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The Prevelance of hypothyroidism among patients with type 2 diabetes in Najaf Al-Ashraf Governorate. A survey study

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شكر وتقدير

الحمد والشكر لله على نعمة انجاز البحث كما أتقدم بجزيل الشكر والامتنان لمشرفتي الدكتورة سارة حسن كاظم على دعمها ونصائحها وتوجيهها وتشجيعها اثناء فترة إعداد هذه الدراسة. كما أتقدم بالشكر الجزيل لقسم صحة المجتمع وجامعة الفرات الأوسط على تسهيلهما لي لإتمام هذه الدراسة . وأتقدم بجزيل الشكر لكل من ساهم بانجاز هذا العمل

إهداء

إلى الدكتورة سارة حسن كاظم بكل حب وتقدير، أتقدم إليكم بأسمى آيات الشكر والامتنان على دعمكم وتوجيهكم المتواصل الذي كان حجر الأساس في هذا البحث. كنتم قدوة لي في العلم والتفاني، فكل كلمة تعلمتها وكل نصيحة قدمتموها كان لها أثر كبير في تطوير قدراتي. وحققت هذا الإنجاز. شكرًا لحرصكم الدائم على نجاحنا، وإيمانكم بقدراتنا الذي حفزنا على الاستمرار والتقدم. هذا الإهداء ما هو إلا تعبير بسيط عن امتناني الكبير لكم ولكل ما قدمتموه لي في مسيرتي العلمية

اقرار المشرف

اني (د. سارة حسن) المشرف على البحث

The Prevelance of hypothyroidism among patients with type 2 diabetes in Najaf Al-Ashraf Governorate. A survey study

المعد من قبل الطلبة اعلاه في قسم تقنيات صحة مجتمع في المعهد التقني كوفة جامعة الفرات الاوسط التقنية قد اطلعت على البحث والذي اجري تحت اشرافي وهو جزء من متطلبات نيل شهادة الدبلوم التقني في تقنيات صحة مجتمع

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بناءا على توصيه المقدمة من قبل المشرف ارشح هذا البحث

The Prevelance of hypothyroidism among patients with type 2 diabetes in Najaf Al-Ashraf Governorate. A survey study

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Abstract

Type 2 diabetes mellitus (T2DM) has an intersecting underlying pathology with thyroid dysfunction. This was a Survey study of Sixty patients admitted to Najaf Center for Diabetes and Endocrinology in Al-Sadr Medical City Hospital. The data were collecting during a period between January 2025 to March 2025 . Median age of the patients was 50 years (interquartile range, 35- 60), including 8 men and 52 women. The results collected from the patients coming to the center showed that approximately 30% percent of diabetic patients had later developed hypothyroidism, while approximately 70% percent did not develop hyperactivity, in addition to that women in the age group between 45-50 years were the most Diabetes and hypoactivity of the thyroid gland, which may be due to the decreasing of hormones in women, which may be disturbed after the interruption of the menstrual cycle, in addition to that it has been disturbed due to previous pregnancies and childbirth, especially the hormones regulating body functions and the level of sugar in the blood, in addition to that with age, catabolism increases, and this would It affects the occurrence of disorders in the cells that produce this hormone.

Keywords: Diabetes, Hypothyroidism, Insuline, Thyroid hormones

Chapter One
Introduction

Introduction

Diabetes mellitus (DM) is a disease of inadequate control of blood levels of glucose. It has many subclassifications, including type 1, type 2, maturity-onset diabetes of the young (MODY), gestational diabetes, neonatal diabetes, and steroid-induced diabetes. Type 1 and 2 DM are the main subtypes, each with different pathophysiology, presentation, and management, but both have a potential for hyperglycemia (Rajaei *et al*.,2019).

