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Study and evaluation of the relationship between thyroid hormones (T3, T4, and TSH) and obesity in patients residing in the western region of Iraq

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ABSTRACT

Thyroid hormones are important for weight, metabolism, appetite regulation, and energy production. Therefore, thyroid dysfunction and obesity are related issues. Obesity has been linked to metabolic disorders and weakened thyroid function. The present work seeks to ascertain the association between weight and thyroid hormone analysis results (triiodothyronine, thyroxine, and thyroid-stimulating hormone) in patients attending hospitals in the western Iraqi provinces of Fallujah, Karma, Anah, and Haditha. Blood samples were collected from patients from the four study regions. They comprised 40 samples from males, 98 samples from females, and seven samples from children under the age of 10 years. Results showed that 14 male patients, four of whom were obese and one was underweight, were suffering from the possibility of thyroid disease. A total of 65 female patients, 28 of whom were obese and one was underweight, were suffering from the possibility of thyroid disease. Among children under the age of 10 years, five, of whom three were obese and two were underweight, were suffering from the possibility of thyroid disease. This study showed that at a rate of 74.4%, females were more susceptible to thyroid disease than males and children. It also demonstrated that among the study areas, Karma was the most affected, with a rate of 53.3%. Several factors may cause an increase in the incidence of thyroid disease. They include genetic and psychological factors and the spread of factories and

Introduction

Of all the organs in the body, the thyroid has one of the highest blood flow rates per gram of tissue. The inferior and superior thyroid arteries are linked, providing the thyroid gland with a rich blood supply. Pituitary gland hormones control the endocrine secretion of the thyroid gland. The thyroid gland has two main functions. The thyroid gland's first function is to secrete hormones that maintain the ideal degree of metabolism in the tissues. The thyroid gland's second function is to secrete calcitonin, a hormone that controls the amount of circulating calcium.

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Thyrotropin-releasing hormone (TRH), which is released by the hypothalamus, stimulates the pituitary gland's secretion of thyroid-stimulating hormone (TSH).

Elevated free thyroxine (T4) and triiodothyronine (T3) block the release of TRH and TSH in a negative feedback loop. T4 and T3 secretion and iodine uptake thus decrease. TSH synthesis is also inhibited by other hormones, including glucocorticoids, dopamine, and somatostatin. [1]

The anterior pituitary produces the glycoprotein hormone TSH. TSH stimulates the receptors of thyroid cells to produce T3 and T4, which are then released into the bloodstream and exert a detrimental effect on the thyroid gland. When T3 and T4 levels are excessively high, TSH production ceases. Additionally, they stop the synthesis of TRH. [2] Free T4 and TSH tests are the

recommended initial tests to check for any thyroid abnormalities. These tests identify whether the anomaly originates centrally or peripherally from the pituitary gland (secondary), the thyroid gland (primary), or peripherally from the hypothalamus. When primary hypothyroidism is suspected, the thyroid gland is not releasing sufficient thyroid hormones. As a result, free T4 levels reduce and TSH levels suitably increase. In primary hyperthyroidism, TSH levels are adequately low, whereas free T4 levels are unusually elevated. [3]

In obese children, adults, and adolescents, TSH levels are positively connected with body mass index (BMI) and are either slightly elevated or at the upper limit of the normal range. The degree of obesity appears to be positively correlated with TSH. Thyroid hormone levels in patients with obesity have been reported to be normal, elevated, or reduced; this variation in research findings likely stems from the fact that patients are assessed at various points in time (while on an overindulgent or a hypocaloric diet), and their levels of obesity and plasma insulin sensitivity may vary. [4,5] Body weight loss is widely accepted to be associated with hyperthyroidism and body weight growth with hypothyroidism. [6,7]

The related changes in people with hypo- and hyperthyroidism constitute evidence that thyroid hormones are important regulators of energy balance. Through stimulating lipid catabolism, metabolic thermogenesis, and heat production, the metabolic effects of thyroid hormones are closely related to the systems controlling body weight balance and stimulating fat mass. Given that adipocytes are one of the primary target tissues of thyroid hormones, thyroid hormone metabolism and obesity are markedly correlated. In this particular context, a number of studies have indicated that thyroid dysfunction may serve as an obesity risk factor. Data also suggest that obesity may contribute to thyroid dysfunction. In light of these data, this review examines the relationship between obesity and thyroidal physiology and its underlying mechanisms. [3]

