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*Original Research Article*

**A cross-sectional studyto evaluate the prevalence of thyroid disorders between diabetic patients in Hilla city**

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**Abstract**

 The aim of the present study was to evaluate the frequency of thyroid dysfunctions between diabetic patients. 150,36 diabetic and non-diabetic subjects,respectively were included in the study. they underwent a laboratory diagnosis for T3,T4,TSH and blood sugar tests.and a demographic data (weight ,height ,age, duration of diabetes ,hypertension, kidney and liver dysfunction) were obtained from them. Results revealed that there was a disturbance in thyroid hormone concentrations among diabetic patients ,The most frequently thyroid dysfunction was subclinical hypothyroidismas there was a decrease in thyroid hormone (T4)concentration.the study concluded that there was a prevalence of thyroid dysfunction among diabetic patient especially among type 2 DM patients as it was high with subclinicalhypothyroidism.

**Key words:** diabetes, hypothyroidism, hyperthyroidism,thyroid dysfunction

**الخلاصة**

 تهدف الدراسة الى تقدير تكرار حالات الاضطرابات في وظيفة الغدة الدرقية بين مرضى السكري . شملت الدراسة 150 مريض بداء السكري و36 شخص سليم ،خضعوا جميعهم الى الفحص المختبري من اجل قياس هرمونات الغدة الدرقية(T3.T4) وهرمون TSH وقياس مستوى السكر في الدم .كما اخذت المعلومات الاستبيانية من المرضى مثل (الوزن ،الطول،العمر ،مدة الاصابة بمرض السكري ، الاصابة بضغط الدم، اضطرابات مشخصة بالكلية والكبد).اوضحت النتائج وجود اضطرابات في تراكيز هرمونات الغدة الدرقية بين مرضى داء السكري وكانت هذه الاضطرابات من نوع نقص الدرقية وهيالاكثر شيوعا بين مرضى السكري من النوع الثاني.

**الكلمات المفتاحية :** مرض السكري،نقص الدرقية،فرط الدرقية ،اضطرابات الغدة الدرقية.

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**Introduction**

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hyroid dysfunction and diabetes disease, aretwo most common endocrine dysfunctions in manypopulations [1] The correlation between them isviewed widely, from the first studies that were published in 1979 [2].Many studies in various countries wereperformed for the evaluation of the frequencies of thyroid gland dysfunction in diabeticpatients. There is a great variability in the frequency of thyroid gland disorders in general population.In general populations, theprevalence of these diseases range between 6.6% in United kingdom [3,4]. In contrast, diabetes disease was shows ahighprevalence 10.8% in the community and up to13.4% in hospitals of diabetic clinic care[5,6].Thedifferences in these prevalence ratios can be explainedby many diagnostic parameters of thyroid dysfunctions, the status of iodineintake among the various regions,

varioussensitivities ofTSH assays and techniques and the large diversitybetween populations [7]. Thecorrelation between thyroid dysfunction and diabetes disease is characterized by inextricable  interaction of mutual reliance between them. Identification of thyroid dysfunction,especially the subclinical dysfunction, in patients with diabetes diseasewas justified as most patients can be asymptomatic.Evaluation the prevalence of clinical and subclinicalthyroid disease in diabetic patients in populations andits presentation in the course of diabetes with knownfactors about cardiovascular risk is an important condition[8]. The studywas aimedto evaluate the frequencies of thyroid gland dysfunctions in diabetic patientswith type 1 and type 2 diabetes in clinical routine in a random community in Hilla city.

**Materials and Methods**

 Study subjects include 150 adult, with known diabetic patients and 36 non diabetic controls without evidence of thyroid disease.

Diabetes Mellitus (DM) was ruled out in non- diabetic controls using fasting plasma glucose level. Those with FBG < 6.0mmol/L were accepted as controls.

Venous blood samples of all subjects were collected into plain tubes, allowed to clot and thencentrifuged to separate serum by the centrifuge apparatusafter 3 hours of collection. These sera were kept frozen at -20oC until analysis. The collected sera from the 150 Diabetics and the 36 non-diabetic controls were assayed for TSH, T3 and T4.