T2DM owes its pathological origin to inappropriate secretion of insulin, due to defective islet cell function or beta cell mass. Continuous consumption of calories-rich meals, junk food and sedentary lifestyle have culminated into an epidemic of diabetes projected to afflict around 300 million people across the globe by 2020 (Baxter et al.,2020) . Defective insulin secretion leads to various metabolic aberrations in T2DM, spanning from hyperglycemia due to defective insulin-stimulated glucose uptake and upregulated hepatic glucose production, along with dyslipidaemia, which includes impaired homeostasis of fatty acids, triglycerides, and lipoproteins (Baxter and Webb ,2009).The human pancreas is basically composed of two types of secretory cells that are both involved in nutrient handling: 98% of the cells- the exocrine type – secrete a foodprocessing enzyme-bicarbonate mixture into the duodenum, while the remaining 2% - the endocrine type- have a metabolic function and secrete a mixture of nutrient-generated hormones into the portal vein. This small endocrine part is of vital importance in maintaining glucose homeostasis through the action of the 51-amino acid peptide insulin. Four endocrine cell types can be distinguished: A cells (alpha), B cells (beta), D cells (delta) and PP cells (pancreatic polypeptide) (Klöppel and In't Veld, 1997). These endocrine cells are distributed throughout the pancreas in areas known as islets.

Hypothyroidism results from low levels of thyroid hormone with varied etiology and manifestations. Untreated hypothyroidism increases morbidity and mortality. In the United States, autoimmune thyroid disease (Hashimoto thyroiditis) is the most common cause of hypothyroidism, but globally lack of iodine in the diet is the most common cause. The patient presentation can vary from asymptomatic disease to myxedema coma. Today, the diagnosis of hypothyroidism is easily made with simple blood tests and can be treated with exogenous thyroid hormone(Taylor et al.,2018) . Hypothyroidism is majorly divided into two categories, primary and secondary (central) hypothyroidism. Hypothyroidism is termed primary when the

thyroid gland itself is not able to produce adequate amounts of thyroid hormone. The less common, secondary, or central hypothyroidism is labeled when the thyroid gland itself is normal, and the pathology is related to the pituitary gland or hypothalamus(Garbe et al.,2012). The decline in the production of T4 results in an increase in the secretion of TSH by the pituitary gland, causing hypertrophy and hyperplasia of the thyroid parenchyma, thereby leading to increased T3 production(Hou et al.,2016).

The most prevalent etiology of primary hypothyroidism is an iodine deficiency in iodine-deficient geographic areas worldwide. Autoimmune thyroid diseases are the leading causes of hypothyroidism in the United States and the iodine-sufficient regions. Hashimoto thyroiditis is the most common etiology in the United States, and it has a strong association with lymphoma. Etiology can be influenced locally by iodine fortification and the emergence of new iodine-deficient areas(Taylor et al.,2018).

Other common causes of hypothyroidism include:

- Drugs such as amiodarone, thalidomide, oral tyrosine kinase inhibitors (sunitinib, imatinib) stavudine, interferon, bexarotene, perchlorate, rifampin, ethionamide, phenobarbital, phenytoin, carbamazepine, interleukin-2, and lithium,
- Thyroid radioactive iodine therapy
- Thyroid surgery
- Radiotherapy to head or neck area
- Central hypothyroidism from neoplastic, infiltrative, inflammatory, genetic, or iatrogenic disorders of the pituitary or hypothalamus.
- A new class of cancer medications such as anti-CTLA-4 and anti-PD-L1/PD-1 therapy has been associated with both primary and/or secondary hypothyroidism.

Secondary and tertiary hypothyroidism, also known as central hypothyroidism is caused by a defect in the hypothalamic-pituitary axis. Its causes include the following:

- Pituitary tumors
- Tumors compressing hypothalamus

- Sheehan syndrome
- Thyroid releasing hormone (TRH) resistance
- TRH deficiency
- Lymphocytic hypophysitis
- Radiation therapy to the brain
- Drugs such as dopamine, prednisone, or opioids (Khoury et al.,2020)

The role of hyporthyroidism in diabetes was investigated in 1927, by Coller and Huggins proving the association of hypothyroidism and worsening of diabetes. It was shown that surgical removal of parts of thyroid gland had an ameliorative effect on the restoration of glucose tolerance in hypothyroid patients suffering from coexisting diabetes (Brenta et al.,2007). Patients with type 2 DM are at increased risk of thyroid disease, especially those with poor glycaemic control. The following mechanisms are thought to be responsible. Higher levels of circulating insulin associated with insulin resistance has been shown to have a proliferative effect on thyroid tissue resulting in larger thyroid size with increased formation of nodules (Singh *et al*.,2011, Rezzonico *et al*.,2007, Ayturk *et al*.,2009). This may lead to thyroid dysfunction (hypothyroidism) in patients with type 2 DM.

