



## A RETROSPECTIVE STUDY TO DETERMINE THYROID DYSFUNCTION IN PATIENTS WITH DIABETES MELLITUS AT KALABURAGI, KARNATAKA, INDIA

### Biochemistry

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### ABSTRACT

**Background-** There is a complex interrelationship in the co-existence of thyroid dysfunction among diabetic patients and may be related to the growth of cardiovascular diseases and other complications of long-term metabolic imbalances. The prevalence of thyroid dysfunction varies from 10 to 24% among diabetic patients.

**Objective-** To determine the prevalence of thyroid dysfunction among the patients with diabetes mellitus in a tertiary care hospital at Kalaburagi, India.

**Methods-** This retrospective study was conducted during June 2018 analysing the records of diabetes patients attending to the diabetes OPD, Department of General Medicine in the past one year and their association with thyroid dysfunction was studied.

**Results-** A total number of 200 diabetes mellitus Type I and Type II patients were included in the study. Out of 200 patients, 27 (22.5 %) had thyroid dysfunction and remaining 93 patients had normal thyroid function. Out of 27 thyroid dysfunction patients, 8 (6.6%) had clinical hypothyroidism, 17 (14.1%) had subclinical hypothyroidism and 2 (1.6%) diabetics had hyperthyroidism.

**Conclusions:** Thyroid is common among type 2 diabetic patients, especially in females. It is most commonly secondary to autoimmune thyroid disease. Microvascular complications are commonly observed in this group of patients with dual endocrinal disorder treating physicians should routinely screen thyroid in patients with diabetes mellitus to prevent complications.

### KEYWORDS

Diabetes mellitus, Prevalence, Thyroid dysfunction

### INTRODUCTION:

Thyroid diseases and diabetes mellitus are the two most common endocrine disorders encountered in clinical practice. Diabetes and thyroid disorders have been shown to mutually influence each other and associations between both conditions have long been reported.<sup>1</sup> On one hand, thyroid hormones contribute to the regulation of carbohydrate metabolism and pancreatic function, and on the other hand, diabetes affects thyroid function tests to variable extents. A growing body of evidence pointed towards an array of complex interlinking biochemical, genetic, and hormonal malfunctions reflecting this pathophysiological association.<sup>2,3</sup> It has been found that thyroid dysfunction is more common in patients with DM than in the normal population in studies done in various settings.<sup>4,11</sup> Thyroid disorders were found to be more common in T1DM subjects as compared to those with T2DM. Autoimmunity is thought to be the major cause of thyroid-dysfunction associated DM.<sup>12</sup> The complex relationship between thyroid disease and DM has clinical implications. Treatment of thyroid dysfunction in diabetic patients will benefit glycemic control, reduce cardiovascular risk, and improve general well-being, nevertheless consensus regarding optimal thyroid screening strategies in routine diabetes care is still lacking. DM appears to influence thyroid function at two sites; firstly, at the level of hypothalamic control of TSH release and secondly at peripheral tissue by converting T4 to T3. The nocturnal TSH peak is blunted or abolished in diabetic patients, and the TSH response to TRH is also impaired.<sup>13</sup> Both DM and thyroid disorder may affect the health of mother and foetus with impact on obstetric care. High Anti-TPO antibody (TPO Ab) titres have been documented in pregnant women at risk for gestational DM.<sup>14</sup> Postpartum thyroid dysfunction occurs in up to 25% of women with T1DM.<sup>15</sup>

### MATERIALS & METHODS:

The study was conducted in all type diabetic patients. The Study participants were collected from OPD of Medicine Department of hospital affiliated to KBN Medical College, Gulbarga. 200 patients of both type 1 and type 2 diabetes were selected from OPD randomly and were studied and followed up for 2 years.

### INCLUSION CRITERIA

- 1 All patients with diabetes aged more than 30 years.
- 2 All diabetics irrespective of glucose control.
- 3 All diabetics irrespective of treatment.

### Exclusions criteria

1. Patients with Gestational diabetes mellitus,
2. Pancreatitis

### 3. Steroid induced Diabetes

### METHODOLOGY-

A detailed history was taken, and examination done as per the proforma. All patients in addition to haematological and routine urine work up underwent target organ evaluation for diabetes. All patients were evaluated for thyroid status; assessment of T3, T4 and TSH levels and as required FNAC and biopsy was done by our pathologist in Hospital. The laboratory evaluation of thyroid functions was done by estimation of serum T3, T4 and TSH levels by chemi-luminescence assay method. Two ml of blood was drawn and centrifuged and serum (500microml) collected from that and incubated with the reagent (separate for T3, T4 and TSH) for about 1 hour at room temperature. Later the readings were taken from the instrument COBAS 6000.

### The normal readings are

T3 – 0.7- 2.0 ng/ml

T4 – 4.5- 11.0 microg/dl

TSH- 0.4- 5.0 microIU/ml

Patients were diagnosed based on the ADA criteria for diabetes.

Symptoms of diabetes plus random blood glucose concentration of 11.1 mmol/L (200 mg/dL) or Fasting plasma glucose of 7.0 mmol/L (126 mg/dL) or Two-hour plasma glucose of 11.1 mmol/L (200 mg/dL) during an oral glucose tolerance test.

### STATISTICAL ANALYSIS:

The collected data was entered and analyzed by using SPSS (Statistical Package for Social Sciences) version 19.0 for windows. The findings expressed in terms of proportions or percentages. Chi-square test was used to check significant associations between categorical variables. A p value <0.05 was considered as statistically significant.

