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Evaluation of Pancreatic and Thyroid Hormones Levels in Obese Women

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ABSTRACT

This study was prepared on 65 obese women attended to Baghdad Teaching Hospital and 50 women of normal weight as a control group from January to August 2024. The results showed that the mean of patients ages was (29.9 ± 0.988) years and 40(61.5%) of them were from rural areas in comparison to 25(38.5%) from urban areas. The variation (P=0.001) for 33(50.07%) and 50 (100%) patients and control group respectively of (overweight) women whose body weight (90≥100 Kg). The serum T3 hormone level was (P<0.01) for patients (3.17±1.41) and (1.27±0.64) for control, while the T4 hormone level was (P>0.05) for patients (3.63±1.00) and controls (3.86±1.72) with the TSH level was(P<0.01) for patients (2.62±1.07) and controls (1.11±0.94). Moreover, the results demonstrated that the T4 hormone level in women with Maximum body Mass was 32 (3.47±1.19), with (P>0.05), while it was in Minimum body mass was 33 (3.78±0.77) with (P>0.05), Furthermore, the levels of TSH hormone in women was 32(2.21± 1.23) and 32 (3.02±0.69) with (P<0.01) for both maximum and minimum body mass respectively, and the level of serum glucose in 32 Maximum body mass women was (3.28±2.21), while it was 33 in women with Minimum body mass was (4.22±1.35) with (P<0.05).

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1- INTRODUCTION

The metabolic syndromes (Mets) are a combination of harmful health factors which include hyperglycaemia, hypertension, dyslipidemia as well as abdominal obesity [1]. For many decades, the relationship between these factors has been recognized, and more recently, the MetS prevalence has been rising globally and MetS is found to be correlated with an elevated risk for developing severe illnesses e.g. type-2 diabetes (T2D), cardiovascular diseases (CVDs) and causing mortalities [2]. Obesity is a main component of Mets and elevates the risk of developing CVD, type-2 diabetes and dyslipidemia. Nevertheless, recently, it was indicated that not all obese people may highly encounter mortality risks [3]. It is thought that subgroup of nearly (10%-30%) of obese people are metabolically-healthy, although they suffer from increased body fat accumulation, which is referred to as metabolically-healthy-obesity (MHO) In the present research [4]. In recent times, different obesity sub-phenotypes with variable metabolic shapes were extremely explained. Such phenotypes of obesity can predict CVD development and elevated mortalities better than obesity itself can do [5]. There is a well-known association between both excessive and insufficient iodine intakes with different thyroid disorders. Korea is country which is well-known to be an area for iodine repletion with highly seafood and seaweed intakes. A previous study demonstrated more than sufficient iodine intake and as a right-shifted distribution of thyroid stimulating hormone (TSH) levels among Korean general populations. The regulation of metabolism and energy homeostasis are the primary responsibilities of Thyroid hormones (THs) [6]. Among euthyroid individuals, to date, many cross-sectional researches revealed a relationship between TSH or THs and Mets. Recently, It has been shown by several studies that there was an association between high TSH quintiles and MetS and insulin resistance (IR) [7]. On the contrary, other studies found no relationship between Mets and TSH in euthyroid individuals. The levels of adult's Low-normal free thyroxine (fT4) are correlated with higher IR, and people suffering from low-normal thyroid functions are at high CVD risks [8]. Therefore, an association between THs and factors related to Met components may be found. In recent times, it was shown by an Irani prospective population based cohort study that the normal reference levels of fT4 are correlated with the developments of certain obesity phenotypes [9]. Nevertheless, in Korean people with highly iodine consumption, the relationship between THs levels and obesity sub-phenotypes has not yet been explained. Thus, the present study aimed to investigate the association between obesity sub-phenotypes and levels of thyroid hormones in accordance with age and gender in the Korean general populations [10]. Our study aimed to evaluate Pancreatic disturbance and Thyroids hormones in obese women.

2- MATERIALS AND METHODS

In this study, 65 blood samples were collected from obese women who attended to Baghdad Teaching Hospital and had overweight body masses. They were divided into 2 groups: the first group (overweight) whose body weights ranged from (90 to ≥ 100) Kg, and the second group whose body weights ranged from (75 to 90) Kg. Also, 50 blood samples were taken from Normal Weight women as a control group. This work was conducted during the period from January to August 2024. Body mass index is calculated based on body mass measurements. T3, T4, TSH were measured by Competitive Enzyme immune assay. While serum blood glucose was measured by Uv spectrophotometer.

