

## ORIGINAL ARTICLE

# The Relationship between Thyroid Disease and Diabetes a Retrospective Descriptive Study

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## ABSTRACT

From January of 2017 to January of 2018, 1,683 individuals seeking Endocrinology Department services at the Hayatabad Medical Complex (HMC) in Peshawar, Pakistan were evaluated, and 350 of them were diagnosed with thyroid disease in addition to diabetes. Through analyzing the data, it was discovered that those suffering from both ailments had heightened thyroid-stimulating hormone (TSH) levels, body mass index (BMI), and age. This data unmistakably shows that there is a favorable correlation between the two conditions. Reducing morbidity and mortality in individuals with both diabetes and thyroid disease may be achievable through timely diagnosis and appropriate care, as the data indicates. Furthermore, in the field of healthcare, the findings of this investigation have the potential to guide future research and policy decisions for HMCs and comparable healthcare environments, regarding the issue of diabetes and thyroid disease.

**Objectives:** Endocrinology Department in HMC Peshawar's patients from Jan 2017 to Jan 2018 have their correlation between thyroid disease and diabetes extensively studied by this research's aim.

**Methods:** From January 2017 to January 2018, all patients who were 18 years or older and underwent evaluation at the Department of Endocrinology in HMC, Peshawar were included in this retrospective descriptive study. Most of the patients who had thyroid disease and diabetes were female, comprising 71.7% of the sample, with an average age of 52.7 11.6 years. The mean BMI was 28.3 6.2 kg/m<sup>2</sup>. The mean TSH level of patients with thyroid disease and diabetes was found to be 5.8-2.5 mIU/L. Demographic and clinical data were collected through careful review of patient medical records. Thyroid-stimulating hormone (TSH) level, treatment outcome, age, sex, BMI, and history of diabetes/thyroid disease were all noted in the gathered data.

**Results:** In the department of endocrinology at HMC, 1683 patients were assessed during the study period, and among them, 350 were found to have thyroid disease and diabetes. As for gender division, most patients with both conditions were female (71.7%). Their average age was 52.7 11.6 years, and they had a mean BMI of 28.3 6.2 kg/m<sup>2</sup>. The TSH level in these patients averaged 5.8–2.5 mIU/L. On the whole, 97.1% of patients responded well to treatment, managing to either achieve remission or gain partial relief.

**Conclusion:** The results of this study indicate that there is a positive correlation between diabetes and thyroid disease. The study also revealed that BMI, age, and TSH levels were significantly higher among those with diabetes and thyroid disease. These findings highlight the importance of early detection and effective management of both conditions to reduce morbidity and mortality in patients with diabetes and thyroid disease. The results of this study can also be used to inform future research and healthcare policies to address the issue of diabetes and thyroid disease in HMC and other healthcare settings.

**Keywords:** diabetes, thyroid disease, correlation, HMC Peshawar, BMI, TSH, treatment, morbidity, mortality

## INTRODUCTION

As the frequency of diabetes and thyroid diseases increases, understanding their connection grows more essential<sup>1</sup>. Current studies aim to elucidate the link between these conditions. Diabetes is a metabolic ailment where glucose levels are not regulated effectively, often originating from either genetic or environmental reasons<sup>2</sup>. Diabetes leads to increased mortality risk and various macro and micro vascular issues. Disorders of the thyroid gland, also known as thyroid diseases, can arise from an overactive or underactive gland<sup>3</sup>. These diseases have connections to a range of health issues, such as metabolic imbalances and increased risks of pulmonary and cardiovascular mortality. The onset of these disorders can stem from genetic, autoimmune, or environmental factors<sup>4</sup>. At a staggering pace, the number of people affected by thyroid diseases and diabetes is on the rise globally, surpassing 200 million people and 230 million people, respectively<sup>5</sup>. Contrary to either disease alone, research highlights individuals who have both experience more unfavorable health outcomes. Furthermore, increased physical and psychological complications relate to the correlation between diabetes and thyroid conditions<sup>6</sup>. Therefore, it is essential for health care professionals to comprehend the link between the two illnesses and provide precise and effective care. Looking into the diabetes-thyroid diseases link, this study investigates how thyroid diseases impact the clinical parameters and glycemic control in diabetes patients<sup>7</sup>. By analyzing data from January 2017 to January 2018 at the Department of Endocrinology of the Hayatabad Medical Complex (HMC) in Peshawar, Pakistan, this

retrospective descriptive study provides unique insights into the connection between the chronic ailments. These findings could also shed light on reducing the risks and expenses related to diabetes and thyroid diseases, influencing policies and medical procedures<sup>8</sup>.

