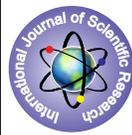


## The Thyroid Profile in Type 2 Diabetes Mellitus and its Significance



### Medical Science

**KEYWORDS :** Diabetes mellitus, thyroid profile, female

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### ABSTRACT

*To study the prevalence of thyroid disorders in patients with type 2 diabetes mellitus. To evaluate the relationship between glycaemic control and occurrence of altered thyroid function in type 2 diabetes mellitus.*

*This is a hospital based cross sectional study done over a period of 2 years involving 108 patients with known type 2 diabetes mellitus or newly detected Type 2 diabetes mellitus without known thyroid disorders. All the patients with type 2 diabetes mellitus were evaluated for thyroid profile.*

*In the present study, 13% of patients with type 2 diabetes mellitus had abnormal thyroid profile. In patients with abnormal thyroid profile, most common abnormality was subclinical hypothyroidism followed by subclinical hyperthyroidism. In persons with abnormal thyroid profile, 85.7% were females and 14.3% were males. This is statistically significant. The prevalence of thyroid abnormalities is more common in females than in males.*

*There is significant correlation between duration of diabetes and family history of diabetes.*

### INTRODUCTION

Diabetes mellitus is a common endocrine disorder which involves multiple organ systems and leads to significant morbidity and mortality due to accompanying complications.

The present work is a modest attempt to study the prevalence of thyroid disorders in patients with type 2 diabetes mellitus.

#### Aims of the study

To study the distribution of thyroid disorders in patients with type 2 diabetes mellitus regarding age, sex, duration of diabetes, type of treatment, family history of diabetes mellitus, comorbid conditions, BMI and lipid profile.

To evaluate the relationship between glycaemic control and occurrence of altered thyroid function in type 2 diabetes mellitus.

Unfavorable modification of lifestyle and dietary habits with urbanization are the most important factors for the development of diabetes.

#### Effect of diabetes mellitus on thyroid diseases

Dysthyroid optic neuropathy (DON) resulting in blindness is the most threatening complication of Graves' orbitopathy (GO). It is due to the compression of optic nerve by enlarged extraocular muscles at the orbital apex.

#### Effect of hyperthyroidism on glycaemic status

Graves' disease is the commonest cause of hyperthyroidism. While Graves disease may be associated with type 1 diabetes in polyglandular autoimmune syndrome, thyrotoxicosis by itself is diabetogenic.

#### In hypothyroidism, the synthesis and release of insulin is decreased.

Vondra K et al in their study found that prevalence of thyroid disease in diabetic patients is 2-3 times higher than in non diabetic subjects. It rises with age and is strongly influenced by female gender and autoimmune diabetes. They even recommended thyroid disease screening and diagnosis in patients with diabetes mellitus.

Thyroid dysfunction is common in adults and can be diagnosed accurately by laboratory tests. Commonly done tests to diagnose thyroid disorders include estimation of thyroid stimulating hormone (TSH) along with thyroid hormones, tri-iodothyronine(T3)

& tetra iodothyronine (T4) either in total or free form.

The guidelines of American thyroid association and American association of clinical Endocrinologists recommend serum TSH measurement as the single most reliable test to diagnose all common forms of hypothyroidism and hyperthyroidism particularly in the ambulatory setting.

### MATERIALS AND METHODS

**Study group:** the study group included 108 persons with known type 2 diabetes mellitus or newly detected type 2 diabetes mellitus without known thyroid disorders either admitted in wards or attending the outpatient departments who met the inclusion criteria.

#### Inclusion criteria

Known type 2 diabetes mellitus and newly detected type 2 diabetes mellitus subjects who gave informed consent to participate in the study.

#### BMI calculation

Body mass index =weight(Kg)/height (m)<sup>2</sup>

#### Blood sugar

Both fasting and postprandial blood sugar are estimated by Trinder's (Glucose oxidase) method and read at 505/670 nm.

#### Renal function test

The blood urea in this study was estimated using DAM method (Diacetyl Monoxime). Serum creatinine was estimated using Modified Jaffe's method.

#### Urine analysis

Urine sample is collected for urine routine analysis which includes sugar,protein, cytology and urinary sediments.

#### Urine spot PCR

Urine sample is collected to estimate protein creatinine ratio, sulfo salicylic precipitation method is used for protein estimation.

#### Lipid profile

Total cholesterol, triglyceride(TGL), Low Density Lipoprotein(LDL) and High Density Lipoprotein(HDL) levels were analysed in the early morning fasting blood sample.

**HbA1C**

Blood sample collected in EDTA coated tubes and HbA1C is estimated by Biorad-HPLC method.

**Thyroid Profile**

Estimation was done in fasting serum sample.

**Methods used:**

1.TSH- Ultrasensitive sandwich chemi luminescent immune assay.

2.FT3 & FT4- Competitive chemi luminescent immune assay.

**Analysis and Results**

Abnormal thyroid profile Vs Duration of Diabetes

P=0.028

Among the 14 patients with abnormal thyroid profile, 28.65%(4) had Diabetes more than 10 years, 28.6%(4) had duration between 6-10 years and 42.9%(6) had Diabetes 5 years or less. Compared with normal thyroid group it is statistically significant.

**DISCUSSION**

In the present study patients of diabetes mellitus were taken from medical wards of CAIMS over period of 2 years and they were evaluated for altered thyroid profile.

**Age distribution**

In the present study of 108 type 2 diabetic patients, 14 patients(13%) were up to 40 years, 78 patients (72%) were between 41-60 years and 16 patients (14.8%) were 61 years or more.