All subjects were underwent a laboratory evaluations.The data were obtained by a survey and a questioner protocol,about the variables that would be assessed in this research: gender, age (years),BMI,hypertension,liver dysfunction,kidney and Thyroid Dysfunctions (hyper-thyroidism, hypothyroidism.Thyroid dysfunction was classified as:

• Normal;as T3, T4 and TSH concentrations were in the normal range (70-210 ng/dl for T3; 5.5-11.8 μg/dl for T4 and 0.3-5.5 μIU/ml for TSH).

•clinical- Hypothyroidism ;as TSH concentrationswere more than5.5mIU/ml and T3, T4concentrations were less than normal range.

• Subclinical- Hypothyroidism ;as TSH concentrations were more than 5.5 mIU/ml and T3, T4 concentrations were within normal range.

•clinical- Hyperthyroidism ;as TSH concentrationswere less than0.3mIU/ml and T3, T4 concentrations more than normal range.

• Subclinical- Hyperthyroidism ;as TSH concentrations were lessthan 0.3 mIU/ml and T3, T4 concentrations were within normal range.

**Results**

**Table 1:**Distribution of Sex and age among diabeticand non-diabeticsubjects

|  |  |  |  |
| --- | --- | --- | --- |
| Group | Male | Female | Mean Age(In Years) |
| Diabetic patients | 61 | 89 | 43.16 ± 3.1 |
| Non Diabetic patients | 15 | 21 | 38.74 ± 5.2 |

**Table 3:**Concentrations of TSH and thyroid hormones in diabetic and non- diabetic patients

|  |  |  |
| --- | --- | --- |
| Hormone con. | diabetic patients(Mean ± SD) | non diabetic patients(Mean ± SD) |
| TSH(uIU/ml) | 6.95 ± 7.43 | 3.65 ± 2.01 |
| T3(ng/dl) | 121.9 ± 40.20 | 149.4 ± 10.85 |
| T4(ug/dl) | 8.09 ± 2.92 | 7.68 ± 0.75 |

**Table 4:**Thyroid disorders distributionamong diabetic group

|  |  |  |
| --- | --- | --- |
| **Thyroid function** | **Type1diabetesN=36** | **Type2 diabetesN=114** |
| **Gender** |
| **Male** | **Female** | **Male** | **Female** |
| **Euthyroidism** | **7** | **20** | **25** | **72** |
| **SC- Hypothyroidism** | **2** | **2** | **3** | **4** |
| **C-Hypothyroidism** | **1** | **1** | **2** | **2** |
| **SC-Hyperthyroidism** | **0** | **2** | **2** | **3** |
| **C-Hyperthyroidism** | **0** | **1** | **0** | **1** |

**Table 5:**Some physiological parameters of diabetic and non- diabetic patients

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Type1diabetes | Type2 diabetes | non diabetic |
| Diabetes duration (years) | 15.6 ± 3.5  | 14.9 ± 8.8 | ------- |
| BMI (kg/m2) | 29.3 ± 1.7  | 30.2 ± 4,2 | 26.45± 4,6 |
| Hypertension(No.) | 10 | 33 | 2 |
| Dyslipidemia(No.) | 9 | 54 | 5 |
| Kidney dysfunction(No.) | 7 | 66 | 14 |
| Liver dysfunction(No.) | 3 | 25 | 2 |

**Discussion**

 Patients with diabetes disease were at a higher risk of suffering from thyroiddisorders [21].Thyroid diseases in both the non- diabetic and diabetic patients were reported to be more frequent among women than among men6].

The study revealed a frequency of thyroid dysfunction between the patients withType2 Diabetes was more than that among Type1Diabetic patients, as insulin resistance was an important pathological parameter in type 2 diabetes, On other hand insulin resistance and cells function are correlated inversely with thyroid stimulating hormone concentrations,The matter that explains the imbalance in insulin concentration was widely associated with thyroid dysfunctions, and it is mediated by ẞ-cells dysfunction[20,22].

Results revealed that frequency of thyroid dysfunction among the patients with diabetic disease was significant (higher) than among non- diabetic.

 Results revealed that subclinical hypothyroidism,was more frequent parameter of thyroid dysfunction found among the patients,a result that was resemblesan other studies that already mentioned in the literature[3,4].