Aim of study:

To determine the risk factors of hypothyroidism in patients with Type 2 DM.

Chapter Two

Materials and methods

Materials and Methods

Data Collection

The Data were collected from patients with Type 2 DM admitted to Najaf Center for Diabetes and Endocrinology in Al-Sadr Medical City Hospital.

Sample Size

Sixty patients with Type 2 DM admitted to Najaf Center for Diabetes and Endocrinology in Al-Sadr Medical City Hospital were enrolled.

Time data collected

The data were collected during a period from January 2025 to March 2025.

Data sources

The demographic characteristics, clinical symptoms, laboratory data, and medications were extracted from Patients who come to the center. Available tests for patients are: morning sugar (fasting),Two hours after eating (random). Cumulative glucose check (measurement of glucose in red cells every three months), Eye examination for diabetics, thyroid hormones , Ultrasound devices of the thyroid gland.

Sample selection method

Based on Recorded data several covariates were selected for analysis as potential confounding variables in our regression analyses. These included age, Gender,BMI and Chronic Disease.

Data analysis

The study relied on descriptive statistics to analyze the data. Specifically the number and percentage of patients in different categories

(e.g., age groups, Gender, BMI) were calculated. This approach helped in understanding the distribution of Hypothyroidism patients among Diabetic 2 patients .

Chapter Three
Results

Results:

Data was collected from patients arriving at the Diabetes Center in Al-Sadr Hospital, and it was collected from 60 patients whose ages ranged from 39-59 years, and it was divided as in Table (1).

Table 1: Distribution of patients according to Age category

Age	Number	Percentage
35-40	**2**	**3.3%**
40-45	**11**	**18.3%**
45-50	**19**	**31.65%**
50-55	**14**	**23.3%**
55-60	**11**	**18.3%**

The age group ranged from 35-60, and the most affected group were in age between 45-50.

Table 2: Distribution of patients according to Gender

Gender	Number	percentage
Male	8	10%
Female	52	90%

Table (2) show that female were more infected than male. The infected male were less.

Table 3: Hypothyroidism depending on Sex

Hypothyroidism	Number	Percentage
Male	**2**	11.11%
Female	**16**	88.88%
Total	**18**	100%

The percentage of Hypothyroidism in female more than male that 88.88% of female were infected by diabetics but just 11.11% of male were infect by Hypothyroidism

Table 4: Diabetes depending on sex

Diabetes	Number	Percentage
Male	**8**	**10%**
Female	**52**	**90%**
Total	**60**	**100%**

The percentage of diabetics in female more than male that 90% of female were infected by diabetics but just 10% of male were infect by diabetics

Table 5:Relationship between Diabetes and Hypothyroidism

Disease	Number of patients	Percentage
Diabetes with hypothyroidism	18	30%
Diabetes without hypothyroidism	42	70%

The results showed that 30% of diabetic patients had hypothyroidism, while 70% of diabetic patients did not have hypothyroidism.

Table 6: Distributions of the Patients According to BMI

State of BMI	Diabetes No. of patients=42	Hypothyroidism+Diabetes No.of patients=18
Increase in BMI	18	12
Normal BMI	24	6

The results showed that 18 patients with diabetic had high BMI and 12 patients with hypothyroidism and Diabetes had high BMI, as show in table(6).

Chapter four
Discussion

Discussion

There was an association made between thyroid dysfunctions and DM. Patients with Diabetes Mellitus had significantly increased incidence of thyroid dysfunctions(Chen *et al*., 2019).

After considering gender and age, it was found that female patients and patients younger than 65 y/o had a higher risk of developing T2D. The results provide important clinical information that one should check blood sugar in patients who have been diagnosed with thyroid dysfunction, whether hyperthyroidism or hypothyroidism.These results were similar to results of (Wang,2013) when he show that women were more infected with diabetes and thyroid dysfunction than male,also show the patients between 40-50 were more infected by these disease.

