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The relation between oral health and body mass index among women with hyperthyroidism

Eman Habib Kadhom (MSc)[1], Nada Jafer MH. Radhi (PhD)[2]
[1,2] College of Dentistry, University of Baghdad, Baghdad, Iraq

Abstract

Background: Hyperthyroidism is a medical condition in which excessive synthesis and secretion of thyroid hormones into the blood. According to multiple research, hyperthyroidism is linked to weight loss and increased metabolism.
Objective: To assess how hyperthyroidism affects oral health in relation to body mass index.
Patients and Methods: The sample was composed of 90 female patients aged 25-45 years include hyperthyroid group and healthy group, the hyperthyroid patients were diagnosed by specialist and under treatment with carbimazole.Clinical evaluation of caries was done according to World Health Organization(2013). The body mass index was measured from the patient's weight and height, according to the formula World Health Organization(2000). Plaque Index of Silness and Löe was used to evaluate dental plaque (1964),Using the gingival index of Loe and Silness the gingival inflammation was evaluated (1963).
Results: Found the Body mass index in the hyperthyroid group was higher than the healthy group with significant difference. The most correlations between caries and body mass index in the hyperthyroid group were weak negative not significant while in the healthy group most correlations were weak positive not significant, the correlations of Gingival index and body mass index were weak positive not significant in both groups.The plaque index had weak negative in hyperthyroid while in control positive correlation and all correlation were not significant.
Conclusion: In the present study,the Body mass index higher among women with hyperthyroidism under treatment with carbimazole and the correlation between caries experience and body mass index was negative and not significant.
Keywords: Body mass index, Carbimazole, Dental caries, Hyperthyroidism, Gingival index, Plaque index.

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Correspondence Address: Eman Habib Kadhom
College of Dentistry, University of Baghdad, Baghdad, Iraq
Email: imanwitwit94@gmail.com

Website: https://djm.uodiyala.edu.iq/index.php/djm

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Introduction

Thyroid hormones regulate thermogenesis, glucose and lipid metabolism, making them a crucial aspect in managing mammalian dynamic energy balance. The effects of hypo- or hyperthyroidism on body weight have long been studied; hyperthyroidism is frequently associated with increased energy expenditure and weight loss. However, the association between thyroid function and body weight is not well understood [1]. Therapy for hyperthyroid patients depends on the underlying cause, treatment strategies include

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antithyroid drugs, radioactive iodine, thyroid surgery, and medications for symptom control [2]. Thyroid disorders can cause Malnutrition or the presence of numerous nutritional deficiencies in a patient's body. Nutrient deficiencies that usually observed are protein deficiencies, some vitamins and mineral deficiencies. Proper diet helps to reduce the symptoms of the disease, maintains a healthy weight and prevents the occurrence of malnutrition. Anthropometric, biochemical and physicochemical parameters are used to assess the nutritional status during the diagnosis and treatment of thyroid diseases. hyperthyroidism is often afflicted with rapid weight loss [3]. Due to the long-standing association between hyperthyroidism and weight loss, underweight patients with hyperthyroidism experience adrenergic hyper stimulation, increased basal metabolism and thermogenesis, and a higher overall energy expenditure, all of which contribute to a tendency toward weight loss [4, 5]. In study was collected information on BMI and hormone levels before and after thyroid function had returned to normal over the course of a 12-month follow-up. On completion of treatment, weight gain was seen in the hyperthyroidism patient group. Another study support that fact the higher energy consumption at rest brought on by hyperthyroidism causes a reduction in the body's lean and fat mass, which results in weight loss [6]. After starting antithyroid medication therapy and becoming euthyroid, another study indicated that individuals continued to gain weight for up to 9 months [7]. Another study found Patients with hyperthyroidism predominantly had decreased lean body mass but after treatment with carbimazole increased after achievement of euthyroidism [8]. As far as There were no studies conducting the correlation between BMI with dental caries and gingival health in hyperthyroid patients. Dental caries a chronic multifactorial disease and vitally needs to be studied in these patients. Increased susceptibility to caries and periodontal disease are two potential oral symptoms [9]. Nutritional status has local and systemic effect in the etiology and pathogenesis of dental caries [10, 11]. The oral cavity can affect one's ability to consume a sufficient food and attain nutrient balance, but the opposite is also true: nutrition and diet can affect the oral cavity, and vice versa [12, 13]. In study found that individuals with overweight and obesity experience more issues with the gingival health compared to normal weight individuals in an Iraqi population [14]. Therefore, the purpose of this study was to investigate the association between BMI with dental caries and gingival health in hyperthyroidism females.