Thyroid disease is one of the most prevalent endocrine dysfunctions worldwide, particularly in women. This condition is linked to imbalances in female sex hormones, like estrogen, that considerably increase the likelihood of autoimmune thyroiditis in women. Given the uncertainty in their economic situation and its effect on their level of living, females are more likely than males to experience thyroid disorders. This situation is particularly true for Iraqi women, who are expected to take on greater home obligations than Iraqi men. [6]

Individuals with hyperthyroidism tend to lose weight because of adrenergic hyperstimulation that results in increased basal metabolism, thermogenesis, and total energy expenditure. Considering that hyperthyroidism is anorexigenic, it also occasionally causes anorexia and accelerated gastrointestinal transit. A medical disorder known as hypothyroidism occurs when thyroid hormone production by the thyroid gland is abnormally infrequent. It is usually linked to low metabolic activity. TSH, thyroid hormones, and BMI have a complex relationship, and hypothyroidism is linked to increases in body weight. Patients with hyperthyroidism experience a remarkable increase in weight as a result of thyroid medication. The opposite occurs in patients with hypothyroidism, indicating that thyroid hormones have an effect on changes in weight. Iodine shortage is the primary cause of hypothyroidism because it is a crucial component of thyroid hormones. [8]

Materials and Methods

This research was conducted in Anbar Governorate, the Republic of Iraq, from 1 August to 1 December 2023. Samples were collected from four areas: Al-Karma Hospital (100 samples) in Karma, Haditha Hospital (19 samples) in Haditha, Fallujah Hospital in Fallujah (16 samples), and Anah Hospital in Anah (10 samples) (Figure 1). The 145 samples were distributed and classified by age and gender (Tables 1, 2, 3 & 4). A total of 98 females with ages ranging between 1–80 years constituted the female sample. The male sample comprised 40 males with ages ranging from 1 year to 70 years. The children's sample included seven children with ages ranging from 1 year to 10 years. Kits for T3, T4, and TSH hormones from Nipigon Heath Corp Company, Ontario, Canada, were used. Serum was separated by utilizing a centrifuge and stored in the refrigerator until use. A Nipigon hormone analyzer (Nipigon Heath Corp Company, Model Robot_R1,

Ontario, Canada) was employed to measure the concentrations of T3, T4, and TSH.

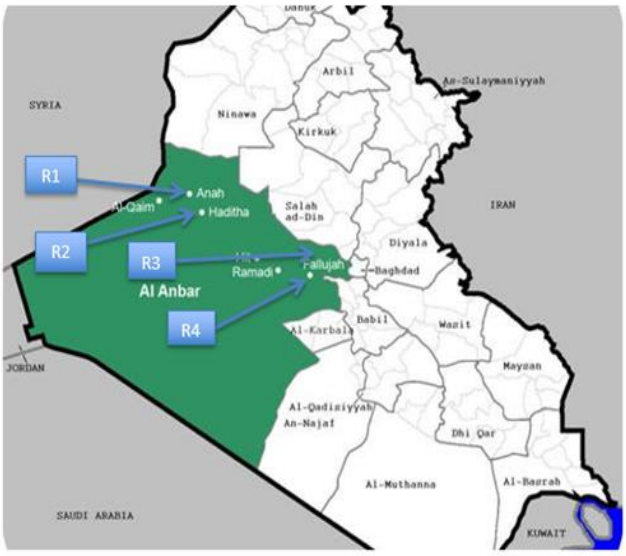

Figure 1. Map of Anbar Government, Iraq. R1: Anah Hospital. R2: Haditha Hospital. R3: Karma Hospital. R4: Fallujah Hospital.

Table 1. Samples classified by age and gender.