Statistical analysis: For data analysis, the SPSS program version-20 (Faculty version) was used, involving Mean ± SD and t-tests. A p-value less than (0.05) are regarded as significant.

3- RESULTS

The results in table (1) showed that the mean of patients ages was (29.9 ± 0.988) years and 40(61.5%) of them were from rural areas in comparison to 25(38.5%) from urban areas with a highly significant difference between (P=0.001).

Table (1): Demographical picture for the studied groups

Demographic characteristic	**No%**	**SD±**
Age group/ (years)		
16 – 26 26 -35 36-46 47≤56		**29.9 ± 0.988**
Residency		
Rural	**40(61.5%)**	
Urban	**25(38.5%)**	

The number and percentage of (overweight) women whose body weight ranged from (90≥100 Kg) was 33(50.07%) in comparison with the number and percentage of the control group 50 (100%) with a highly significant variation (P=0.001). Also, the number and percentage of the women with Minimum body Mass (75 ≥ 90 Kg) was 32 (49.03%) in comparison with the control group 50 (100%) with a highly significant variation (P=0.001) as shown in table (2).

Table (2): Prevalence of Body mass group among obese women

Obesity		Studied groups		Chi-Square (P-value)
		Control	Obese women	
Normal	N	50	0	P=0.001 HS
	%	100.0%	0%	
Maximum body Mass	N	0	65	
	%	0%	100%	
Total	N	50	33	
	%	100.0%	50.07%	
Obesity		**Studied groups**		**Chi-Square (P-value)**
		Healthy pregnant Control	**Infected women**	
Normal	N	50	0	P=0.001 HS
	%	100.0%	0%	
Minimum body Mass	N	0	65	
	%	0%	100%	
Total	N	50	32	
	%	100.0%	49.03%	

The mean of serum T3 hormone level was (3.17±1.41) in comparison with the controls (1.27±0.64) with a highly significant variation (P<0.01), while the mean of serum T4 hormone level was (3.63±1.00) in comparison with the controls (3.86±1.72) with no significant difference (P>0.05), while the mean of serum TSH level was (2.62±1.07) in comparison with the controls (1.11±0.94) with a highly significant difference (P<0.01). While the mean of serum glucose level was (3.76±1.87) when compared to the controls (0.44±0.25) with a highly significant variation (P<0.01) as shown in table (3).

Table (3): The mean of Thyroid hormones and Testosterone among patients and Control Group

Hormones	Groups	Mean± Std.	t- test	P-Value	C.S
T3	Patient	3.17±1.41	8.824	.000	P<0.01 (HS)
	Control	1.27±0.64			
T4	Patient	3.63±1.00	0.914	.363	P>0.05 (NS)
	Control	3.86±1.72			
TSH	Patient	2.62±1.07	7.897	.000	P<0.01 (HS)
	Control	1.11±0.94			
Diabetes mellitus	Patient	3.76±1.87	12.451	.000	P<0.01 (HS)
	Control	0.44±0.25			

T3: (1.3-3.1) nmol/L. T4: (57.9-150.6) nmol/L. TSH: (0.4-4.0) mIU/ml, Glucose: (90-120) mg/dl

The results showed that the mean level of T3 hormone in women with Maximum body Mass was 32(3.37±1.62), while the mean level of T3 hormone in women with Minimum body mass was 33 (2.96±1.16) with no significant variation (P>0.05). Moreover, the results demonstrated that the mean of T4 hormone level in women with Maximum body Mass was 32 (3.47±1.19), with no significant variation (P>0.05), while the mean level of serum T4 hormone in

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women with Minimum body mass was 33 (3.78±0.77) with a non-significant variation (P>0.05), Furthermore, the mean of serum TSH hormone level in women with Maximum body Mass was 32(2.21± 1.23), and the mean of serum TSH hormone level in women with minimum body mass was 32 (3.02±0.69) with highly significant variations (P<0.01), and the mean level of serum glucose in 32 Maximum body mass women was (3.28±2.21), while mean level of serum glucose in 33 women with Minimum body mass was (4.22±1.35) with a significant variation (P<0.05), as shown in table (4).