Patients and Methods

The sample was composed of 90 female aged 25-45 years attending an endocrine disorder center in Al- Sader Medical City in al-Najaf Governorate/Iraq. The study conducted from December -2021 to May -2022. The sample include two group each group consist of 45 females. The patients group, including hyperthyroid female patients while the control group contain 45 healthy females, the hyperthyroid patients were diagnosed by specialist and under treatment with carbimazole, the study group included female patients diagnosed with hyperthyroidism one year ago and more. A

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Ministry of Health authorization was gained. Additionally, Prestudy data from medical records were used to determine the type of thyroid malfunction, how long the patient had been ill, the drugs they were taking, and their medical history. For this study, the samples had to meet the following requirements: they shouldn't have had any other systemic illnesses, they shouldn't have been taking any other medications rather than those for thyroid dysfunction, and they shouldn't have been pregnant or smokers. Method of randomization was simple randomization method. According to WHO (2013) [36]guidelines, examinations were conducted on each patient under standardized circumstances. Dental plaque thickness adjacent to the gingival margin was assessed using plaque index (PLI) of Silness and Löe (1964) [15], The gingival inflammation was examined and recorded according to gingival index (GI) of Loe and Silness (1964) [16] by using periodontal probe, the general information, which included name, age, gender, and dental and medical histories, was entered on a particular form before the examination so personal file contained information was registered. Each patient was inspected in an appropriate chair with a headrest and artificial headlight. By using the digital weight scale , body mass index was measured from the patient's weight and height, according to the formula (WHO, 2000)[34]:-

BMI=Weight (Kg) /Height (m2)

BMI was measured according to World Health Organization (WHO, 2006) [35] as follow:-

- Underweight BMI < 18.5
- Normal BMI 18.5- 24
- Overweight BMI 24-30
- Obese BMI > 30

Statistical Analysis

The Statistical Package for Social Science was used to describe and analyze the data (SPSS version -22, Chicago, Illionis, USA). P value of ≤ 0.05 was considered as statistically significant.

Results

Table (1) the distribution of BMI, the healthy subjects found in the control group more than in the study group , the obese were more in the study than those in the control group.

Table (1): Distribution of body mass index among the study groups

Groups		N.	%
Study	Underweight	1	2.22
	Healthy	11	24.44
	Overweight	17	37.78
	Obese	16	35.56
Control	Healthy	21	46.66
	Overweight	16	35.56
	Obese	8	17.78

In table (2) The results found the BMI in the study group is higher than control with significant difference (P<0.05).

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Table (2): body mass index (mean ±SE) and statistical difference among the study and control groups

Groups	Mean	±SE	T test	P value
Study	28.074	0.697	2.217	0.029 Sig.
Control	26.038	0.599		

Table (3) ,there were weak negative and not significant correlations between caries experience and body mass index in the study group except MS and DMFS were weak positive not significant while in the control group the correlations were weak positive not significant except FS was weak negative not significant.

