

Thyroid dysfunction study among Type 2 Diabetes Mellitus patients attending a Tertiary care Hospital

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Abstract: Introduction: Patients with one organ specific autoimmune disorder are at risk of developing another autoimmune disorder. Thyroid dysfunction among type 2 diabetes mellitus increases the risk of diabetic complications like nephropathy, neuropathy, retinopathy. Here in this study we concentrated on the prevalence of thyroid disorders among type 2 diabetes mellitus patients, an attempt to provide appropriate treatment and to prevent complications due to endocrine disorders. Materials and Methods: A total of 96 persons attending Out Patient department of General Medicine were selected to do this study including general population without any endocrine & autoimmune disorders and patients who are already diagnosed with diabetes mellitus type 2. They were divided into two groups, 48 members each - Group 1: Patients attending to General medicine OPD without any endocrine disorders and Group 2: Patients presenting with diabetes mellitus type 2. Results: Thyroid dysfunction prevalence detected in 7 (14.5%) out of 48 patients with type 2 Diabetes mellitus, whereas in general population 4.16% thyroid dysfunction was observed. Hypothyroidism observed in type 2 diabetic patients was 10.4%. Hyperthyroidism observed in type 2 diabetes mellitus was 4.16%. Majority of the thyroid disorders diagnosed with Type 2 diabetes mellitus were seen in females (57.1%) than male diabetics (42.8%). Conclusion: Even low normal range thyroid levels raise the risk of developing type 2 diabetes. Both the disorders should needs to be considered cautiously, diagnose early and treat promptly to avoid further complications.

Keywords: Diabetes Mellitus, Thyroid disorder

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I. Introduction

In general population, thyroid disorders are most common and also prevalence increases with age, predominantly females are affected [1,2,3] Depending on the function of thyroid, two types of thyroid disorders: Hypothyroidism and hyperthyroidism. Prevalence of hypothyroidism in adults is 3-10% [4]. By contrast, hyperthyroidism is much less common. Thyroid regulates numerous metabolic processes throughout the body. Thyroid gland is under control hypothalamus pituitary gland. Diabetic patients have a higher prevalence of thyroid disorders when compared to general population, [5] with the hypothyroidism being the most common disorder. The pancreas and the thyroid are both in the endocrine system. Diabetes patients are at the increased risk of other endocrine disorders. Although the risk more with type I diabetes, type 2 diabetes are also at risk for thyroid disease. Thyroid disorders also increases of risk of diabetic complication can worsen many diabetic conditions, such as neuropathy [6]. Thyroid levels in blood plays an important role in regulating blood glucose levels. when thyroid levels are high, blood levels get elevated due to faster utilization of insulin. In contract when, thyroid levels are low, insulin is used up slowly, so blood glucose levels could drop low. There is a definite need to screen for thyroid disorder among diabetes & vice versa[7], can help to treat promptly. When compared to general population, pre diabetes had a 40 times risk of developing type 2 Diabetes if they already had a thyroid disease [8]. Diabetic patients with high insulin levels are at more risk to develop thyroid disorders. Diagnosis of glucose intolerance needs to be cautiously considered. Thyroid dysfunction among type 2 diabetes mellitus increases the risk of diabetic complications like nephropathy, neuropathy, retinopathy [9]. Here in this study we concentrated on the prevalence of thyroid disorders among type 2 diabetes mellitus patients, an attempt to provide appropriate treatment and to prevent complications due to endocrine disorders.

II. Materials And Methods

A study done on Diabetes and thyroid disorders correlation prospectively for about one year (2016) in the Department of General Medicine, Government General Hospital, Ananthapuram. Informed consent has taken from all the patients before doing this study. Patients with diabetes mellitus type 2 without any other endocrine disorders were selected to do this study.

A total of 96 persons attending Out Patient department of General Medicine were selected to do this study including general population without any endocrine & autoimmune disorders and patients who are already diagnosed with diabetes mellitus type 2. They were divided into two groups, 48 members each - Group 1: Patients attending to General medicine OPD without any endocrine disorders and Group 2: Patients presenting with diabetes mellitus type 2.

Exclusion criteria: patients with endocrine disorders other than diabetes mellitus type 2

Inclusion criteria: Type 2 Diabetes mellitus patients

General population without endocrine disorders

Age - >20 years.

Both the groups were advised to undergo Thyroid function test, where T3, T4 and TSH were analyzed. Results from both groups were analyzed and compared thyroid disorders in both groups.

III. Results

48 members of Group 1 patients were selected in corresponding with age and sex of Group 2 patients, so that age and sex factors should not affect the aim of the study. Out of 48 Diabetes Mellitus type 2 patients, 21 were in the age group of 41-50 years, followed by 13 were above 50 years, 10 were belonged to 31-40 years and 4 were 21-30 years. Female predominance was seen among Type 2 Diabetes Mellitus, 32 were females and 18 were males.

