

# Obesity And Graves' Disease, Possible Association

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## Abstract

Graves' disease is an autoimmune disease causing hyperthyroidism and goiter in most cases. As thyroid hormone controls body metabolism, so extra thyroid hormone could be associated with a high basal metabolic rate, leading to weight loss. But in some cases of hyperthyroidism there is a weight gain development instead of weight loss. The present study was conducted on (101) patients already diagnosed with Graves' disease for evaluating their TSH levels and its relation with BMI. The results show that about three quarters of the sample gender were females (72.28%) and about (48.5%) of total cases have obesity, (19.8%) have overweight with a significant correlation between TSH levels and BMI.

**Keywords:** graves, hyperthyroidism, obesity.

## INTRODUCTION:

Graves' disease or GD is considered as one of the autoimmune diseases that mainly influence the thyroid gland in a passive way. It is occurring at all age groups but is more frequent in females at reproductive age causing hyperthyroidism and goiter in most cases, due to autoantibodies that affect the receptors of thyroid stimulating hormone (TSH) which leads to increase the secretion of thyroid hormones (Davies et al. 2020).

Other organs in addition to the thyroid gland could also be involved due to autoimmunity against antigens, causing the extra-thyroidal forms of graves' disease like graves' ophthalmopathy (which is detected in 50% of cases), graves' dermatopathy and acropathy that occurs in rare cases (Marcocci and Marinò 2014).

The etiology of Graves' disease is not clearly understood despite of it is considered as an autoimmune disorder, because it comes from a grouping of environmental factors (as iodine intake which could play a role in GD development) and genetic factors (as human leukocyte antigen associating with an elevated risk of GD development) (Campi and Salvi 2018).

Thyroid hormones and body structure seem to be strictly related. Thyroid hormones adjust thermogenesis, basal metabolism and play an important role in glucose and lipid metabolism, food intake and oxidation of fat. So thyroid disorder is associated with variations in body temperature, body weight and resting and total energy expenditure (REE) regardless of physical activity (Sanyal and Raychaudhuri 2016).

Hypothyroidism is related with reduced metabolic rate, reduced thermogenesis and has also been appeared to associate with an elevated body mass index (BMI) and a higher prevalence of obesity with some clinical evidence telling that even moderate thyroid disorder in the form of subclinical hypothyroidism is related to notable changes in body weight and denotes a risk factor for overweight and obesity (Danforth et al. 1979).

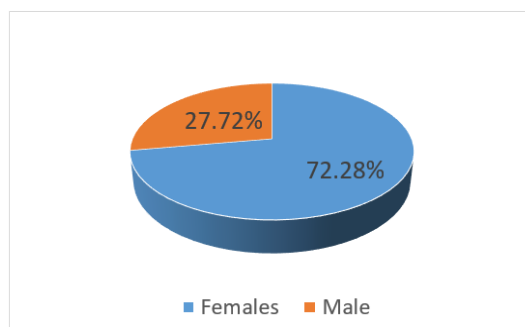
Because thyroid hormone controls body metabolism, so extra thyroid hormone resulting from (GD- hyperthyroidism) mainly associated with a high basal metabolic rate, which means burning additional energy while the body at rest and leading to weight loss commonly (Elliott et al. 2013).

But in some cases of hyperthyroidism there is a weight gain development instead of weight loss. The explanations for this may include either for increased appetite that results from hyperthyroidism, or for hyperthyroidism treatments which leads to decrease thyroid hormone excretion, or in some cases the immune response for GD can attack thyroid gland causing inflammation (Hashimoto thyroiditis) which leads to hypothyroidism and weight gain (Hersh 2018).

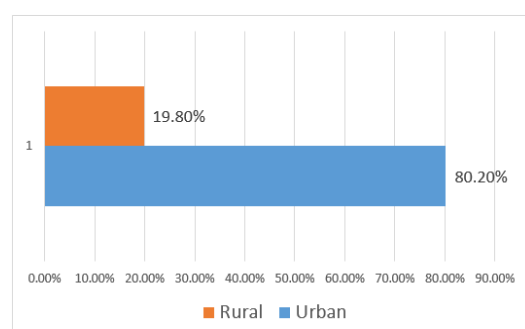
## METHODOLOGY:

This study was a cross-sectional conducted on (101) cases selected randomly from patients already diagnosed with Graves' disease by a specialized endocrinology center in AL-Basra city / Iraq. Several variables were selected like Age, Gender, Marital status, Weight, Height, Chronic disease, Body mass index (BMI) and Thyroid stimulating hormone (TSH) and statistically analyzed by IBM SPSS 23 and Microsoft Excel.

