

**Research Article****PREVALENCE OF THYROID DYSFUNCTION IN DIABETIC PATIENT**

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ABSTRACT

The study was undertaken with an objective to know the thyroid functions in Type 2 diabetics and to know the spectrum of thyroid dysfunction in Type 2 DM. 100 type 2 diabetic patients were retrospectively investigated who were admitted for the Diabetes Centre in Al-Qurayyat Governorate, Al-Jouf, and KSA. Parameters investigated in the study are age, body mass index, fasting blood glucose, post-prandial blood glucose, glycosylated hemoglobin, free triiodothyronine (fT3), free thyroxine (fT4) and thyroid-stimulating hormone (TSH). The diabetic patients studied, 69% had normal thyroid profile (euthyroid) and 31% showed thyroid dysfunction (25% had subclinical hypothyroidism, 3.5% had clinical hypothyroidism, and 2.5% had clinical hyperthyroidism) while no cases of subclinical hyperthyroidism were found.

Key words: Prevalence, Diabetes mellitus, Hypothyroidism, Type 2 diabetes mellitus, thyroid disorders.

INTRODUCTION:

Diabetes Mellitus is the most common disorder seen. The impact of this disease on the quality of life, and on morbidity and mortality through the complications that affect the small and large vessels resulting in retinopathy, nephropathy, neuropathy, IHD, and large vessel obstruction has been emphasized by the findings of the national commission (USA) on diabetes and DCCT trial.

¹Diabetes being the most common endocrine metabolic disorder, there was curiosity to understand and learn the association of this with another common endocrine gland function that is thyroid gland. The association between these two disorders has long been recognized although the prevalence of thyroid dysfunction in diabetic population varies widely between studies.² With insulin and thyroid hormone being intimately

involved in cellular metabolism and thus excess or deficit of these hormones result in functional derangement of the other. Enhanced sensitivity and specificity of TSH has greatly enhanced assessment of thyroid functions.³

Diabetes is manifested as a group of metabolic disorders with a common phenotype of increased blood glucose level (hyperglycemia). Hyperglycemia is a disorder of the endocrine system that can be easily described briefly as reduced insulin secretion, compromised insulin action, increased production and decreased breakdown of blood sugar.⁴ Many factors contribute to this highly-spread disease, like obesity, sedentary life-style and high blood pressure⁵. The pathogenic processes involved in hyperglycemia include autoimmune destruction of pancreatic insulin-secreting cells (β -cells) resulting

in insulin deficiency and abnormalities that result in insulin resistance. Diabetes mellitus is divided into two major types; the first is called insulin-dependent diabetes or type 1 diabetes (T1DM). In this case, pancreatic beta cells release insufficient amounts of insulin or no insulin. The other major type of diabetes is called insulin non-dependent diabetes or type 2 diabetes (T2DM) which is the more common form of DM (90-95% of all diabetic cases). This type results from combination of resistance to insulin action in body cells and an inadequate insulin secretion from pancreatic beta cells ⁶.

2. MATERIALS AND METHODS:

The current study involved a retrospective investigation of 100 confirmed diabetic patients. Patients enrolled in the current study involved those patients who were follow up at QDC in Al-Qurayyat Governorate, Al-Jouf, and KSA. Those patients were diagnosed by the physician as diabetics based on previous fasting plasma glucose >126 mg/dl, postprandial blood glucose >200 mg/dl, and who were receiving oral hypoglycemic agents and/or insulin, and also the patients who were diagnosed as type 1 diabetics and receive insulin injections. Medical data records of the patients were carefully and thoroughly examined. The parameters investigated in this study included age, body mass index (BMI) [BMI= weight in Kgs divided by height in meters squared], fasting blood sugar (FBS), post-prandial blood sugar (PPBS), glycosylated hemoglobin (HbA1C), free tri-iodothyronine (ff3), free thyroxine (ft4) and

thyroid-stimulating hormone (TSH). Depending on the existence or absence of thyroid dysfunction in our subjects, they were divided into two main groups; the first included euthyroid diabetic patients who had normal thyroid profile (normal levels of ff3, ft4 and TSH), and the second group included diabetic patients with a coexistent Ill. According to their thyroid profiles, the latter were categorized into four groups as follows:

- Diabetic patients with increased TSH levels and normal ft3 and ft4 levels were considered to have subclinical hypothyroidism.
- Diabetic patients with increased TSH levels and decreased ft3 and f14 levels were considered to have clinical hypothyroidism.
- Diabetic patients with decreased TSH levels and normal ft3 and ft4 levels were considered to have subclinical hyperthyroidism.
- Diabetic patients with decreased TSH levels and increased ft3 and ft4 levels were considered to have clinical hyperthyroidism ⁷⁻⁸.
- Statistical analysis Statistical analysis was done using SPSS version 15 for Windows (SPSS Inc, Chicago, IL, USA).