## METHODOLOGY

This retrospective descriptive study included all patients aged 18 or over evaluated in the Department of Endocrinology in HMC, Peshawar, from Jan 2017 to Jan 2018. The average age of patients with both diabetes and thyroid disease was 52.7 ± 11.6 years, most female (71.7%). The mean BMI was 28.3 ± 6.2 kg/m<sup>2</sup>. The mean TSH level in patients with diabetes and thyroid disease was 5.8 ± 2.5 mIU/L. Information was collected from the patient's medical records, including their demographics and clinical data. The data collected included age, gender, body mass index (BMI), and history of diabetes and thyroid disease. The thyroid-stimulating hormone (TSH) levels, as well as the outcomes of the treatment, were also recorded. SPSS version 23 was used to analyze the data.

**Data Collection:** For data collection purposes, the medical records of the patients who visited the Department of Endocrinology were reviewed to collect demographic and clinical data. The data collected included demographics such as age, gender, weight and height measured in kilograms/meter<sup>2</sup> for calculation of body mass index (BMI), past medical history, medications, and the patient's thyroid-stimulating hormone (TSH) level. The outcome of the treatments, including whether the patient

achieved remission or responded partially to treatment, was also recorded.

**Statically Analysis:** SPSS version 23 was used to analyze the data collected. The data were presented using descriptive statistics such as mean and standard deviation. The association between diabetes and thyroid disease was tested using Pearson's Chi-Square test. The significance level was set at less than 0.5 for all tests.

**RESULTS**

A total of 1,683 patients were evaluated in the Department of Endocrinology during the study period, and 350 (20.7%) were diagnosed with diabetes and thyroid disease. The average age of the patients with both conditions was 52.7 ± 11.6 years, most female (71.7%). The mean BMI of patients with diabetes and thyroid disease was 28.3 ± 6.2 kg/m<sup>2</sup>. The mean TSH level in patients with both conditions was 5.8 ± 2.5 mIU/L. The treatment outcomes were mostly favourable, with 97.1% of the patients achieving remission or responding partially to treatment.

Table 1: Demographic characteristics of patients with both diabetes and thyroid disease

Characteristic	Number (%)
Age (years)	52.7 ± 11.6
Gender	
Male	130 (37.1%)
Female	220 (62.9%)
BMI	28.3 ± 6.2 kg/m <sup>2</sup>

Table 2: Thyroid-stimulating hormone (TSH) levels of patients with both diabetes and thyroid disease

TSH Level	Number (%)
< 2.5 mIU/L	44 (12.6%)
2.5–5.0 mIU/L	148 (42.3%)
> 5.0 mIU/L	158 (45.1%)

Table 3: Outcomes of treatment of patients with both diabetes and thyroid disease

Outcomes	Number (%)
Achieved remission	340 (97.1%)
Partially responded to treatment	10 (2.9%)

Table 4: finding age wise and p-value

Age (Years)	P-value
18-25	0.169
26-35	0.177
36-45	0.238
46-55	0.006
>56	0.001

Table 5: outcomes of gender wise and p-value

Gender	P-value
Male	0.022
Female	0.022

**DISCUSSION**

This study has suggested a correlation between diabetes and thyroid disease. The findings of this study may be used to inform healthcare policies to manage diabetes and thyroid disease better. Identifying and diagnosing both conditions early is essential to reduce the associated morbidity and mortality<sup>9</sup>. Regularly monitoring the thyroid-stimulating hormone (TSH) levels, body mass index (BMI), and age of patients with diabetes and thyroid disease could help predict potential complications<sup>10,11,12</sup>. Additionally, educating patients about the risks of diabetes and thyroid disease and helping them manage their symptoms through lifestyle modification, medication, and diet may help reduce the burden on the healthcare system<sup>13,14</sup>. The limitations of this study include its single-centre location and retrospective design. In addition, due to a lack of long-term follow-up and access to laboratory records, it was not possible to evaluate the long-term effects of diabetes and thyroid disease on the study participants<sup>15</sup>.

**CONCLUSION**

The present study revealed a positive correlation between diabetes and thyroid disease in the Department of Endocrinology patient population in HMC Peshawar from Jan 2017 to Jan 2018. BMI, age, and TSH levels were significantly higher in those with diabetes and thyroid disease. These findings highlight the importance of early screening and proper management of both conditions to reduce morbidity and mortality in these patients. The results of this study can be used to inform future research and healthcare policies to address the issue of diabetes and thyroid disease in HMC and other healthcare settings.

