroid disease by detects the presence of thyroid peroxidase antibodies in the blood stream.

So in case of thyroid peroxidase antibodies presence in blood, this suggest that an autoimmune disorder, such as Hashimoto's disease or Graves' disease, is the cause of a thyroid disease. Which means that the human immunity system mistakenly creates antibodies which attack the other normal tissues. These antibodies that attack on thyroid gland cells rarely cause pain, swelling and decreased thyroid functions (Kaczur et al. 1997).

Some people who have thyroid peroxidase antibodies may not develop thyroid disease immediately. But the presence of thyroid peroxidase antibodies may increase the chance for developing thyroid disorders in future (Fröhlich and Wahl 2017).

#### Anti-thyroid-stimulating hormone receptor (TSHR) antibodies:

Thyrotropin (also known as thyroid stimulating hormone or sometimes TSH) is a glycoprotein produced by the anterior part of pituitary that intricate in controlling of metabolism and thyroid structure, which stimulates the accurate release of the thyroid hormones. TSH is adjusted by thyroid hormone (T3) in addition to various retinoid compounds, also its regulate by Thyrotropin-releasing hormone which made by a cluster of

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nerve cells in the hypothalamus gland. TSH could binds to the thyroid-stimulating hormone receptors (TSHR), which is split for 2 subunits ( A and B) and could implementing a big role in regulating thyroid function (Tozzoli et al. 2012).

Graves' disease (GD) pathogenesis is related to autoimmune production for antibodies of TSH receptor (TRAbs). However, TRAbs are diverse and might have either an inhibitory effect (TSH-receptors blocking antibody-TBAb) or a stimulating effect (TSH receptor stimulating antibody-TSAb) which is the most frequent case in GD and finally a neutral effect on the TSH-receptors and that's one is rare (Matthews and Syed 2011).

### METHODOLOGY

It was a cross-sectional study conducted on (two hundred patients) selected randomly from cases already diagnosed with thyroid disorder diseases by a specialized endocrinology center in AL-Basra city / Iraq. Where TPO test was performed for 127 of them, and TRAB test was conducted for the remaining 73 patients. Several variables have been selected

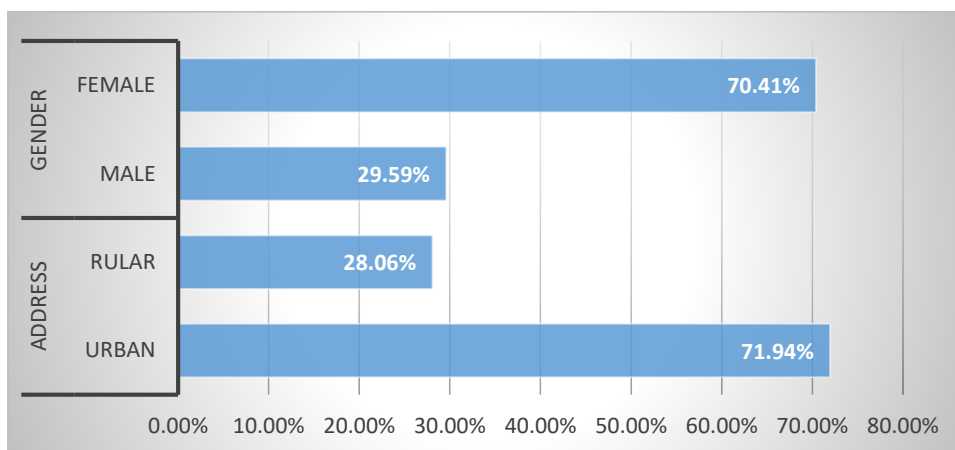
like sociodemographic one (Age, Gender, Marital status, Address, Weight, Height, Body mass index, Smoking) and others like Thyroid stimulating hormone (TSH) in addition to anti-thyroid peroxidase (TPO) and TSH receptor antibodies (TRAbs).

All data have been statistically analyzed by IBM SPSS 23 and Microsoft Excel.

### RESULTS AND DISCUSSIONS

Some sociodemographic factures were presented in (Figure 1) and (Figure 2) of this study, where it showed that the percentage of males was 29.59% while the percentage of females was 70.41% which is a very high percentage of thyroid diseases among them.