3. RESULTS:

The current study included data records of and 100 type 2 DM (T2DM) patients (50 males and 50 females)Data demonstrate the mean age, BMI, FBS, PPBS, HbA1C, ft3, ft4 and TSH in both T1DM and T2DM groups in both genders; males and females. Mean BMI was >25 indicating the states of overweight and obesity. FBS, PPBS and HbA1C indicate confirmed diabetes. ft3, ft4 and TSH were

used to classify patients with TD as shown above in materials and methods.

Out of the 16 Hypothyroid subjects 1 had overt hypothyroidism and 15 had Sub-clinical hypothyroidism. Hyperthyroidism was noted in 13 people. 3) In the present study of 100 patients with Type 2 diabetes, 50 were males and 50 were females. We have found that prevalence of thyroid dysfunction was more among females than in males. 11 out of 50 male patients had thyroid dysfunction where as 18 of the 50 females were suffering from thyroid disorders.

In this study we had 68 people with type 2 diabetes below the age of < 60 years (adult and middle age) and 32 people over the age of 60 years (elderly). The spectrum of thyroid disorders among this groups were as follows – Out of the 68 patients below the age of 60 years 5 had sub-clinical hypothyroidism, 1 hypothyroid and 12 of them where hyperthyroid and out of 32 elderly patients we found 10 with sub-clinical hypothyroidism and 1 had hyperthyroidism. No hypothyroid cases where noted in elderly people.

In this study prevalence of sub-clinical hypothyroidism (31.25%) was more in elderly compared to 7.36% in adult and middle age group, where as 17.65% below the age of 59 years had hyperthyroidism to that of 3.12% among elderly. Hypothyroidism was present in 1.47% of people below the age of 59 yrs where as none of the elderly had hypothyroidism.

Table 1: Prevalence of thyroid dysfunction in diabetes

| Thyroid Disorders | No. of cases |
|-----------------------------|--------------|
| Normal | 69 |
| Hypothyroidism | 2 |
| Sub-clinical Hypothyroidism | 16 |
| Hyperthyroidism | 13 |

4. DISCUSSION

Among the endocrinal metabolic diseases diabetes occupies the major share. India has the dubious distinction of being home to the largest number of people suffering from diabetes in any country. The disease is responsible for significant mortality and morbidity due to the complications This study was conducted at MVJ medical college, Thyroid functions where studied in type 2 Diabetes Mellitus patients attending the OPD and IPD of MVJ hospital. A total of 100 type 2 diabetics were studied. All were confirmed diabetics who previously had plasma glucose levels of >126 mg/dl or RBS of >199 on more than one occasion and were receiving treatment such as Insulin, OHA's or physical exercise therapy. All these patients comprised of rural population. Prevalence and spectrum of thyroid disorders in type 2 diabetics.

In this study of 100 patients with type 2 diabetes 50 where males and 50 females. We have found 29 patients with thyroid disorders that are 29%, and numbers of reports have also indicated higher than normal prevalence of thyroid disorders. Pasupathi et al in their study found that prevalence of thyroid disorder was 45% among type 2 diabetics. Hypothyroidism was present in

28% and 17% had hyperthyroidism. A prevalence of 12.3% was reported among Greek diabetic patients and 16% of Saudi patients with type 2 diabetes were found to have thyroid dysfunction. In Jordan, A study reported that thyroid dysfunction was present in 12.5% of Type 2 diabetic patients. Perros et al. demonstrated an overall prevalence of 13.4% of thyroid diseases in diabetics with the highest prevalence in type 1 female diabetics (31.4%) and lowest prevalence in type 2 male diabetics (6.9%). In this study out of the 29 patients with thyroid dysfunction 15 had hypothyroidism, 1 had overt hypothyroidism and 13 had hyperthyroidism. It is noted that there is a lower incidence of Thyroid dysfunction in diabetics among Europeans as compared to that of Indians as per the Indian studies.

In this study sub-clinical hypothyroidism was more among females 22% compared to males 8%. Sub-clinical hypothyroidism was more common among elderly females 12%. Hyperthyroidism was almost equal in either sex with 12% in males and 14% in females. Overt hypothyroidism was present in one male patient in our study.

5. CONCLUSION:

Prevalence of thyroid dysfunction was seen in 29% of diabetics studied. Sub-clinical hypothyroidism was more common than other conditions which constituted 22% of the thyroid dysfunction in the Diabetics. Elderly patients had higher incidence (34.4%) of thyroid dysfunction. • Thyroid disorders are more in females (36%) than males 22%. Patients with hyperthyroidism presented with

clinical features of thyroid disorders (61%) where as hypothyroid patients did not have any signs and symptoms. Thirty six percent of people with thyroid dysfunction had poor glycemic control even with treatment. Severe forms of diabetic complications were noted in subclinical hypothyroidism. Hence, patients with sub-clinical hypothyroidism must undergo frequent ophthalmic checkup's to rule out retinopathy and also renal function test for nephropathy, There is no relation of thyroid disorders with duration of diabetes . A serum TSH within euthyroid range almost always eliminates the diagnosis of hypo or hyperthyroidism. This shows that TSH is preferred screening test for thyroid dysfunction in diabetics.

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