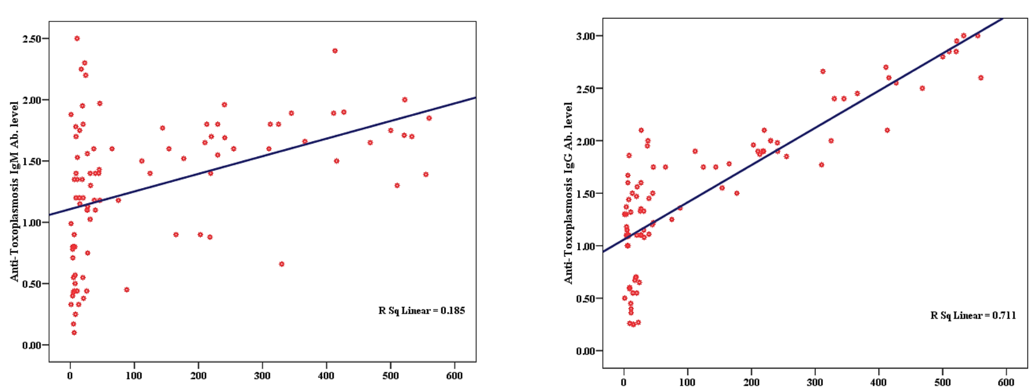
Table (4): The Mean levels of Thyroid and Diabetes mellitus hormones between Maximum and Minimum body Mass

Hormones	Obesity	N	Mean± Std.	t- test	P-Value	C.S
T3	Maximum body Mass	32	3.37±1.62	1.172	.246	P>0.05 (NS)
	Minimum body Mass	33	2.96±1.16			
T4	Maximum body Mass	32	3.47±1.19	1.246	.217	P>0.05 (NS)
	Minimum body Mass	33	3.78±0.77			
TSH	Maximum body Mass	32	2.21± 1.23	3.269	.002	P<0.01 (HS)
	Minimum body Mass	33	3.02±0.69			
Diabetes Mellitus	Maximum body Mass	32	3.28±2.21	2.087	.041	P<0.05 (S)
	Minimum body Mass	33	4.22±1.35			

Table 5 and Figure 1 showed that there was a highly significant correlation of TSH between Maximum and Minimum obesity.

Table (5): Correlation of TSH with Maximum and Minimum obesity

Thyroid	**Obese women**	**Maximum obesity**	**Minimum obesity**
TSH	R	0.431	0.843
	P-value	0.0001	0.0001
	Important	High important	High important



TSH level/Maximum body mass **TSH level/ Minimum body mass**
Figure 4.5 Correlation of TSH level with Maximum and Minimum obesity

4- DISCUSSION

Our results indicated that the mean age was (29.9 ± 0.988) in obese women. Hales, et al, (2020) reported that 43% of adults of 18 year age and more were overweighed and 16% suffered from obesity. In the year 2022, it was reported that 37 million children <5 years of age were over weighted, while more than 390 million adolescents and children of 5–19 year age were overweight, involving 160 million who lived with obesity [11]. The distribution of obesity in women have overweight, the Maximum body Mass between (90≥100 Kg) was 33(50.07%) in comparison with the controls 50 (100%) with highly sig. variation. P=0.001, and with the Minimum body Mass (75 ≥90 Kg), 32 (49.03%) in comparison with the controls 50 (100%) with highly significant variation (P=0.001). Pengpid, et al, (2022) revealed that 3.6% of their studied samples were underweight (BMI <18.5 Kg/m2), 30.8% were of normal weights (BMI = 18.5–24.9 Kg/m2), 31.8% were over weighted (BMI=25.0–29.9 Kg/m2) and 33.9% were obese (BMI ≥30.0 Kg/m2). In the adjusted multinomial logistic regression, it appeared that the age was (40–49) years in comparison with 18–39 year old [12]. The mean of T3 hormone was (3.17±1.41) in comparison with the controls (1.27±0.64) with a higher sig. variation (P<0.01), these findings agreed with (Sosa-López , at al, 2021) who found that the descriptive analysis of free T3 and total T3 level and T4/T3 ratio showed increased T3 levels with the increased obesity grade, and no correlation has been detected [13]. The mean of T4 hormone was (3.63±1.00) in comparison with the controls (3.86±1.72) with a non-significant variation (P>0.05). Staníková, et al, (2023) proved that BMI-SDS was highly significantly decreased in obese adolescent females, with a level lower than median FT4 in comparison with females who had higher than median FT4 levels at baselines [14]. The mean of diabetes was (3.76±1.87) compared to the controls (0.44±0.25) with significant variation (P<0.01). These results were in a harmony with (Forslund, et al., 2020) who explained that abdominal fat distributions and obesity in females suffering from PCOS in the mid-fertile years have been the main risk factors for developing T2-D after 24 years when their lifestyle's factors were comparable to the healthy control [15]. On the other hand, the mean of TSH hormone with Maximum body Mass was 32(2.21± 1.23) and the mean of TSH hormone level was 32 (3.02±0.69) with highly significant variation (P<0.01). Al Mohareb, et al, (2021) reported a positive relation between BMI & TSH with highly odd ratios of becoming obese with increased TSH and decreased FT3. Such alterations can be either associated or adaptive to the state of obesity [16]. Also the mean level of diabetes in 32 Maximum body mass women was (3.28±2.21), and in 33 Minimum body mass (4.22±1.35) with a significant difference P<0.05, these findings were matched with (Silveira, et al., 2020) who found that there is a very high increase in type 2 blood sugar levels in women with high weights and at very high rates [17]. Velluzzi, et al, (2022) detected an increase in TPOAb prevalence in a large numbers of obese people, attributing this relationship to possible results of the obesity-related immune and inflammatory changes in these patients' thyroid glands [66]. A highly prevalence of many autoimmune diseases with a growing obesity prevalence are present in the island of Sardinia. Therefore, studies on Sardinian people with obesity may reveal adequate statistical strength to explain any association between anthropometric data, thyroid autoimmunity and normal levels of TSH [18]. Biondi, et al, (2024) proved a decreased TSH receptor expression and changed deiodinase function was observed in the adipose tissues patients with obesity. The present data did not support the importance of pharmacological corrections of the isolated hyperthyrotropinemia in euthyroid people with obesity [19]. Kartal, et al., (2023) found an increased serum TSH could become reversible following hypocaloric diets or bariatric surgeries. However, obesity is related to high levels of leptin. Inflammation can increase Hashimoto thyroiditis risk, which raises the probability of that patients with obesity will experience subclinical or hypothyroidisms. Atherosclerosis, renal and liver diseases are associated with both metabolic syndrome and subclinical hypothyroidisms [20].

