

Frequency of Thyroid Function Abnormalities among Patients of Type II Diabetes Mellitus

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ABSTRACT

Objective: To determine the frequency of thyroid function changes in type II Diabetes mellitus patients

Material and methods: This cross-sectional study was carried out at the Medicine OPD of Indus Medical College Tando Muhammad Khan. The study duration was six months, from December 2020 to May 2021. All the diagnosed cases of type 2 diabetes mellitus, aged 40 to 65 years and both genders were included. Each case underwent a 5 ml blood sample, which was sent immediately to the diagnostic laboratory of the hospital to assess the TSH level for thyroid function. The research proforma was applied to gather all the data, and SPSS software version 26 was utilized to analyse the results.

Results: A total of 200 diabetic patients were studied; their average age was 46.23+7.11 years. Females were in the majority 60.0%. The overall average of HbA1c was 7.02+1.41%. Out of all the hypothyroidism cases were 6.5% and hyperthyroidism cases were 2.5%, while in 90.0% of the cases, thyroid stimulating hormone (TSH) was normal. Thyroid function abnormalities were statistically insignificant according to gender (p=993).

Conclusion: As per the study conclusion, thyroid function abnormalities were observed to be 9% among patients of type II diabetes mellitus.

Keywords: Diabetes, Type II, thyroid function, HBA1C

INTRODUCTION

Type II Diabetes Mellitus (T2DM), one of the most common metabolic diseases in the world, is brought on by the interaction of two principal elements: incorrect insulin production by pancreatic beta-cells and improper insulin sensitivity in insulin-sensitive tissues.¹ The prevalence of diabetes has increased substantially in recent decades. An individual's quality of life is impacted by the chronic, degenerative condition known as diabetes mellitus. It requires ongoing medical care, education of patients and their families, and related care to control the illness and avoid chronic consequences.² Individuals having Type 2 Diabetes Mellitus exhibit physical, physiological, and psychological impairments that have an impact on the family, the community, and the healthcare system as a whole; they commonly end up in the hospital due to these issues.² During time, many diabetic people manifest symptoms of thyroid dysfunction. Individuals having diabetes mellitus type 2 are at a higher risk of developing hypothyroidism due in large part to insulin resistance. Diabetic individuals' hypothyroidism worsens their dyslipidemia, high blood pressure, and coronary heart disease.³ Thyroid issues and DM have been linked for a long time, and there is evidence that they influence one another.⁴ It has been noted that thyroid dysfunction occurs more frequently as individuals become older, and that females and diabetics are more likely to have thyroid issues than non-diabetics.^{4,5} To find asymptomatic thyroid dysfunction in diabetes individuals, thyroid illness should be tested annually.⁶ The likelihood of aberrant metabolism of the glucose may also need to be investigated in cases having thyroid dysfunction, as levels of thyroid hormones might enhance insulin resistance, absorption of the glucose by the intestine, and hepatic glucose synthesis.⁶ Additionally, there are geographical variations in diabetes manifestations due to genetic and environmental factors that affect diabetic occurrence and the consequences of potential risks (like thyroid impairment) on the mechanisms of diabetes related complications.⁸⁻⁹ The link between levels of thyroid hormone and the likelihood of developing T2DM is still hotly debated, and investigations in humans have produced contradictory results.¹⁰ Numerous studies have suggested that having high TSH and low free thyroxine levels is beneficial for treating hyperglycemia and resistance of the insulin,¹⁰⁻¹² but others have claimed that there is no connection between these two diseases.^{10,13} This study has

been done to determine the frequency of thyroid function changes in type II diabetes mellitus patients.

MATERIAL AND METHODS

This cross-sectional study was carried out at the Department of Medicine (OPD) of Indus Medical College Tando Muhammad Khan. The study duration was six months, from December 2020 to May 2021. All the diagnosed cases of type 2 diabetes mellitus (HbA1c >6.5%) from the ages of 40 to 65 years, and both genders were included. All the patients having chronic liver disease, gestational diabetes, diabetes mellitus type I, patients with a history of thyroid surgeries, and those who did not agree to participate in the study were excluded. A verbal informed consent was taken from all the study subjects. All the costs of the blood tests were done by the researcher himself. Each case underwent a 5 ml blood sample, which was sent immediately to the diagnostic laboratory of the hospital, to assess the TSH level for thyroid function and random blood sugar. The research proforma was applied to gather all the data, and SPSS software version 26 was utilized to analyse the results.