In the study by[9], where 126 subject with diabetic disease from Type 1Diabetes were evaluated, the frequency of thyroid gland dysfunctions was 20.6%,and the frequency of Subclinical-Hypothyroidism was 13.5% that confirm our data.

In the evaluation of Type2 Diabetic patients, results were revealed the frequency of thyroid dysfunction and Subclinical-Hypothyroidism as in the study of [11]. These results obtained were more than those that obtained in ther esults of the study of [10], and in the study [12].Another studies were showed that the complications of thyroid gland dysfunctions were increased with age[3].

It is important to explain that our patients with Subclinical-Hypothyroidisim, are older than patients in the two earlier studies that were mentioned above. These findings would be more directed tosub clinical thyroid gland abnormalities that could clear up the higher frequencies that were found in our study. The subclinical thyroid dysfunctions were mentioned with a biochemical disturbances without the presenting of aclinical symptoms or signs [13].

The study revealed a frequency of hypertension among the diabetic subjects as compared with the non- diabetic once .Similar study among young adult population was done [14,20] showed similar results.

While dyslipidemia is a reported complication of confirmed hypo-thyroidism in non-diabetic[15]and diabetic[16] subjects.A study by [10]*,*revealed that there was not any significant relationship that could be found between subclinical-Hypo-thyroidism and the complaintion of dyslipidemia. Another studies were reported that thyroid gland hormones were important essentials for them obilization of tissue lipids especially the brown adipose connective tissues (BATs) which are the body fuel for the production of heat[17].

There was a significant high number of diabetic patients with kidney dysfunction compared with non-diabetic control subjects. Similar results were observed in the study of [18]. Due to high blood sugar there is damage to the nephrons[11] .As a result, kidneys unable to maintain the fluidand electrolytes homeostasis. There is rise in plasmaconcentration of serum creatinine and urea. In severe hyperglycemia, there is formation of advanced glycationend-products (AGEs) has long been recognized to cause cellular injury. AGEs accelerates increased vascularpermeability, basement membrane thickening and mesangial fibrosis. This process leads to renal failure.as hyperglycemia is the main cause of liver and blood pressure disorders as a complication of diabetes [19,20].

A restriction of the present study was that one sample of blood only was collected and analyzed for the concentrations of TSH,T3 and T4 hormones, which might have beenthe causeof high frequency of thyroid dysfunction .However, the dosage of T4 was not included always inother studies like [4],but the number of diabetic subject can confirm the findings of this study.

The present study was joinedwith the previous studies that have been determined thefrequencies of thyroid gland dysfunctionsamong diabetic patients for the both tow diabetes types (Type 1& Type 2).

In conclusion, Results of the present cross-sectional study was showed a presence of high frequency of thyroid gland dysfunctionsamong diabetics. The frequency of a new cases of thyroid dysfunction wasidentified, and the propable aggravation of some physiological risk factors likedyslipidemia and hypertension,resulting from an unidentified thyroiddysfunctionscould lead to an increase in cardiovascular risk among these diabetic patients.

**References**

1.Palma,C. S.; Marco P. ;Verônica G.;Eliete L.;Maria de F.;Luiz C. ; Fernanda F.; Tássia G.;Ludmila de F.; Juliana O.; Stefanie C.;Vinícius P.; and Marília B.Prevalence of thyroid dysfunction in patients withdiabetes mellitus.Diabetology& Metabolic Syndrome 2013, 5(58), 1.

2.Papazafiropoulou A.;Sotiropoulos A.;Kokoloki A.;Kardara M.;StamatakiP,e and Pappas S. Prevalence of thyroid dysfunction among Greek type 2 diabetic patients attending an outpatient clinic. J Clin Med Res 2010, 2:75.

3. Leonidas H.;Duntas, Jacques Orgiazzi and Georg Brabant. The interface between thyroid and diabetes mellitus. Clinical Endocrinology (2011) 75, 1.

4.Hollowell JG.;Staehling NW.; Flanders WD.;HannonWH.;GunterEW.;SpencerCA.andBravermanLE.Serum TSH, T4 and thyroid antibodies in the United States population (1988 to 1994): national health and nutrition examination survey. J ClinEndocrinolMetab 2002, 87:489.

