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Determine if Thyroid Function Testing Should Be Incorporated Into the Type 2 Diabetes Inquiry Process

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ABSTRACT

Background: In diabetes mellitus, abnormal thyroid hormone levels are observed. Insulin and iodo-thyronines regulate the metabolism of carbohydrates, proteins, and lipids; the lack of these hormones slows the development of diabetes, whereas elevated amounts are diabetogenic. Insufficiency or excess of Insulin and thyroid hormones leads to dysfunction.

Aims and Objectives: To investigate if thyroid function tests should be incorporated into the diagnostic procedure for type 2 diabetes.

Materials & Methods: Santosh Medical College and hospital, Ghaziabad, Department of Medicine, on patients who will be visiting the Medicine OPD of Santosh Hospital Ghaziabad. Due to the fact that this hospital serves all segments of society, the sample taken from this hospital accurately represents the Indian population from 1 June 2019 to 31 May 2020. The trial will comprise 500 individuals with type-2 diabetes mellitus who randomly present to the Santosh hospital, regardless of age or gender.

Results: Between 40 and 49 years, there were 97 patients with Type 2 diabetes, between 50 and 59 years, there were 173 patients, between 60 and 69 years, there were 146 patients, between 70 and 79 years, there were 55 patients, and between 80 and 89 years, there were 29 patients.

Conclusion: The prevalence of thyroid dysfunction was evaluated in 500 type 2 diabetic patients at the Santosh hospital during a two-year period; sex preponderance was also detected in 170 diabetic patients with thyroid dysfunction. The significantly higher prevalence of thyroid dysfunction (1.34 percent) among people with type 2 diabetes. 64% of the total number of diabetic patients were female, indicating a significant female preponderance in the study group. The biggest majority of diabetics are between the ages of 50 and 59.

Keywords: diabetes, thyroid, dysfunctions, insulin, iodo-thyronines

1. INTRODUCTION

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Diabetic mellitus is defined as fasting blood sugar =/> 126 mg/dl following an eight-hour fast or (without eating anything) or by having non-fasting glucose levels =/>200mg/dl in conjunction with diabetes symptoms, or a glucose level of =/>200mg/dl on a two-hour glucose tolerance test, or HbA1c = /> 6.5%. (1).

Diabetes Prevalence in India

Indians have a greater tendency to developing diabetes. Several studies indicate that migratory Indians are prone to developing diabetes. The local population has a lower incidence of diabetes than Indian immigrants. (2).

The results of investigations on the prevalence of diabetes mellitus in India were comprehensively examined using the WHO diagnostic criteria for diabetes. 23 to 28% of illness prevalence was found in the urban population, while 2 to 5% was found in the rural population. In the following decade, higher values of impaired glucose tolerance ranging from 3.6% to 9.1% indicate a greater prevalence of diabetes mellitus (3). According to the World Health Organization, India had 69.2 million diabetics in 2015 The expected numbers for 2025 and 2035 are 80 million and 108 million, respectively (4).

Diabetes mellitus is marked by abnormal thyroid hormone levels (17).Insulin and iodo-thyronines regulate the metabolism of carbohydrates, proteins, and lipids; the lack of these hormones slows the development of diabetes, whereas elevated amounts are diabetogenic. Insufficiency or excess of Insulin and thyroid hormones causes dysfunction (18).

Despite this, hypothyroidism is associated with a variety of alterations in glucose metabolism. Subclinical hypothyroidism exacerbates the dyslipidemia observed in type2 diabetes, but adequate thyroxin replacement reverses it, hence reducing the risk of cardiovascular disease. (19). The published data on thyroid illness in diabetes originate from inpatients, outpatients, and general practise samples, and longitudinal data are scarce. However, Indian studies on thyroid abnormalities in type 2 diabetic patients are poor, and such studies among diabetic populations do not exist in this region of the country; so, we conducted this study.

Diabetes has been known to humans since prehistoric times. Throughout all of history, little was known about this lethal condition characterised by bodily wasting, severe thirst, and frequent urination. According to historical evidence, the Indians had awareness of diabetes mellitus as early as prehistoric times. During the Vedic period (600 BC), the ailment was known as Asrava, and it is described in depth in CharakSamhita, sushrutasamhita, and Vagbhatta. AsthangaHridaya (600 A.D.) is the first medical text in which the term glycosuria is used to define madhumeha (diabetes mellitus).