RESULTS

A total of 200 diabetic patients were studied; their average age was 46.23+7.11 years. Females were in the majority 60.0%, and males were 40.0%. overall average of HbA1c was 7.02+1.41%, average random blood sugar was 180.0+20.56 mg/dl and average TSH was 3.77+2.31mIU/L. Table.1

Out of all the hypothyroidism cases were 6.5% and hyperthyroidism cases were 2.5%, while in 90.0% of the cases, thyroid stimulating hormone (TSH) was normal. Table.2

Table 1: Descriptive statistics of the demographic data n=200

Variables	Statistics	
Age (years)	46.23+7.11 years	
Gender	Males	80(40.0%)
	Females	120(60.0%)
Residential status	Rural	87(43.5%)
	Urban	113(56.5%)
Hba1c	7.02+1.41%	
RBS	180.0+20.56 mg/dl	
TSH	3.77+2.31mIU/L	

Thyroid function abnormalities were slightly higher among females than males, while findings were statistically insignificant according to gender (p=993). Table.3

Table 2: Thyroid function abnormalities n=200

Variables	Statistics	
Normal	182	91.0%
Hypothyroidism	13	6.5%
Hyperthyroidism	5	2.5%

Table 2: Thyroid function abnormalities according to gender n=200

Thyroid function	Gender		Total	p-value
	Males	Females		
Normal	73	109	182	0.993
	36.5%	54.5%	91.0%	
Hypothyroidism	5	8	13	
	2.5%	4.0%	6.5%	
Hyperthyroidism	2	3	5	
	1.0%	1.5%	2.5%	
Total	80	120	200	
	40.0%	60.0%	100.0%	

DISCUSSION

Thyroid hormones play a role in insulin sensitivity and glucose regulation and are crucial for metabolism and energy homeostasis.⁹ In comparison to non-diabetics, diabetic patients had greater prevalence rates of thyroid problems, and diabetes type 2 frequently showed overt hypothyroidism (T2DM).^{8,14} In this study, the average age of the patients was 46.23 + 7.11 years. Consistently, in the study of Bai K et al¹⁵ reported that the patient's average age was 45.85 + 9.08 years. On the other hand, Abidi AR et al¹⁶ reported that the patients' mean age was 59.81 ± 12.8 years for 37 males and 55.31 ± 11.10 years for 63 females. Okafor EN et al¹⁷ also reported that the average age of the patients was 49.22 ± 9.79 years. In this study, females were in the majority 60.0% and males were 40.0%. These findings were almost similar to the study of Abidi AR et al¹⁶ as out of 100 diabetes patients, 37 were males and 63 were females. Abidi AR et al¹⁶ reported that the out of all females were 210 and males were 50. In this study, the overall average of HbA1c was 7.02+1.41%, average random blood sugar was 180.0+20.56 mg/dl, and average TSH was 3.77+2.31mIU/L. On the other hand, Elebrashy IN et al⁴ reported that the average glycosylated haemoglobin was 9.3 ± 2.66%. In the study of Al-Geffari M et al⁶ reported that the mean TSH was 4.7+4.2 in the patient's group and 2.6+1.2 was in the normal population group.

In this study, overall thyroid dysfunction was 9.0%, particularly hypothyroidism was 6.5% and hyperthyroidism was 2.5%, while in 90.0% of the cases, thyroid stimulating hormone (TSH) was normal. Similarly, Al-Geffari M et al⁶ reported that 25.3% of people had hypothyroidism, and 3.2% had hyperthyroidism. Bai K et al¹⁵ demonstrated that patients with type 2 DM were found to have an 18% thyroid dysfunction rate. In the comparison of this study, Mehalingam V et al³ reported that the 13.9% of study participants had hypothyroidism, while 3.6% had hyperthyroidism. Thyroid abnormalities and diabetes mellitus are two significant, globally prevalent health issues. Recognizing the link between diabetes mellitus and thyroid impairment is crucial to helping clinicians manage both of them effectively since they both have an impact on one another.¹⁸ In this study, thyroid function abnormalities were high among females, while findings were statistically insignificant according to gender (p=993). The thyroid gland is a related endocrine gland that has the ability to impact bodily metabolism. The hormones produced by the thyroid gland are essential for improving a healthy metabolism, which includes controlling how the body processes carbohydrates and how much

insulin the pancreas secretes.¹⁹ Thyroid function can be expressed to be significantly impacted by diabetes mellitus. Generally, these hormones play a crucial role in the body's metabolism, and any change in either of their levels can affect how well each of them functions. The role of the three hormones in maintaining the balance of the metabolism of proteins, lipids, and the carbohydrates is well known.¹⁹ Elebrashy IN et al⁴ also observed that the strong positive connection between antithyroid antibodies and serum TSH in individuals having type 2 diabetes (T2DM) indicates that thyroid dysfunction in females having T2DM is caused by an autoimmune-mediated pathogenetic pathway, boosting the importance of autoimmunity in the etiology of T2DM.

CONCLUSION

As per the study conclusion, thyroid function abnormalities were observed to be high among patients of type II diabetes mellitus. Although patients with type II diabetes should be screened for thyroid function to detect early thyroid function abnormalities in order to reduce morbidity and mortality. Due to several limitations, including small sample size, it is recommended that large-scale studies should be conducted on such subject. It is advised that large-scale studies be conducted on this subject due to a number of limitations, including the small sample size of the current study.

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