

Study Of Type 2 Dm Patients In Newly Detected Hypothyroidism

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Abstract: **Background:** Present Study was carried out to study relationship between Effects of Newly diagnosed Hypothyroidism on Type 2 DM patients. **Method:** Observational Cross Sectional Study was conducted in Medicine wards of Tertiary care Hospital in patients matching the Inclusion Criteria, In which detailed history and examination was done. **Result:** Patients with FBS 206 ± 84.11 , and PP2BS 310 ± 106.31 developed hypothyroidism in the form of either overt or subclinical and which was also statistically significant. ($p < 0.05$). **Conclusion:** Overweight and Obese patients of Type 2 DM, with increasing age were at Higher risk to develop Hypothyroidism. [Variya Dhruv Natl J Integr Res Med, 2019; 10(6):57-60]

Key Words: Diabetes Type 2, Hypothyroidism

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Introduction: Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both^{1,2}. There is autoimmune destruction of the β -cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action³. The abnormalities in carbohydrate, fat, and protein metabolism that are found in diabetes are due to deficient action of insulin on target tissues². Symptoms of marked hyperglycemia include polyuria, polydipsia, weight loss, sometimes with polyphagia, and blurred vision.

Hypothyroidism is a clinical state due to the decreased secretion of thyroid hormones viz., thyroxine (T4) and triiodothyronine (T3) or very rarely due to the decreased action of these hormones at tissue levels⁴, characterized by certain SYMPTOMS such as Tiredness, weakness, Dry skin, Feeling cold, Hair loss, Difficulty concentrating and poor memory, Constipation, Weight gain with poor appetite, Dyspnea, Hoarse voice, Menorrhagia (later oligomenorrhea or amenorrhea), Paresthesia, Impaired hearing; certain SIGNS such as Dry coarse skin, cool peripheral extremities, Puffy face, hands, and feet (myxedema), Diffuse alopecia, Bradycardia, Peripheral edema, Delayed tendon reflex relaxation, Carpal tunnel syndrome, Serous cavity effusions; CLINICALLY by Serum TSH, Free T3 and Free T4 level⁵. Some patients may have minor symptoms, this state is called subclinical hypothyroidism⁶.

Aims And Objectives: (1) To measure Serum TSH, FT3 and FT4 in patients of type 2 DM. (2) To find out the significance of Hypothyroidism in type -2 DM. (3) To study whether Hypothyroidism is associated with duration of diabetes or not.

Materials and Methods: 1. Study Site: Tertiary Care Hospital Of South Gujarat

2. Study Population : 110 cases of Type 2 Diabetes mellitus were examined for thyroid dysfunction. These cases were observed on indoor bases in our tertiary care hospital from March 2017 To July 2018.

3. Study Design: Observational Cross Sectional Study

4. Sample Size : Sample size was calculated by using open epi software, considering the proportion of type 2 DM without any co-morbidities at Department of Medicine in one month at our tertiary care hospital. $P=11.12\%$, Level of significance= 95% , Allowable error = 6% , No. of patients with Type 2DM = 110 (sample size).

Inclusion Criteria: (1) Patients with Type 2 diabetes aged more than 30 years. (2) Patients with known case of Type 2 diabetes irrespective of type of treatment (OHA/insulin).

Exclusion Criteria: (1) Known cases of hypothyroidism and Hyperthyroidism. (2) Age less than 30 yrs. (3) Patients with type 1 diabetes mellitus. (4) Pregnant and lactating females with diabetes (Gestational diabetes). (5) Subjects not willing to participate in study. (6) Associated co-morbidities due to diabetes which includes neuropathy, nephropathy, obesity, cardiovascular diseases.

Methodology: A detailed history was taken regarding presenting symptoms, duration of type 2 diabetes mellitus and clinical course of disease and Clinical Examination done to rule out Complications. Blood investigations were done including serum TSH, free T3 and free T4 and FBS, PP2BS and appropriate treatment was given.

Results: Patient profile as per type to thyroid disease is shown in table 1 and age wise distribution was shown in table 2

>40 (Morbid obesity)	-	-
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Table 1: Distribution of Thyroid disease

Thyroid profile	Number of cases (n=110)	Percentage (%)
Normal	90	82%
Overt hypothyroidism	12	11%
Subclinical hypothyroidism	8	7%
Total	110	100%

Uppal⁷ found that in his study of 120 diabetic patients, 17% of patients had hypothyroidism and 7.5% had hyperthyroidism. Celani et al⁸ in their study of 290 type 2 DM patients found that 91 patients (31.4%) had abnormal TSH concentrations out of which 48.3% had subclinical hypothyroidism, 24.2 had subclinical hyperthyroidism, 23.1% had overt hypothyroidism, and 4.4% had over hyperthyroidism.

Table 2: Age wise distribution of patients with type 2 DM with Hypothyroidism

Age(years)	Patients with Hypothyroidism (n=20)	Percentage (%)
31-40	0	-
41-50	2	10%
51-60	9	45%
61-70	5	25%
>70	4	20%

Table 3: BMI wise distribution of Type 2 diabetic patient with Hypothyroidism

BMI	Patients with Hypothyroidism (n=20)	Percentage (%)
<18.5 (Below Normal)	-	-
18.5-24.9 (Normal)	6	30%
25- 29.9 (Over weight)	12	60%
30- 34.9 (Class 1 obesity)	2	10%
35- 39.9 (Class 2 obesity)	-	-

This finding of our study was similar to Papazafiropoulou et al⁹ and Proce et al¹⁰, who also found prevalence of thyroid disorders to be significantly more in patients who had higher BMI. Demitrost¹¹ et al. found that, patients with BMI >25 were at increased risk of developing hypothyroidism. This finding was similar to our findings (Tabel 3). Similar findings were also observed by khurana et al¹².