Thyroid dysfunction prevalence detected in 7 (14.5%) out of 48 patients with type 2 Diabetes mellitus, whereas in general population 4.16% thyroid dysfunction was observed. 10.34% of higher prevalence of thyroid dysfunction was observed in diabetic patients (Table 1).

Table 1. Incidence of Thyroid disorders among general population and Type 2 Diabetes Mellitus

Thyroid dysfunction	General Population (n=48)	Percentage	Type 2 DM patients (n=48)	Percentage
Present	2	4.16%	7	14.5%
Absent	46	95.8%	41	85.4%

Two persons detected with thyroid dysfunction among general population group were shown elevated TSH levels and normal T4, T3 levels considered under subclinical Hypothyroidism. Hypothyroidism observed in type 2 diabetic patients was 10.4%. Hyperthyroidism observed in type 2 diabetes mellitus was 4.16% (Table 2). Majority of the thyroid disorders diagnosed with Type 2 diabetes mellitus were seen in females (57.1%) than male diabetics (42.8%).

Table 2. Thyroid disorders incidence among Diabetes mellitus patients

Thyroid disorders	No. of diabetic patients (n=48)	Percentage
Hypothyroidism	5	10.4%
Hyperthyroidism	2	4.16%

IV. Discussion

The affect of thyroid dysfunction among diabetic patients, pathogenesis of diabetes and thyroid correlation explained in many ways. Hyperthyroidism associated with worsening glycemic control in due to underlying increased hepatic gluconeogenesis, rapid gastrointestinal glucose absorption and probably increased insulin resistance.

Thyroid gland produces vital hormones by utilizing iodine such as T3 (Triiodothyronine) & T4 (Thyroxine). T4 is the primary hormone released by the gland delivers to various body tissues via blood stream. A small portion of T4 is converted to T3, which is an active hormone. These hormones are regulated in blood and body tissues by the feedback mechanism involving hypothalamus releasing thyrotropin releasing hormone (TRH) that causes pituitary gland to release thyroid stimulating hormone (TSH), which in turn stimulates thyroid gland to release T4.

Thyroid disorders are usually confirmed by laboratory testing of T4, T3, TSH, Anti thyroglobulin, antithyroid peroxidase, TSH receptor antibodies. Thyroid disorders usually seen in patients who already had pre diabetes. Thyroid diseases should be treated before it affects blood glucose levels adversely [10]. E. Almekinder [8] documented adults with thyroid levels lower 33.33 percent had a 1.4 times higher risk of developing type 2 Diabetes when compared to patients with thyroid levels upper 33.33 percent. Vibha Uppal et al [11] documented that There was a significant correlation between glycosylated haemoglobin and thyroid hormones. There was no correlation between serum insulin and thyroid hormones.

In similar to our study Perros et al [12] observed female preponderance in thyroid diseases when compared to male diabetic patients with 31.4% and 6.9% respectively. Many of the studies reported a thyroid dysfunction is higher in diabetic population when compared to general population. Perros et al [12] reported

13.4% of thyroid diseases in diabetics. Papazafiropoulou A et al [13], Akbar DH et al [14], Radaideh ARM et al [15] stated that thyroid prevalence in diabetic patients was 12.3%, 16%, 12.5% respectively.

Patricia Wu [5] conducted a high quality study on Thyroid disease and Diabetes, documented thyroid disease prevalence in general population as 6.6%, whereas 10.8% among Diabetic patients and also reported 36% Hypothyroidism, 513% Subclinical hypothyroidism, 12% Hyperthyroidism, 11% Postpartum thyroiditis.

Thyroid releasing hormone stimulates production of thyroid stimulating hormones is limited and the nocturnal TSH peak is reduced in diabetic patients [16]. Coiro et al [17] documented amelioration in glycemic control did not restore the nocturnal TSH peak in type 1 diabetics. In diabetics, impairment of conversion of T4 to T3 may be the cause of reduced T3 levels. Thyroid Nodules formation due to proliferation of tissue associated with higher insulin levels [18,19].

V. Conclusion

Thyroid disorders and Diabetes mellitus are two closely related autoimmune disorders.. Especially in Diabetes patients with unexplained worsening hyperglycemia underlying hyperthyroidism should be considered. Hypothyroidism can exacerbate dyslipidemia in diabetes patients which further increase cardiovascular complications. Even low normal range thyroid levels raise the risk of developing type 2 diabetes. Both the disorders should needs to be considered cautiously, diagnose early and treat promptly to avoid further complications.

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