In diabetes mellitus, environmental influences are equally as important as hereditary factors. Inappropriate dietary habits, dyslipidemia, Obesity, hypertension, cigarette smoking, immunological response, viral infections, and all conditions that raise insulin need or lower the likelihood of insulin production in the Beta-cells are included.

CAUSE

Insulin deficiency, which is absolute in type I diabetes but relative in type II diabetes, is the fundamental cause of diabetes mellitus. There could be a lot of reasons for this.

Near 3 to 4 weeks of gestation, the thyroid gland arises as an epithelial proliferation on the floor of the pharynx near the base of the tongue, between the tuberculumimpar and the copula

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linguae, at a site later identified as the foramen cecum. The thyroid then descends in front of the pharyngeal gut via the thyroglossal duct as a bilobed diverticulum. In later weeks, it migrates to the base of the neck. Throughout migration, the thyroid stays linked to the tongue via the thyroglossal duct.

At 18-20 weeks of gestation, the foetal hypothalamus and pituitary begin to secrete thyrotropin-releasing hormones (TRH) and thyroid-stimulating hormones (TSH), while foetal production of thyroxin (T4) reaches a clinically significant level (13). Prior to 30 weeks of gestation, foetal T3 levels are low (less than 15 ng/dl), increasing to 50 ng/dl at term. The ability of the foetus to manufacture its own thyroid hormones protects the foetus from problems in brain development, such as hypothyroidism in the mother. However, premature infants may face neurodevelopmental difficulties due to a lack in maternal thyroid hormones because their own thyroid is not fully developed to meet their postnatal requirements (14).

It has been demonstrated that subclinical hypothyroidism affects around one in twenty women with type 2 diabetes. Ridgway et al. conducted a study that revealed a higher frequency of untreated thyroid disease among Americans, with women being more susceptible than men. In their study, 11.7% of diabetics had thyroid malfunction, including 9.5% hypothyroidism and 2.2% hyperthyroidism (23). Few Indian investigations are undertaken to determine the relationship between thyroid autoimmunity and type II diabetes. Gautam et al. demonstrated two populations. In the first group, the incidence of diabetes increased fivefold among hypothyroid individuals, and hypothyroidism was also fivefold more prevalent among diabetic patients compared to the general population.

The clinical and biochemical characteristics of diabetes mellitus in the Indian population are notably distinct from those in western nations. They examined the prevalence of thyroid microsomal antibody and thyroglobulin antibody in patients with insulin-dependent diabetes mellitus, insulin-independent diabetes mellitus, and healthy controls. Patients with insulin-dependent diabetes mellitus had a higher incidence of thyroid antibodies, with thyroid microsomal antibody titre exceeding thyroglobulin antibody titre. This study revealed that patients with insulin-dependent diabetes mellitus are more susceptible to self-tolerance loss of thyroid antigens (14).

2. MATERIALS AND METHODS

Santosh Medical College and hospital, Ghaziabad, Department of Medicine, on patients who will be visiting the Medicine OPD of Santosh Hospital Ghaziabad. Due to the fact that this hospital serves all segments of society, the sample taken from this hospital accurately represents the Indian population from 1 June 2019 to 31 May 2020. Using the following formula from open Epi: (open source Epidemiologic statistics for public health) v3.2 software, the sample size n was computed.

The trial will comprise 500 individuals with type-2 diabetes mellitus who randomly present to the Santosh hospital, regardless of age or gender.[14-16] The following criteria were used to diagnose type 2 diabetes mellitus: All subjects were on a diabetic diet, oral anti-diabetic medications, insulin, or a combination thereof.

All of the resulting data was statistically evaluated to get unambiguous results. The data were tabulated, and each table was numbered and given an appropriate title. Bar charts were used to display some of the pertinent data. The arithmetic mean was calculated to obtain the data's

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centre value. Where the mean was affected by an extreme value, the standard deviation was subtracted and the percentage was computed.