### RESULTS:

A total number of 200 diabetes mellitus Type I and Type II patients were included in the study. Out of 200 patients, 27 (22.5 %) had thyroid dysfunction and remaining 93 patients had normal thyroid function. While the rest 80 patients were not involved in the study as they are completely normal without any euthyroid state.

**Table- 1 Prevalence of thyroid dysfunction in Type 2 Diabetes mellitus cases under study (n=120)**

Thyroid dysfunction	No. of patients.
Hypothyroidism	8 (6.6%)
Subclinical hypothyroidism	17 (14.1%)

Hyperthyroidism	2 (1.6%)
Normal	93 (77.5%)
Total	120

In this study, out of 27 thyroid dysfunction patients, 8 (6.6%) had clinical hypothyroidism, 17 (14.1%) had subclinical hypothyroidism and 2 (1.6%) diabetics had hyperthyroidism.

**Table 2 Sex wise distribution of thyroid dysfunction in Type 2 Diabetes mellitus cases (n=120)**

Sex	Hypothyroidism	Subclinical hypothyroidism	Hyperthyroidism	Normal	Total
Male	3	5	1	51	60
Female	5	12	1	42	60

In the present study, we randomly selected 60 male and 60 female diabetic patients. We found thyroid dysfunction more in female 18 (15%) cases than in male 9 (7.5%) cases. Out of 18 female patients, 5(4.1%) had clinical hypothyroidism and 12(10%) patients had subclinical hypothyroidism. Hyperthyroidism was seen in only 1 (0.8%) patient. Among male diabetics, 3(2.5%) had clinical hypothyroidism, 5(4.1%) had subclinical hypothyroidism and hyperthyroidism was noted in 1(0.8%) patient.

**Table 3 Age wise distribution of thyroid dysfunction in Type 2 Diabetes mellitus among male cases (n=60)**

Age	Hypothyroidism	Subclinical hypothyroidism	Hyperthyroidism	Normal
Below 60 years	0	1	0	24
Above 60 years	3	4	1	27
Total	3	5	1	51

In this study, 25 diabetics male were below 60 years and 35 diabetics were above 60 years. Among males, 8(6.6%) patients of thyroid dysfunction was seen in above 60 years of age group, which comprises of hypothyroidism in 3 patients, subclinical hypothyroidism in 4 patients and hyperthyroidism in 1 patient. Only, 1(0.8%) patient of subclinical hypothyroidism was below 60 years of age.(Table 3)

**Table 4 Age wise distribution of thyroid dysfunction in Type 2 Diabetes mellitus among female cases (n=60)**

Age	Hypothyroidism	Subclinical hypothyroidism	Hyperthyroidism	Normal
Below 60 years	1	5	0	22
Above 60 years	4	7	1	20
Total	5	12	1	42

Among female patients, 12 patients were above 60 years. Thyroid dysfunction was seen in 12 (10%) patients in above 60 years of age group, which comprises of clinical hypothyroidism in 4 patients, subclinical hypothyroidism in 7 patients and hyperthyroidism in 1 patient. In below 60 years of age group, out of 28 patients, only 6 (5%) patients of thyroid dysfunction was noted. Subclinical hypothyroidism was seen in 5 patients. (Table 4)

## DISCUSSION:

This study comprises of 200 diabetic patients with equal number of male and female patients. The study demonstrated a 22.5% prevalence of thyroid dysfunction in diabetic patients. It was comparable to a Indian study done by Ravishankar et al,2013 (29%).<sup>16</sup> Various workers reported a lower prevalence rate of thyroid dysfunction among diabetics from different countries in their study. A study conducted by Papazafropoulou A et al (2010) found 12.3% in Greek diabetics,<sup>17</sup> Perros P et al (1995) reported 6.9% and another study by Radaideh A R M et al (2004) in Jordan found 12.5% of thyroid dysfunction in diabetic patients.<sup>18,19</sup> But, one study carried out by Udiogon C E J et al(2007) in calbar, Nigeria found a higher prevalence rate of thyroid dysfunction (46.5%).<sup>20</sup> In this study, among the thyroid spectrum disorders, subclinical hypothyroidism was the most frequent dysfunction, 14% of the patients. This finding was like studies done by various workers in different parts of the world. Further, subclinical hypothyroidism was more frequent in females i.e 10% compared to males 4.1% which was comparable to a Indian study by Ravishankar et al in 2013.<sup>16</sup> Hyperthyroidism was equal in either sex with one patient in male and one patient in female. In our study, we have found 20 (16.6%) patients

with thyroid dysfunction over 60 years of age compared to 7 ( 5.8%) patients below the age of 60 years. Many studies have shown that increased prevalence of hypothyroidism in elderly diabetics compared to young diabetics. Ravishankar et al reported 34.4% thyroid dysfunction over 60 years of age compared to that of 26.4% below the age of 60 years. In the present study, microvascular complication was seen in 44 diabetic patients. Among the complications, retinopathy was found in 12 patients, neuropathy in 14 patients and nephropathy in 18 patients. Out of the 18 nephropathy cases, 4 had thyroid dysfunction. 5 patients had thyroid dysfunction among 14 diabetics with neuropathy. 3 patients of thyroid dysfunction were seen in 12 patients with retinopathy. These findings were comparable with the study conducted by Ravishankar et al in 2013.

## CONCLUSION:

Thyroid is common among type 2 diabetic patients, especially in females. It is most commonly secondary to autoimmune thyroid disease. Microvascular complications are commonly observed in this group of patients with dual endocrinal disorder treating physicians should routinely screen thyroid in patients with diabetes mellitus to prevent complications.

**Conflict of Interest-** None declared

**Source of Funding-** None

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