The hyperglycaemia seen in diabetics is known to have negative effects on thyroid function precisely blunting the pituitary TSH response to stimulation by hypothalamic TRH. This may be due to possible alteration of post translational glycosylation of TRH thus affecting the biological activity. This mechanism suggests that diabetes may predispose to thyroid dysfunction (Ghazali and Abbiyesuku,2010) .

Hypothyroidism found in 30% of Type 2 Diabetics with thyroid dysfunction in this study is also in agreement with all previous studies cited above including the Wickham survey(Tunbridge *et al*, 1977) and the Colorado study (Sobnigwi *et al*, 2002) which reported hypothyroidism as the most prevalent form of thyroid dysfunction observed in all the studies.

There was an increase in the body mass index (BMI) of Hypothyroidism patients by 12 patients with a high BMI >25 ,while only 6% of the patients had a normal BMI <25. These results agree with the finding of Popławska *et al*., that he

observed 72% of Hypothyroidism patients have an increase in BMI . Rong *et al*., in their study, show that the risks of Hypothyroidism in the obese population increased by 91% (Reinehr *et al*.,2006). Multiple studies have reported a positive association of BMI with levels of TSH, T3 (total and free), and serum leptin, which could be due to progressive fat accumulation (Reinehr ,2010). Fatty individuals have underexpression of TSH receptors on their adipocytes, which further increases the plasma concentration of TSH and fT3(Nannipieri *et al*.,2009). In our study, further suggesting a direct relationship between BMI and proportion of patients with hypothyroidism.

In summary, the prevalence of thyroid dysfunction is higher in Type 2 DM than that in the general population, more females are affected than are males .

Chapter five

Conclusion & Recommendations

Conclusion

Diabetes and thyroid disease are closely linked. If you have hypothyroidism, your insulin levels can drop and your blood sugar can rise, increasing the risk of diabetes. If you have Diabetes, the opposite can occur and lead to bouts of low thyroid function or hormone.

Recommendation

If you have diabetes or thyroid disease, properly managing your condition and maintaining an ideal weight may reduce your risk of developing the other condition. Properly managing your blood sugar or thyroid hormone can also help. There is the need to determine method specific reference intervals for local application to allow an unbiased interpretation of thyroid function tests in our citizens.

Chapter sex References

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الخلاصة

داء السكري من النوع الثاني له علم أمراض أساسي متقاطع مع اختلال وظيفي في الغدة الدرقية. كانت هذه دراسة مسحية على ستين مريضا تم ادخالهم الى مركز النجف للسكري والغدد الصماء في مستشفى مدينة الصدر الطبية.تم جمع البيانات من المرضى الوافدين خلال الفترة من الشهر الاول الى الشهر الثالث من سنة ٢٠٢٥. كان متوسط عمر المرضى ٥٠ عامًا (المدى الربيعي ٣٥-٦٠) ، بما في ذلك ٨ رجال و ٥٢ امرأة. أظهرت النتائج التي تم جمعها من المرضى القادمين إلى المركز أن ما يقرب من ٣٠٪ من مرضى السكري قد أصيبوا لاحقًا بقصور الغدة الدرقية ، في حين أن حوالي ٧٠.٪ لم يصابوا بفرط نشاط ، بالإضافة إلى أن النساء في الفئة العمرية بين ٤٥-٥٠ عامًا كانوا الأكثر داء السكري ونقص نشاط الغدة الدرقية ، والذي قد يكون نتيجة لنقص الهرمونات عند النساء ، والذي قد ينزعج بعد انقطاع الدورة الشهرية ، بالإضافة إلى أنه قد يكون مضطربًا بسبب حالات الحمل والولادة السابقة ، وخاصة الهرمونات تنظيم وظائف الجسم ومستوى السكر في الدم ، بالإضافة إلى ذلك مع تقدم العمر يزداد الهدم ، وهذا من شأنه أن يؤثر على حدوث اضطرابات في الخلايا التي تنتج هذا الهرمون.

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نسبة انتشار قصور الغدة الدرقية لدى مرضى السكري من النوع ٢ في محافظة النجف الأشرف. دراسة مسحية

الى جامعه الفرات الاوسط/ قسم صحه مجتمع/ معهد الكوفه
من اجل استيفاء متطلبات للحصول على شهادة الدبلوم

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