Region	Total samples	Male	Female	Children
Haditha	**19**	**3**	**15**	**1**
Fallujah	**16**	**4**	**11**	**1**
Anah	**10**	**1**	**8**	**1**
Karma	**100**	**32**	**64**	**4**
Total	**145**	**40**	**98**	**7**

Results and Discussion

This study aims to provide an overview of the existing literature describing the intricate connections among thyroid function (T4, T3, and TSH), age, and obesity. The normal ranges of T3, T4, and TSH are 0.8–2.2 ng/ml, 60–120 ng/ml, and 0.4–4.0 mIU/L, respectively.

In this research, the samples were divided into three main categories (males, females, and children). The 40 patients in the first main category (males, Table 2) visited the hospital and underwent thyroid hormone tests. The results showed the following:

- MF3, MK4, MK8, and MK27 (high TSH with normal T3 and T4) values: Patients may be suffering from subclinical hypothyroidism.
- MK-5, MK-14, and MK-23 (high T4 with normal TSH and T3) values: Patients could be suffering from primary hyperthyroidism.
- MK-15 and MK-31 (low T3 and T4 and high TSH) values: Patients could be suffering from primary hypothyroidism.
- MH-2, MH-2, and MH-4 (normal TSH and high T3 and T4) values: Patients could be suffering from hyperthyroidism.
- MH-3 (normal T3 and T4 and low TSH) values: Patients could be suffering from mild or early hyperthyroidism.
- MF1 (high TSH and T3 with normal T4) values: Patients could be suffering from thyroiditis (i.e., thyroid inflammation).

The second main category (females) included 98 patients (Table 3) who visited the hospital and underwent thyroid hormone tests. The results showed the following:

- FH3, FH12, FK1, FK2, FK4, FK20, FK22, FK27, FK30, FK37, FK38, FK39, FK45, FK48, FK50, FK57, FK60, FK55, and FK62 (normal T3 and T4 and high TSH) values: Patients could be suffering from subclinical hypothyroidism.
- FH-11, FH-14, FF-6, FF-9, FF-11, FA-2, and FK-53 (low T3 and T4 and high TSH) values: Patients may be suffering from primary hypothyroidism.
- FH4, FH7, and FF8 (low TSH with normal T3 and T4) values: Patients may be suffering from early or mild hyperthyroidism.
- FH5, FH6, FF2, FF4, FF7, FF10, FA4, FA5, FK10, FK13, FK15, FK19, FK28, FK32, and FK44 (high T3 and T4 with normal TSH) values: Patients may be suffering from hyperthyroidism.
- FH1, FH8, and FF3 (high T3 and T4 with low TSH) values: Patients may be suffering from hyperthyroidism.
- FH9, FH10 (low T4 with normal T3 and TSH) and FK56, FK63 (low T3 with normal T4 and TSH) values: Patients may be suffering from primary hypothyroidism.

The third main category (children) included seven patients (Table 4), who showed the possibility of suffering from thyroid disease. The results showed the following:

- CA1 (high T3 and T4 with low TSH): Patients may suffer from hyperthyroidism.
- CF1 (high T3 with normal T4 and TSH): Patients may suffer from hyperthyroidism.
- CK1 (high TSH with normal T3 and T4): Patients may suffer from subclinical hypothyroidism.
- CK2 (high T4 with normal T3 and TSH): Patients may suffer from hyperthyroidism.
- CK3 (low T3 with normal T4 and TSH): Patients may suffer from primary hypothyroidism.

However, the accuracy of the results may exhibit a certain error percentage due to several factors, including the effectiveness of the solutions and type of devices used to measure hormone levels. Several factors may cause a high incidence of thyroid disease. They include genetics, psychological state, the spread of factories, and the effects of wars.

The results obtained by applying the mathematical equation BMI = weight (kg)/height^2 (m) and weight limits for those under 19 years of age [15,16] (Table 3.1) showed that 14 out of 40 male patients may suffer from thyroid gland diseases. Of these patients, four who showed symptoms of thyroid disease were obese and only one was underweight. The results by regions are shown in Table 5.