Blood sugar will be measured using glucose uptake oxidase peroxidase. Glucose

Age in years	Type 2 diabetes patients	% of Total patients
40-49	97	19.4
50-59	173	34.6
60-69	146	29.2
70-79	55	11

oxidase is an enzyme isolated from Aspergillus Niger's growing medium. Glucose oxidase catalyses the oxidation of plasma beta D-glucose to D glucono-1, 5-lactone by the production of hydrogen peroxide; the lactone is subsequently slowly hydrolyzed to D-gluconic acid. [17-19] A peroxidase enzyme subsequently converts the hydrogen peroxide generated into oxygen and water. Oxygen reacts with an oxygen acceptor, such as ortho toluidine, to form a coloured molecule, the concentration of which can be detected using colorimetry.

Statistical Package of Social Science was used to do the analysis (SPSS Version 19; Chicago Inc., USA). The statistical significance of the comparisons was determined by employing particular tests. The mean values of quantitative variables were used to differentiate them from qualitative variables' proportions. The significance level was determined to be P 0.05.

3. RESULTS

At Santosh hospital Ghaziabad, we conducted the study among type2 diabetic patients to find out thyroid disorder prevalence.

Table-1: Gender distribution of type2 diabetic patients

The study was conducted on 500 randomly selected patients on type-2 diabetes mellitus of age=/> 40 yrs. and both sex attending to the Santosh hospital as out patients. Out of 500 patients 180 were males and 320 females.

Table-2: AgeWise Distribution of Type 2 Diabetic patient

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GENDER	NUMBER	% OF TOTAL PATIENT
Male	180	36
Female	320	64
TOTAL	500	100%

Following table shows the Age wise distribution of Type 2 diabetic patients between 40-49 years there were 97 patients, between 50-59 years there were 173 patients, between 60-69 years there were 146 patients, between 70-79 years there were 55 patients and between 80-89 years there were 29 patients.

4. DISCUSSION

As is generally known, diabetes mellitus is the most frequent endocrine condition encountered in general practise. In this study, we randomly selected 500 patients with type 2 diabetes who were outpatients at our hospital. They represented a variety of Native American backgrounds. 170 of the selected patients have an altered thyroid condition, a prevalence of 33.8%. [20] In the study conducted by Smithson on the diabetic population of the United Kingdom, the prevalence of undiagnosed thyroid illness was 5.8% and 10.8% among all diabetic patients.

In the present study, thyroid dysfunction has a prevalence of 34%, with hypothyroidism being the most prevalent at 19.2%, followed by subclinical hypothyroidism at 11.6%, and hyperthyroidism being the least prevalent at 3.4%. In a study by Smithson, 5% of diabetics had a thyroid condition, including 2.5% hypothyroid, 1.8% subclinical hypothyroid, and 0.45% hyperthyroid. The Maazozair study revealed that 28% of diabetics have a thyroid issue, with subclinical hypothyroidism being the most prevalent at 18.8%. [23-25] The prevalence of thyroid problem among diabetics was found to be 35.8%, with 61.9% hypothyroidism and 27.3% subclinical hypothyroidism. Thus, we conclude that screening for thyroid profile in individuals with type 2 diabetes is cost-effective.[18-20] Our study's outcomes were superior to those of Smithson and Ridgway, but comparable to those of MaazOzair and Surendra Kumar. Hypothyroidism was the most prevalent thyroid malfunction in type 2 diabetes in our study.

5. CONCLUSION

The prevalence of thyroid dysfunction was studied in 500 type 2 diabetic patients at the Santosh hospital during a two-year period; sex preponderance in 170 diabetic patients with thyroid dysfunction was also identified.Our study's conclusion is summarised below.Our study reveals a significantly greater prevalence of thyroid dysfunction in patients with type 2 diabetes at 1.34 percent.There was a noticeable female preponderance in the study group, with 64% of the total number of diabetic patients being female.

The greatest number of persons with diabetes are between the ages of 50 and 59.The largest number of patients with hypothyroidism was 19.2%, followed by 11.6% with subclinical hypothyroidism. There is a female majority among diabetes patients with thyroid issues (22.8% of the overall study population).72 female patients (14.4% of the total study group)

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had hypothyroid and 35 female patients (7% of the total study group) had subclinical hypothyroid. In males, 24 (4.8% of the total study population) had hypothyroidism and 23 (4.6% of the study population) had subclinical hypothyroidism.

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