This shows that the disease was more prevalent between 41-60 years of age.

**Gender distribution**

In the present study 40.7% (44 nos) of the studied population were males and 59.3%(64 nos) were females. Female to male ratio was 1.45:1.

**Duration of diabetes mellitus**

In the present study, majority of cases that is 70.4% (76/108) had duration of diabetes up to 5 years, 18.5% (20/108) of patients had duration between 6-10 years and 11.1% (12/108) of patients had duration of illness more than 10 years.

Majority of people are in the age group between 41 to 60 yrs and have duration of disease less than 5 years.

**BMI**

Among the study population, 59.2% (64/108) were overweight and obese; 38.9% (42/108) had normal BMI.

**HbA1c level**

In the present study, 51.9% (56) had HbA1C level more than 8% and 48.1% (52) had level HbA1C less than 8%.

More than half of the diabetics had poor glycemic control. Paolo fumelli in his study of 562 diabetic patients found that all the patients had level HbA1C greater than 8%.

**Abnormal Thyroid profile**

In the present study, 13% (14) of the total 108 patients with diabetes mellitus had abnormal thyroid profile.

The present study is similar to Abdel-Rahman et al who in his study of 908 type 2 diabetic patients found that the prevalence of thyroid disease was 12.5%, 6.6% of whom were newly diagnosed and 5.9% had known thyroid dysfunction.

The prevalence of thyroid disease in the non diabetic control group was 6.6%.

**Distribution of thyroid abnormalities**

In the present study, 11.1% (12) of the patients had report suggestive of subclinical hypothyroidism and 1.9% (2) of the patients had report suggestive of sub clinical hyperthyroidism.

Smithson M J in his study found that the prevalence of thyroid disease in the entire population of diabetic patients registered in the general practice was 10.8%. In the control group of non diabetics, the prevalence was 6.6%.

In the present study, diabetic patients, when compared with the control group of normal patients in Wickham study and a 20 years follow-up of Wickham survey by vanderpump MP et al shows that the prevalence of altered thyroid profile in the study group is significant(p=0.0064).

**SIGNIFICANCE OF TYPE OF TREATMENT IN PATIENTS WITH ABNORMAL THYROID PROFILE:**

Out of 14 patients with thyroid abnormality, 57.1 % ( 8/14) were on OHA, 14.3 % ( 2/14) were on Insulin and 28.6 % ( 4/14) were on both OHA/Insulin. Compared with normal thyroid profile group it has no statistical significance (p=0.293)

Out of 14 patients with abnormal thyroid profile, 57.1 % ( 8/14) had HbA1C value above 8% and the remaining (42.9%) had HbA1C 8 or less. The mean HbA1C level of the patients with abnormal thyroid profile was 9.29% compared to 8.67% in the patients with normal thyroid profile. This difference is not statistically significant (p=0.268).

The findings are similar to the studies by Parr JH et al and Chubb et al who found no correlation between changes in free thyroid hormone concentrations and HbA1C level.

**CONCLUSION**

In the present study, 13%(14 nos) of patients with type 2 diabetes mellitus had abnormal thyroid profile.

In patients with abnormal thyroid profile (14 nos), most common abnormality was subclinical hypothyroidism (85.7%) followed by subclinical hyperthyroidism (14.3%).

In persons with abnormal thyroid profile, 85.7% were females and 14.3% were males. This is statistically significant.

In persons with abnormal thyroid profile 28.65% had diabetes for more than 10 years and 28.6% had diabetes mellitus for duration of 6 to 10 years and 42.9% had diabetes for 5 years or less. Compared with normal thyroid group it is statistically significant.

Majority (70.4%) of patients was on OHA and 14.8% each were on insulin and both OHA/Insulin

**Limitations**

Study population was small.

Associated thyroid autoimmunity was not evaluated due to constraints.

Follow up study was not done.

For the study in this aspect with large scale research is required to through more light on this subject.

**SUMMARY**

Prevalence of thyroid dysfunction is more common among type 2 diabetes mellitus patients than in general population.

There is significant correlation between duration of diabetes and

Family history of diabetes. Prevalence of thyroid dysfunction in patients with type 2 diabetes mellitus is higher in females than in males.

Routine screening for thyroid dysfunction in type 2 diabetes mellitus patients may be justified especially in females and patients with family history of diabetes and patients with long duration of diabetes should because progression to overt thyroid dysfunction is associated with significant morbidity.

## REFERENCE

1. Peter H Bennett, William C Knowlton. Definition, diagnosis and classification of diabetes. Joslin's diabetes mellitus 14th edition, 2005:331-337. |
2. Alvin C. Powers. Diabetes mellitus. Harrison's principles of internal medicine 18th edition; 2968 to 2986 [vol.2] |
3. IDF Diabetes atlas 5th edition, 2012 |
4. WHO (2003), Tech. Rep. Ser. N 916. |
5. WHO (2002), Health situation in the South East Asia Region 1998-2000, New Delhi. |
6. International Diabetes Federation, 20th October 2012, Montreal. |
7. UN. 83rd plenary meeting, 20th December 2006. 61st session; Agenda 113. |
8. Donald M Barnett, Leo P Krall. History of diabetes. Joslin's diabetes mellitus 14th edition, 2005:1-17. |
9. Porter R. The greatest benefit to mankind, a medical history of humanity. New York: WW Norton, 1997:71. |
10. Schadowaldt H. The history of diabetes mellitus. In: Van Engelhard D, ed. diabetes, and its medical and cultural history. |