The results indicated that among the female patients, 56 were suffering from possible thyroid disease, 28 were suffering from obesity, and only one was underweight. Their distributions in the regions under study are shown in Table 6. Among children under the age of 10 years, five of the seven patients visiting hospitals were suffering from the possibility of thyroid disease, with only one being obese and not suffering from thyroid disease. By contrast, three other patients were underweight, of whom two were likely to suffer from thyroid disease (Table 7).

The summary of the study results in Table 8 indicates that the region most affected by thyroid disease is Karma City, where 40 out of 75 patients (53.3%) had thyroid disease, and the least affected region was Anah City (5.3%). The results also indicated that females were more susceptible to thyroid disease than other patients, accounting for 56 cases of thyroid disease out of a total of 75 cases (74.4%). The lowest rate of thyroid disease was found in children and was 6.7%.

Table 2. Results of thyroid hormone analysis for male patients visiting hospitals in four regions. Blue: patient with thyroid disease, red: high results, yellow: low results, and violet: high weight.

TSH	T4	T3	Height	Weight	Age	Male	Regions	J
0.97	98.22	1.98	189	130	28	MH1	Ha	1
3.04	1.33	87.62	175	104	30	MH2		2
0.32	119.2	1.26	180	77	25	MH3		3
1.335	101.7	1.628	182	88	56	MA1	Anah	4
8	110	3.1	174	100	33	MF1	Fallujah	5
0.4	160	5.34	167	50	45	MF2		6
6	95	0.8	165	85	28	MF3		7
1	160	3.9	170	102	48	MF4		8
2.15	91.21	1.29	125	30	12	MK1	Karma	9
3.57	72.1	0.99	150	45	16	MK2		10
1.74	76.21	1.26	137	35	14	MK3		11
19.6	105.9	1.28	182	70	29	MK4		12
3.62	149.8	1.43	179	71	25	MK5		13
1.706	111.9	1.95	164	69	23	MK6		14
0.989	92.68	1.288	180	68	25	MK7		15
14.06	65.65	0.89	190	95	28	MK8		16
1.924	88.71	1.145	160	72	26	MK9		17
3.59	81.91	1.08	165	66	27	MK10		18
1.771	96.3	1.23	159	68	23	MK11		19
3.297	68.52	1.15	172	75	29	MK12		20
1.118	106.1	1.32	177	80	26	MK13		21
1.92	144	1.38	175	68	28	MK14		22
7.82	60.26	0.72	1.52	59	20	MK15		23
3.231	82.27	1.116	181	62	22	MK16		24
1.071	86.30	1.25	180	89	36	MK17		25
1.86	94.11	1.3	159	58	30	MK18		26
2.91	83.76	1.35	170	76	39	MK19		27
3	67.81	1.18	172	69	32	MK20		28
1.686	107	1.36	182	77	38	MK21		29
3.7	80.95	1.163	180	73	30	MK22		30
1.964	138.8	1.482	182	84	39	MK23		31
2.018	82.77	1.239	185	87	39	MK24		32
1.318	65.15	1.154	165	67	44	MK25		33
3.92	102	1.027	178	87	42	MK26		34
6.325	89.08	0.97	166	73	45	MK27		35
0.8	59.5	1.13	175	94	50	MK28		36
1.7	75.03	1.34	169	75	60	MK29		37
1.8	75.92	0.82	195	92	70	MK30		38
11.8	56.6	2.4	185	80	45	MK31		39
2.08	92.37	1.8	175	65	32	MK32		40

Table 3. Results of thyroid hormone analysis for female patients visiting hospitals in four regions. Blue: patients with thyroid disease, red: high results, yellow: low results, and violet: high weight.