5.Perros P.;McCrimmonRJ.;Shaw G. andFrier BM. Frequency of thyroid dysfunction in diabetic patients: value of annual screening. Diabet Med 1995, 12:622.

6.Smithson MJ. Screening for thyroid dysfunction in a community population of diabetic patients. Diabet Med 1998, 15:148.

7.Rezzonico J.;Pusiol E.;PitoiaF.andNiepomniszcze H. Introducing the thyroid gland as another victim of the insulin resistance syndrome. Thyroid 2008, 18:461.

8.Rezzonico, J. H.;Niepomniszcze, M.;Rezzonico, E. Pusiol; M. Alberto, and G. Brenta, “The association of insulin resistance with subclinical thyrotoxicosis,*Thyroid*, 2011, 21(9): 945.

9.Guillermo, E.U.;Kashif, A.L.;MaryB.M.;Helen, C.L.;Frankie, S.;Andrew,B.and Abbas, E.K.Thyroid Dysfunction in Patients WithType 1 Diabetes. DIABETES CARE, 2003 26, (4).

10.Chubb,SA.;Davis,WA.;Inman,Z.andDavis TM.Prevalence and progression of subclinical hypothyroidism in women with type 2 diabetes: the Fremantle Diabetes Study. ClinEndocrinol (Oxf) 2005, 62(4):480.

11.Chen HS.;Wu,TE.;Jap,TS.;Lu,RA.;Wang, ML.; Chen,RL.andLin, HD. Subclinical hypothyroidism is a risk factor for nephropathy and cardiovascular diseases in Type 2 diabetic patients. Diabet Med 2007, 24(12):1336.

12. Vikhe,Vikram B.;Shubhangi A Kanitkar.;Krunal K Tamakuwala.;Anu N Gaikwad.;MeenakshiKalyan.;andRajani R Agarwal.Thyroid dysfunction in patients with type 2 diabetes mellitus at tertiary care center.National journal of medical research. 2013, 3(4):377

13.Benseñor I: Screening for thyroid disorders in asymptomatic adults from Brazilian populations. Sao Paulo Med J/Rev Paul Med 2002, 120(5):146.

14.Sawant,A.M.;Shetty,D.;Mankeshwar, and Ashavaid,T.F. Prevalence of Dyslipidemia in Young Adult Indian Population. J Assoc Physicians India.2008,56: 99.

15.Johnston. J.;McLelland, A.; and O’Reilly, DS. The relationship between serum cholesterol and serum thyroid hormones in male patients with suspected hypothyroidism. Ann ClinBiochem 1993, 30 (3):256.

16.Gray,RS.;Smith,AF.;Clarke BF. Hypercholesterolemia in diabetics with clinically unrecognized primary thyroid failure. HormMetab Res 1981, 13(9):508.

17.Mory G.;D. Ricquier;Pesquies, and P. Hemon, “Effects of hypothyroidism on the brown adipose tissue of adult rats: comparison with the effects of adaptation to cold,” Journal of Endocrinology. 1981, 91(3):515.

18. Mittal,A.;Sathian, B.;Kumar, A.;Chandarsekhran, N. and Sunka ,A. Diabetes mellitus as a Potential Risk Factor Disease among Nepalese. Nepal Journal of Epidemiology 2010, 1 (1):22 .

19.Salahudeen,A.K.;Kanji,V.;Reckelhoff, J.F. and Schmibt, A.M.Pathogenesis of diabetic nephropathy: a radical approach. NephrolDial Transplan.1997, 12(4): 664.

20.Chen G.;Juan W.;Yinghua L . Associations between cardiovascularrisk, insulin resistance, β- cell function and thyroid dysfunction : a cross-sectionalstudy in She ethnic minority group of Fujian Province in China.Euro J Endocrinol 2010, (163):775.

21.Radaideh, AR.;Nusier, MK.;Amari, FL.;Bateiha,AE.;El-Khateeb, MS.;Naser,AS.;andAjlouni, KM.: Thyroid dysfunction in patients with type 2 diabetes mellitusin Jordan. Saudi Med J 2004, 25:1046–1050.

22. Brenta, G.;Ceh, FS.; and, Pisarer M,. Acute hormone withdrawal inathyreotic patients results in a state of insulin resistance. *Thyroid*2009; 19(6): 665–9.