Table (3): Correlation between Body mass index and caries experience

Groups		Body mass index	
		r	p
Study	Decay surface	-0.093	0.541
	Missing surface	0.133	0.384
	Filling surface	-0.102	0.506
	DMFS	0.054	0.723
	DMFT	-0.164	0.283
Control	Decay surface	0.187	0.218
	Missing surface	0.104	0.497
	Filling surface	-0.163	0.284
	DMFS	0.115	0.451
	DMFT	0.230	0.129

* DMFS=Decay Missing Filling surface *DMFT = Decay Missing Filling tooth
* significant at p<0.05

In table (4) there were weak positive not significant correlations between GI and BMI in both groups. The PLI had weak negative in study while in control positive correlation and all correlation were not significant.

Table (4): Correlation of the body mass index and Plaque index and Gingival index

Groups		Plaque index		Gingival index	
		r	p	r	p
study	Body mass index	-0.156	0.305	0.046	0.763
control	Body mass index	0.039	0.801	0.011	0.944

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Discussion

The oral cavity can affect one's ability to consume a sufficient food and attain nutrient balance, but the opposite is also true: nutrition and diet can affect the oral cavity, and vice versa [12, 13].

In the present study, the index used in recording dental caries experience was DMFS/T index it measures caries in term of surfaces and teeth according to WHO (2013). In previous studies found increase of dental caries among hyperthyroid group compare to normal control group [17, 18].

The results of present study found the BMI in the study group is higher than that in the control with significant difference ($P<0.05$). Patients with thyroid dysfunction commonly experience changes in metabolic parameters that impact adipocyte activity and fat mass. Weight loss, a decline in fat and muscle mass, and thyrotoxicosis are all related to obesity. Depletion in lipid storage and reduction of some serum lipids are typical findings in these patients [19, 20].

While the findings of the present investigation indicated that BMI was higher and significantly different despite the presence of hyperthyroidism, it may be because the patient was taking anti-thyroid medications, which have the opposite effect of raising BMI. Some patients may have developed an eating disorder as a result of long-term usage of medications [7, 21]. That agree with study noticed When treated with antithyroid medicine, patients with thyrotoxicosis, especially those with Graves' disease, gain weight for up to nine months after reaching euthyroid condition [7]. Another study Prospective and retrospective case series so at the time of diagnosis and after receiving the necessary therapy, they looked at how hypo- and hyperthyroidism affected patients' weight and BMI. patients with hyperthyroidism do lose weight, and they continue to do so for several months after beginning their therapy [22]. The possible cause include a changes in the release of adipocytokines in the metabolic disturbances that frequently accompany thyroid dysfunction [8, 23,24,25]. Changes in adipose tissue, muscular mass, body weight, and appetite are brought on by thyroid dysfunction. Patients with thyroid dysfunction are more likely to present with high rates of insulin resistance, type 2 diabetes, and cardiovascular illnesses in addition to the typical clinical symptoms that are directly related to thyroid hormones and TSH [26,27,28,29].

In present study there were weak negative and not significant correlations between caries experience and body mass index in the hyperthyroid group. In 2022 study investigated the relation between BMI and dental caries and there was a positive association evident between the BMI and dental caries in healthy individual [30]. In present study investigated this relation in hyperthyroid patients, the result found weak negative and not significant correlations between caries experience and BMI in hyperthyroid group while in the healthy group the correlation was weak positive not significant. It is unclear how the relationship between dental caries and BMI is negatively correlated and there is no previous study in order to compare with and the correlation was not significant. The dental caries process

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is a longstanding process and multifactorial disease and BMI changes rely on thyroid patients' hormonal changes and may the treatment have an impact on their nutritional status and that indicate there was no link between the dental caries and BMI in these individuals. In some studies investigated this link but in healthy individual, also found no link between BMI and dental caries [31, 32]. Another study found that nutritional status is a relative factor; may affect the oral cleanliness and gingival health [33]. Furthermore, oral hygiene and preventive care are required and should be emphasized through dental care programs.

Conclusions

According to the findings of the current study, carbimazole-treated women with hyperthyroidism had body mass indices that were higher than average, and there was no significant link between their body mass index and their experience with caries. Finally, we could not demonstrate any significant differences between BMI with GI and PLI among patients and controls groups.