TSH	T4	T3	Height	Weight	Age	Female	Regions	No.
0.37	122.13	0.37	162	100	60	FH1	Haditha	1
0.8	122.3	0.37	156	85	62	FH2		2
6.32	69.64	2.2	154	36	47	FH3		3
0.09	85.2	1.98	155	70	78	FH4		4
2.26	138.67	2.21	160	93	43	FH5		5
3.75	109.75	2.22	158	80	45	FH6		6
0.2	112.23	1.78	160	95	53	FH7		7
0.08	350	7.6	157	57	79	FH8		8
0.4	11.8	0.95	155	80	30	FH9		9
0.51	10.8	0.9	154	49	28	FH10		10
14.04	6.5	0.7	163	95	35	FH11		11
5.12	110.36	2.3	163	105	38	FH12		12
1.01	93.75	1.28	160	96	37	FH13		13
34.19	55.39	1.751	165	111	33	FH14		14
4.8	301	1.7	155	57	26	FF1	Fallujah	15
2.1	188	1.79	158	60	12	FF2		16
0.1	157	0.18	157	80	36	FF3		17
1.8	138	2.1	154	55	46	FF4		18
11.8	144	3.2	155	107	25	FF5		19
23.8	32	0.9	157	127	40	FF6		20
1.4	120	2.6	156	64	23	FF7		21
0.09	190	2.3	158	94	35	FF8		22
8	35	1	155	85	50	FF9		23
1.99	74.7	3.39	154	47	20	FF10		24
13.7	43	0.8	159	92	44	FF11		25
1.335	101.7	1.628	155	45	28	FA1	Anah	26
34.19	55.39	1.751	156	80	47	FA2		27
1.711	103.5	1.433	158	75	22	FA3		28
0.555	132.4	2.158	154	80	45	FA4		29
1.324	120.3	2.339	155	70	42	FA5		30
1.876	107.4	1.797	154	45	29	FA6		31
2.597	114.8	2.036	157	55	41	FA7		32
1.55	91.83	1.45	170	60	31	FA8		33
4.52	85.1	1.39	150	53	19	FK1	Karma	34
5.62	81.51	1.56	110	32	13	FK2		35
3.81	101	1.72	120	25	11	FK3		36
9.338	71.62	1.382	140	39	16	FK4		37
3.518	84.44	1.257	135	41	14	FK5		38
1.58	55.14	1.009	170	60	27	FK6		39
2.55	89.8	1.133	167	59	23	FK7		40
1.82	98.42	1.31	161	52	21	FK8		41
2.38	81.93	1.14	157	53	20	FK9		42
0.86	32	0.95	155	67	23	FK10		43
1.45	76.72	1.23	165	66	23	FK11		44
0.654	91.52	1.204	159	65	23	FK12		45
1.283	156.5	1.379	173	67	22	FK13		46
2.586	71.02	0.959	175	77	24	FK14		47
2.39	135.1	1.52	160	58	25	FK15		48
1.46	87	1.11	156	64	21	FK16		49
2.221	98.11	1.42	173	70	28	FK17		50
0.882	108.1	1.255	168	76	27	FK18		51
1.302	125.6	1.375	162	66	24	FK19		52
4.84	81.11	1.13	161	73	27	FK20		53
2.67	59.03	1.21	157	64	30	FK21		54
12.23	77.5	1.25	170	95	30	FK22		55
2.55	79.4	1.19	180	78	37	FK23		56
1.629	83.67	1.596	175	68	33	FK24		57
2.13	82.71	1.31	168	78	38	FK25		58
1.66	119.3	1.37	166	68	32	FK26		69
4.33	78.44	1.406	178	88	33	FK27		60
1.964	157.1	1.264	163	75	31	FK28		61
0.77	95.7	1.37	164	79	38	FK29		62
4.1	88.91	1.104	170	79	37	FK30		63
1.82	71.82	1.256	166	69	36	FK31		64
2.113	200.1	1.46	163	87	35	FK32		65
2.22	62.6	0.87	166	82	36	FK33		66
2.29	57.4	1.05	173	69	35	FK34		67
1.32	94.12	1.13	172	86	36	FK35		68
2.189	66.23	0.925	174	69	37	FK36		69
8.57	120.1	1.42	172	90	37	FK37		70
5.234	75.02	0.924	175	79	38	FK38		71
4.132	105.6	1.083	168	77	40	FK39		72
3.92	62.3	1.12	172	97	45	FK40		73
3.56	77.05	1.57	170	90	48	FK41		74
3.34	54.33	0.99	178	95	48	FK42		75
1.304	101.4	1.114	168	83	45	FK43		76
2.54	124.1	1.343	158	59	40	FK44		77
8.212	75.35	0.928	188	78	40	FK45		78
1.44	98.29	1.25	173	101	48	FK46		89
1.726	77.99	0.99	171	82	40	FK47		80
4.509	78.69	1.148	169	90	50	FK48		81
1.207	84.76	1.239	166	89	55	FK49		82
4.41	81.21	0.989	174	88	52	FK50		83
2.26	77.86	1.21	163	88	50	FK51		84
2.708	77.74	1.234	174	85	54	FK52		85
95.65	27.02	0.804	166	97	50	FK53		86
1.68	73.65	1.001	174	98	56	FK54		87
4.2	103.1	1.22	167	94	53	FK55		88
0.417	94.91	0.759	172	92	53	FK56		99
5.695	66.63	1.059	170	87	58	FK57		90
1.67	83.2	1.322	172	81	65	FK58		91
1.65	74.95	1.058	172	82	68	FK59		92
5.692	65.05	1.26	171	89	60	FK60		93
2.06	91.42	1.06	169	89	60	FK61		94
4.88	67.72	1.26	170	95	60	FK62		95
3.128	40.76	0.688	176	87	68	FK63		96
3.17	77.96	1.033	168	97	72	FK64		97