## RESULTS:

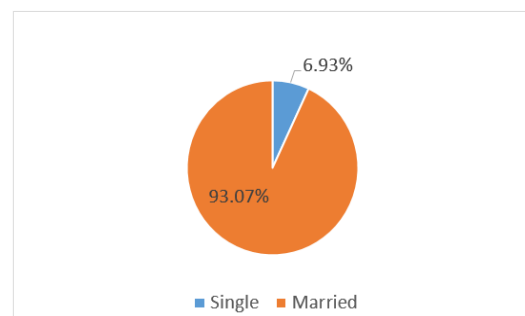


**Figure. (1) Gender.**

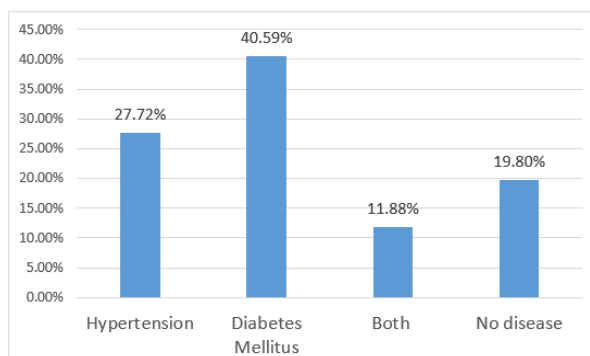


**Figure. (2) Address.**

The results in figure 1 shows that about three quarters of the sample gender were females (72.28%) which agrees with Bauer et al whose concluded that troubles of thyroid system function arise usually in females (Bauer et al. 2014). While in figure 2 indicating that about (80%) of participants was from urban areas.



**Figure. (3) Marital status.**



**Figure. (4) Chronic diseases.**

This study shows in (figure 3) that the majority of patients were married (about 93%). And around (80%) of them having a chronic disease like hypertension (27.72%) or diabetes mellitus (40.59%) or even both of them (11.88%) While (19.80%) have no chronic diseases (figure 4).

**Table. (1)** body mass index and thyroid stimulating hormone.

Parameter	Mean	Median	Std. Deviation	Range	Minimum	Maximum
Age	53.42	54	12.745	62	22	84
Weight	72.459	70	18.084	95	28	123
Height	160.56	159	8.772	42	139	181
BMI	28.33	29.964	6.494	34.9	14.22	49.13
TSH	1.598	0.169	2.562	13.595	0.005	13.6

The results in (table 1) shows that the median of TSH levels was (0.169  $\mu$ IU/mL) which means that hyperthyroidism was common among those Graves diseases patientes, but at the same time the BMI median was hight (29.964) , referring to over weight cases and indicating to a possible association between obesity and hyperthyroidism in Graves' disease patientes.

**Table. (2)** correlations between TSH and BMI

		TSH	BMI
TSH	Pearson Correlation	1	.635*
	Sig. (2-tailed)		.011
	N	23	15
BMI	Pearson Correlation	.635*	1
	Sig. (2-tailed)	.011	
	N	15	86

\*. Correlation is significant at the 0.05 level (2-tailed).

Table (2) in this study indicating that there was a significant relationship between body mass index and thyroid stimulating hormone.

**Table. (3)** Weight gropes percentages for GD patients.

Weight Gropes	Number	Percentage
Under Weight	6	5.9%
Normal Weight	25	24%
Over Weight	20	19.8%
Obesity	49	48.5%
Over Obesity	1	0.9%
Total	101	100%

The results in table (3) showing that there are about half of Graves' disease patients (48.5%) have obesity and about (19.8%) have over weight.

### Conclusions:

- 1- Graves' disease was more common in females than in males and especially the marriage one.
- 2- In most cases, the disease is associated with anther chronic diseases such as diabetes mellitus and hypertension.
- 3- Although hyperthyroidism in most cases causes weight loss, it can also cause weight gain in some cases.

### Recommendations:

- 1- Conduct periodic examinations of thyroid functions for people who suffer from unexplained wight loss or obesity.
- 2- Treatment of advanced cases of high or low thyroid hormones for more effective weight control.
- 3- Conducting more researches on the relationship of hyperthyroidism to obesity.

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