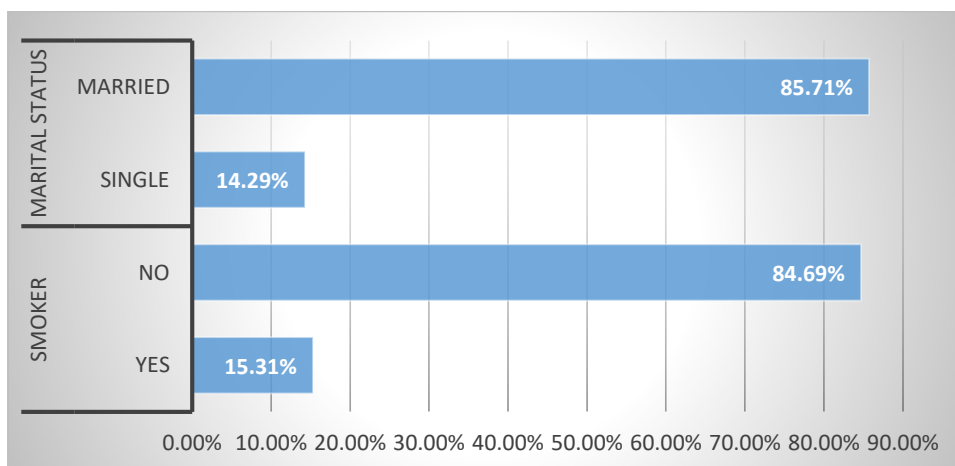
The study also showed that thyroid disorders were more among the people who live in the city 71.94% than those who live in the countryside 28.06% where the reasons may be due to the environment and the high rates of pollution in the city of Al Basra or other factors such as the type of the foods.



(Figure 1) Sociodemographic Parameters/ Gender and Address

The percentage of married people among the patients was high 85.71%, While unmarried was 14.29%, which is normal, given the high average age among them. Also we can note the

percentage of smoking was not too much high 15.31%, as the majority of cases were females and it's not so accepted habit among them.



(Figure 2) Sociodemographic Parameters/ Marital Status and Smokers

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We also note in this study (table1) that adults are the most vulnerable group with age median 49 years. Farther, there is a high percentage of obesity among patients with median

77kg and body mass index 29.65 which may indicate a strong relationship between obesity and thyroid disorders.

**Table 1 (Age, Weight, Height, BMI)**

	Mean	Median	Std. Deviation	Minimum	Maximum
Age	47.62	49.00	13.41	14	76
Weight	76.13	77.00	20.96	18.00	130.00
Height	135.91	156.00	57.11	100.36	184.00
BMI	29.58	29.65	7.93	15.00	49.27

The study revealed in (table 2) the results for thyroid testes. For Thyroid stimulating hormone the results were somewhat within the normal level (median 2.20) because patients were

receiving treatment for the purpose of reaching this result. While the median of TPO and TRAB tests were 86.00 and 1.47 respectively.

**Table 2 (TSH, TPO, TRAB)**

	Mean	Median	Std. Deviation	Minimum	Maximum
TSH	10.41	2.20	22.94	.005	100.00
TPO	215.63	86.00	232.65	5.00	612.00
TRAB	5.83	1.47	8.54	.00	32.40

As for the TPO test, which was positive in 94 out of 127 (74%) patients, the study found (table 3) that the percentage of those suffering from hyperthyroidism among them was 9%, and 92% were suffering from hypothyroidism. While

patients whose TPO result was negative (33 out of 127) patients the study found that the percentage of those suffering from hyperthyroidism among them was 33%, and 67% were suffering from hypothyroidism.

**Table 3 (TPO test and the type of thyroid disorder)**

	N	Hyperthyroidism	Hypothyroidism
TPO +ve	94	8 (9%)	86 (92%)
TPO -ve	33	11 (33%)	22 (67%)
Total	127	19 (15%)	108 (85%)

The study also showed (table 4) that patients who had a positive TRAB result 36 out of 73 (49%), including 92% had hyperthyroidism and the remaining 8% had hypothyroidism.

While those who had negative TRAB results 70% of them had hyperthyroidism and 30% had hypothyroidism.

**Table 4 (TRAB test and the type of thyroid disorder)**

	N	Hyperthyroidism	Hypothyroidism
TRAB +ve	36	33 (92%)	3 (8%)
TRAB -ve	37	26 (70%)	11 (30%)
Total	73	59 (80%)	14 (20%)

### CONCLUSION

In this study, it is clear that a high percentage of people with thyroid disorders have autoimmune-related causes, as 130 out of 200 patients had positive results for both tests, with a rate of 65%.

The study also showed that the percentage of people with hypothyroidism was higher in those who had positive TPO results, in contrast to those who had positive TRAB results, where hyperthyroidism was the dominant disease.

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