Table 4. Results of thyroid hormone analysis for children visiting hospitals in four regions. Blue: patient with thyroid disease, red: high results, yellow: low results, and violet: high weight.

TSH	T4	T3	Length	Weight	Age	Children	Regions	ت
0.156	132.2	2.613	75	11	8	CA1	Anah	1
0.7	98	7.9	100	19	5	CF1	Fallujah	2
1.74	97.26	1.02	73	12	1	CH1	Haditha	3
4.52	64.81	1.42	90	20	9	CK1	KARMA	4
3.75	157.6	1.77	60	15	4	CK2		5
2.92	63.61	0.73	80	34	8	CK3		6
1.704	113.9	1.49	60	9	3	CK4		7

Table 5. Number of patients (male) with thyroid disease distributed by region, gender, and obesity status.

Region	Referred patients (male)	Patients with thyroid disease	Patients suffering from obesity	Patients suffering from weight loss
Karma	32	8	0	0
Fallujah	4	4	3	1
Haditha	3	2	1	0
Anah	1	0	0	0
Total	40	14	4	1
%		35	10	2.5

Table 6. Number of patients (female) with thyroid disease distributed by region, gender, and obesity.

Region	Referred patients (female)	Patients with thyroid disease	Patients suffering from obesity	Patients suffering from weight loss
Karma	64	29	12	0
Fallujah	11	11	6	0
Haditha	14	13	8	1
Anah	8	3	2	0
Total	97	56	28	1
%		57.7	28.8	1

Table 7. Number of patients (children) with thyroid disease distributed by region, gender, and obesity status.

Region	Referred patients (children)	Patients with thyroid disease	Patients suffering from obesity	Patients suffering from weight loss
Karma	4	3	0	1
Fallujah	1	1	0	0
Haditha	1	0	0	0
Anah	1	1	0	1
Total	7	5	0	2
%		71.4	0	28.6

Table 8. Number of patients with thyroid disease distributed by region and gender.

Region	No. of females	No. of males	No. of children	Total	%
Karma	29	8	3	40	53.3
Fallujah	11	4	1	16	21.3
Haditha	13	2	0	15	20
Anah	3	0	1	4	5.3
Total	56	14	5	75	
%	74.7	18.6	6.7		