5- CONCLUSION

According to findings, there was a highly significant correlation of TSH between Maximum and Minimum obesity with increase in the mean level of diabetes in Maximum and Minimum body mass.

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تقييم مستويات هرمونات البنكرياس والغدة الدرقية لدى النساء البدينات

الخلاصة

تم انجاز هذه الدراسة على ٦٥ امراة سمينة اثناء مراجعهتن في مستشفى بغداد التعليمي وكذلك ٥٠ امراة ذات الوزن الطبيعي كمجموعة مسيطرة للفترة من شهر كانون الثاني ال شهر اب سنة ٢٠٢٤ .وقد اظهرت هذه النتائج ان معدل اعمار المرضى:

(0.988 ± 29.9) سنة منهم ٤٠ (٦١,٥%) من الريف مقابل ٢٥ (٣٨,٥%) من الحضر. لوحظ من قيمة التباين p=0.001 ل ٣٣(٥٠,٠٧%) و ٥٠(١٠٠%) للمرضى والمجموعة السيطرة على التوالي من النساء البدينات واللواتي قيمة BMوزن الجسم تتراوح (100 Kg≥٩٠). كان مستوى هرمون T3 في المصل ((P<0.01للمرضى (٣,١٧±١,٤١) و (١,٢٧±٠,٦٤) للمجموعة السيطرة، في حين كان مستوى هرمون (P>0.05) T4 للمرضى (٣,٦٣±١,٠٠) والمجموعة الضابطة (٣,٨٦±) ١,٧٢) وكان مستوى (P<0.01) TSHللمرضى (٢,٦٢±١,٠٧) ومجموعة السيطرة (١,١١ ± ٠,٩٤).كما أظهرت النتائج أن مستوى هرمون T4 لدى النساء ذوات الكتلة القصوى كان ٣٢ (٣,٤٧±١,١٩) مع ((P>0.05، بينما كان في الحد الأدنى من كتلة الجسم ٣٣ (٣,٧٨±٠,٧٧) مع (.(P>0.05علاوة على ذلك، بلغت مستويات هرمون TSH لدى النساء ٣٢ (٢,٢١±١,٢٣) و٣٢ (٣,٠٢±٠,٦٩) مع ((P <0.01لكل من الحد الأقصى والحد الأدنى لكتلة الجسم على التوالي وكان مستوى الجلوكوز في الدم لدى ٣٢ امرأة ذات كتلة الجسم القصوى (٣,٢٨±٢,٢١)، في حين كان ٣٣ لدى النساء ذوات الكتلة الدنيا (٤,٢٢±١,٣٥) مع (P<٠,٠٥).