Table 4: Relation of HbA1c and Hypothyroidism in diabetic patients

HbA1C	Patients with Hypothyroidism (n=20)	Percentage (%)
<7	2	10%
>7	18	90%

Table 5: Hypothyroidism in relation to duration of Diabetes

Duration(years)	Patients with Hypothyroidism (n=20)	Percentage (%)
<5	4	20%
6-10	12	60%
>10	4	20%
Total	20	100%

Diez et al¹³, in his study found no significant relationship between presence of thyroid Dysfunction and duration of diabetes. Shreeatha et al¹⁴, also found that there is no significant relationship between thyroid dysfunction and duration of diabetes mellitus. Result of our study are shown in table 4,5,6 and 7

Table 6: Hypothyroidism Verses Type Of Treatment

Type of Treatment	Patients with Hypothyroidism(n=20)	Percentage (%)
OHA	7	35%
Insulin	10	50%
OHA + insulin	3	15%
Total	20	100%

This finding was similar to celani et al⁸ and khurana et al¹² in which thyroid dysfunction was more common in patients taking insulin for treatment of DM.

Table 7: Comparison Of Various Parameters Between Normal Thyroid Profile and Hypothyroidism In Type 2 DM Patients

Parameters	Normal Thyroid Profile		Hypothyroidism		P-Value
	Mean	SD	Mean	SD	
Age	59.54	10.52	62.70	13	0.24
Duration	6.50	3.58	6.10	3.38	0.66
BMI	26.39	3.30	26.43	3.03	0.25
HbA1C	8.43	1.51	8.23	1.83	0.62
TSH	2.41	1.40	18.42	12.24	<0.00001
FT3	2.85	0.77	1.28	0.96	<0.00001
FT4	1.63	0.57	0.79	0.64	<0.00001

Analysis: Among 110 cases 20 (18%) patients had Hypothyroidism. 12 (11%) patients had overt hypothyroidism and 8 (7%) patients had subclinical hypothyroidism. Out of 20 patients with Hypothyroidism, 5 patients (25%) were in age group of 61-70 years, 9 (45%) were between 51 and 60 years, 2 (10%) were between 41 and 50 years. Thus, the incidence of thyroid dysfunction in the type 2 DM was seen more in the age group 51- 60 years.

Out of 20 patients with Hypothyroidism, 12 (60%) were overweight and 2 (10%) had class 1 obesity while 6 (30%) had normal BMI. Maximum patients were overweight.

Out of 20 diabetic patients who had Hypothyroidism, 4 (20%) had duration of diabetes up to 5 years, 12 (60%) had duration of diabetes 6 - 10 years and 4 (20%) had duration of diabetes >10 years.

Out of 20 Hypothyroid patients, 18 (90%) had HbA1C value 7% and above and the remaining 2 (10%) patient had HbA1C <7 compared with normal thyroid profile group. The mean HbA1C level of the patients with Hypothyroidism is 8.23%.

Out of 20 patients with Hypothyroidism, 7 (35%) were on OHA, 10 (50%) were on insulin and the rest 15% were on both OHA + insulin.

Discussion: Prevalence of Hypothyroidism in DM type 2 varies approximately between 8.6% – 24.5%. In our study, overt hypothyroidism and subclinical hypothyroidism, was seen in 18% of study population. The incidence of Hypothyroidism in type 2 DM was seen more in

the age group 51-60 years. Type 2 DM and Hypothyroidism are more common in overweight and obese patients. It is seen more commonly with higher levels of HbA1C. The duration of diabetes has no significant correlation with thyroid dysfunction. Patients taking insulin have more incidence of hypothyroidism than patients on oral ant diabetic drugs.

Thus, from above discussion patients who had mean FBS 206 ±84.11, and PP2BS 310 ± 106.31 developed hypothyroidism in the form of either overt or subclinical and which was also statistically significant.(p<0.05).

Akbar et al¹⁵ in their study of 100 type 2 diabetics found that the prevalence of thyroid dysfunction was 16% in diabetics ,Results of this study (16%) is similar to our study (18%) in view of thyroid dysfunction in T2DM.

Thyroid hormones contribute to the regulation of carbohydrate metabolism and pancreatic function and on the other hand, diabetes also affects thyroid function tests to a variable extent. However, underlying thyroid disorders may go undiagnosed because the common signs and symptoms of thyroid disorders are similar to those for diabetes and can be overlooked or attributed to other medical disorders.

The recognition of this interdependent relationship between thyroid disease and diabetes is of importance to guide clinicians on the optimal management of both these conditions. Thus, all patients with diabetes mellitus should be screened for thyroid function.

Conclusion: Prevalence of thyroid dysfunction in DM type 2 varies approximately between 8.6% – 24.5%. In our study, thyroid dysfunction, mainly in the form of overt hypothyroidism and subclinical hypothyroidism, was seen in 18% of study population. The incidence of thyroid dysfunction in type 2 DM was seen more in the age group 50-65 years. Type 2 DM and thyroid dysfunction are more common in overweight and obese patients. Thyroid dysfunction in type 2 DM is seen more commonly with higher levels of HbA1C. The duration of diabetes has no significant correlation with thyroid dysfunction. Patients taking insulin have more incidence of hypothyroidism than patients on oral ant diabetic drugs.

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