Thyroid hormone dysfunction and obesity are two related medical conditions that could have substantial adverse effects on a person's general health. The thyroid gland produces the thyroid hormones T3 and T4, which are essential for controlling weight, metabolism, and energy levels. Thyroid hormones affect how much energy is used by controlling the resting metabolic rate, cellular respiration, and thermogenesis. T3 affects appetite regulation via the central nervous system, primarily the hypothalamus, and affects lipid turnover in adipocytes. By controlling lipolysis and lipogenesis, TSH can also affect thermogenesis, reduce hunger, and manage lipid storage. Obesity can affect thyroid function through multiple processes, including lipotoxicity, adipokine alterations, and inflammatory cytokine secretion. Subclinical hypothyroidism can also provoke changes in basal metabolic rate, leading to an increase in BMI. The body's metabolic rate, which dictates how quickly or slowly chemical reactions occur in cells to maintain energy balance, is regulated by thyroid hormones. Effective calorie burning, fat oxidation, and glucose uptake in tissues are all guaranteed by an adequate quantity of thyroid hormones. Hypothyroidism, or insufficient hormone production, slows down metabolic processes and causes fatigue, weight gain, and cold sensitivity. Conversely, hyperthyroidism, or the overproduction of hormones, accelerates metabolism and results in inadvertent weight loss, increased appetite, and heat sensitivity. [3,9] By boosting inflammation and changing hormone metabolism, obesity could have a deleterious effect on thyroid function, and the proinflammatory cytokines released by excess adipose tissue (body fat) can hamper the production and conversion of thyroid hormones. Relative hypothyroidism may result from this process even in cases where blood hormone levels seem normal. Moreover, obesity is linked to increased levels of leptin, a hormone that controls appetite and energy expenditure and is produced by adipose tissue. Increased leptin levels could exacerbate metabolic imbalances by making the body resistant to thyroid hormones. [3]

Conclusion

Hormones play the main role in regulating the occurrence of chemical reactions in cells, and the thyroid hormones T3 and T4 crucially control the regulation of metabolism, weight, and energy levels in

the body. Obesity and thyroid hormone imbalance, which can remarkably affect an individual's overall health, are interconnected. Obesity can negatively affect thyroid function by increasing inflammation and altering hormone metabolism. The results of this study showed the possibility of the presence of factors other than obesity that led to the incidence of thyroid disease, including genetics, societal conditions, and others. They also demonstrated that the incidence of thyroid disease in females is greater than in males and children in the regions under study.

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دراسة وتقييم العلاقة بين هرمونات الغدة الدرقيه (T3,T4,TSH) والسمنه لمرضى سكان المنطقة الغربية–العراق

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الخلاصة:

السمنة واختلال وظائف الغدة الدرقية هي مشكلتان مترابطتان اذ تلعب هرمونات الغدة الدرقية دورا رئيسيا في التمثيل الغذائي والوزن وانتاج الطاقة وتنظيم الشهية، ويمكن ان تساهم السمنة في اظعاف وظيفة الغدة الدرقية واحداث اضطرابات في التمثيل الغذائي. هدفت الدراسة الحالية الى تحديد العلاقة بين نتائج تحليل هرمونات الغدة الدرقيه (T4,T3) و (TSH)والوزن لدى المرضى المراجعين لمستشفيات مناطق الكرمة والفلوجة وحديثة وعنه في المنطقة الغربية من العراق. تم اخذ عينات الدم من المرضى بواقع 40 عينة من الذكور و98 عينة من الاناث و7 عينات للأطفال دون سن العاشرة من مناطق الدراسة الاربعة. بينت النتائج ان 14 مريضا من الذكور كانوا يعانون من احتمالية الاصابة بامراض الغدة الدرقية اربعة منهم يعانون من السمنة ومريض واحد يعاني من نقص الوزن، وان 65 مريضا من الاناث كن يعانين من احتمالية الاصابة بامراض الغدة الدرقية 28 منهن يعانين من السمنة وواحدة تعاني من نقص الوزن، اما بالنسبة للاطفال دون سن العاشرة فقد كان 5 منهم يعاني من احتمالية الاصابة بامراض الغدة الدرقية كان 3 منهم يعانون من السمنة واثنان من نقص الوزن. لقد بينت الدراسة ان الاناث أكثر تعرضا لاحتمالية الاصابة بامراض الغدة الدرقية بنسبة 74.4%، كما بينت الدراسة ايضا منطقة الكرمة هي الاكثر تضررا بنسبة 53.3%. هناك عدة عوامل قد تكون سببا في ارتفاع الاصابت بامراض الغدة الدرقية منها الوراثية والنفسية وانتشار المصانع والحروب.

الكلمات المفتاحية: مؤشر كتلة الجسم، جهاز نيبيكون لتحليل الهرمونات، السمنة، هرمونات الغدة الدرقية.