Recommendations

In hyperthyroid patients after treatment and normalization of thyroid function have statistically significant changes in BMI, so need for regular check out to maintain healthy weight in normal range.

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Conflict of interest: Nil

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العلاقة بين صحة الفم ومؤشر كتلة الجسم لدى النساء المصابات بفرط نشاط الغدة الدرقية

ايمان حبيب كاظم[١]، ندى جعفر محمد راضي[٢]

الملخص

خلفية الدراسة: فرط نشاط الغدة الدرقية هو حالة طبية يحدث فيها فرط إفراز هرمونات الغدة الدرقية (ثلاثي يودوثيرونين [T3] و / أو هرمون الغدة الدرقيةT4) في الدم. يُعرف هرمون الغدة الدرقية بقدرته على التحكم في التمثيل الغذائي والنمو والعديد من وظائف الجسم الأخرى. زيادة التعرض للتسوس وأمراض اللثة هما عرضان محتملان في الفم. وفقا لبحوث متعددة فرط نشاط الغدة الدرقية المرتبط بفقدان الوزن وتقليل الدهون وكتلة العضلات. لم يتم تحديد العلاقة بين وظيفة الغدة الدرقية ووزن الجسم بشكل كامل.

اهداف الدراسة: لتقييم تأثير فرط نشاط الغدة الدرقية على تسوس الأسنان فيما يتعلق بمؤشر كتلة الجسم.

المرضى والطرائق: تتكون العينة من ٩٠ مريضة تتراوح أعمارهن بين ٢٥-٤٥ سنة في مركز اضطرابات الغدد الصماء في محافظة النجف / العراق والتي تضم مجموعة فرط نشاط الغدة الدرقية ومجموعة بدون هذا المرض، وتم تشخيص مرضى فرط نشاط الغدة الدرقية من قبل أخصائي وتحت علاج كاربيمازول. تم إجراء الفحص السريري وتقييم صحة الفم وفقًا لـ (منظمة الصحة العالمية، ٢٠١٣). تم قياس مؤشر كتلة الجسم من وزن المريض وطوله حسب الصيغة (منظمة الصحة العالمية، ٢٠٠٠). تم تقييم dental plque باستخدام مؤشر البلاك (PLI) من Silness و Löe (١٩٦٤) ، وتم فحص وتسجيل التهاب اللثة وفقًا لمؤشر اللثة (GI) لـ Loe and Silness (١٩٦٣).

النتائج: وجد أن مؤشر كتلة الجسم في مجموعة المرض كان أعلى من المجموعة خالية من المرض مع اختلاف معنوي. كانت هناك ارتباطات سلبية ضعيفة وغير معنوية بين تجربة التسوس ومؤشر كتلة الجسم في مجموعة المرض باستثناء MS وDMFs كانت ضعيفة إيجابية غير معنوية بينما في المجموعة الضابطة كانت الارتباطات ضعيفة إيجابية غير معنوية باستثناء FS كانت ضعيفة سلبية غير معنوية. كان هناك ارتباط ضعيف موجب غير معنوي بين GI وBMI في كلا المجموعتين. كان لدى PLI سلبي ضعيف في المرض بينما كان الارتباط الإيجابي في المجموعة خالية من المرض وجميع الارتباط غير معنوي.

الاستنتاجات: في هذه الدراسة، وجدت النتائج أن مؤشر كتلة الجسم أعلى بين النساء المصابات بفرط نشاط الغدة الدرقية تحت العلاج بالكاربيمازول وأن الارتباط بين تجربة التسوس ومؤشر كتلة الجسم كان سلبياً وليسهنالك اختلاف معنوي.

الكلمات المفتاحية: استئصال الغدة الدرقية ، صرير ، بحة في الصوت

البريد الالكتروني: imanwitwit94@gmail.com

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تاريخ قبول البحث: ٢٤ كانون الثاني ٢٠٢٣

[٢،١] كلية طب الأسنان ، جامعة بغداد - بغداد - العراق