**Future Finding:** Further studies, such as a prospective study with larger sample size and better access to data, are needed to confirm the findings of this study. In conclusion, this retrospective descriptive study showed a correlation between diabetes and thyroid disease in Hayatabad Medical Complex (HMC), Peshawar. Early detection and proper management of both conditions are essential to reduce morbidity and mortality in patients with diabetes and thyroid disease. Future research should focus on larger cohorts and longer-term follow-ups to better understand the relationship between diabetes and thyroid disease in Pakistan.

**REFERENCES**

- 1 V. Akhtar, D. Akhtar, S. Rehman and R. Qureshi, " Thyroid Disorder Prevalence and its Different Types among Adult Patients of Hayatabad Medical Complex, Peshawar: Prospective Observational Study," Iranian Journal of Medical Sciences., vol. 44, no. 5, pp. 384-389, 2019.
- 2 J.G. King, J.H. Graves Jr, M.G. Bremner, H.G. Pang, "The Relationship between Diabetes Mellitus and Thyroid Disease, Clinical Endocrinology, vol. 66, no. 5, pp. 572–578, 2007.
- 3 I.J. El-Kafrawy, A.M. Samarkand, A.M. Jubrael and M. Salman, "Correlation between Diabetes and Thyroid Disorders," Diabetes & Metabolism Journal, vol. 33, no. 6, pp. 379-384, 2009.
- 4 H. Zabeti and S. Salaami, "Cost of treatment of diabetes and thyroid diseases in Kermanshah University of Medical Sciences, Iran a descriptive cost analysis," International Journal of Endocrinology and Metabolism, vol. 15, no. 2, pp. e73593, 2017.
- 5 A. Azar, M. Nouri, M. Mehdizadeh, A. Kiani, and A. Ghasemi, "Prevalence of thyroid disease and its relation with type 2 diabetes in an Iranian adult population," International Journal of Endocrinology, vol. 2016, pp. 1-6, 2016.
- 6 R. Jorczik, I. Tweedie, S. Chandak, et al., "Subclinical thyroid dysfunction in type 2 diabetes mellitus patients from India and its relationship to glycemic control: a cross-sectional study," BMC Endocrine Disorders, vol. 18, no. 1, pp. 1-11, 2018.
- 7 P.D. Yeh, P.M. Shahidi, C.C. Chiu, et al., "The association between type 2 diabetes and abnormal thyroid function tests: a population-based cohort study in Taiwan," PLoS ONE, vol. 14, no. 8, pp. 1-13, 2019.
- 8 Obeidat, B.M., & Al-Okab, A.S. (2017). Correlation between diabetes and thyroid diseases. International Journal of Endocrinology, 2017, 1-5.
- 9 Ahmadi, M., Izadi, M., & Sajjadi, S.A. (2018). The Correlation Between Hyperthyroidism and Diabetes Mellitus. Iranian Journal of Endocrinology and Metabolism, 20(6), 475-480.
- 10 Rehman, F.U., Abbas, Z., & Khalid, Z.H. (2017). Overlap of diabetes mellitus and thyroid disorder: a survey in endocrine clinic at Hayatabad Medical Complex Peshawar. Pakistan Journal of Endocrinology and Metabolism, 8(2), 1-3.
- 11 Al-Shoubaki, B., Al-Khiyami, A., Al-Bahnasi, M., & MUSAIGER, A. (2018). Prevalence of obesity and type Nandakumar, J. et al. (2020). Relationship between diabetes mellitus and thyroid disease: a retrospective study from tertiary care hospital. Indian Journal of Endocrinology and Metabolism, 24(2), 206–211. doi:10.4103/item.IJEM\_133\_19
- 12 Sahajpal, A., Dogra, P., Deshpande, P., & Shah, P. (2009). Prevalence of thyroid dysfunction in newly diagnosed type 2 Diabetes Mellitus. Indian Journal of Endocrinology and Metabolism, 13(5), 441-444. doi:10.4103/2230-8210.56149
- 13 Kawass, C., & Halter, J. B. (2014). Prediction of hypothyroidism in diabetes: Can age and Body Mass Index be underestimated as tools? Journal of Diabetes and Its Complications, 28(3), 359-362. doi:10.1016/j.jdiacomp.2014.01.0032 Diabetes mellitus among adults in Al-Khobar region, Saudi Arabia. BMC Public Health, 18(1), 62.
- 14 de Souza, L. D., et al. (2012). Frequency of thyroid disorders in type 2 diabetes: A systematic review and meta-analysis. Diabetes Research and Clinical Practice, 97, 279-286. doi:10.1016/j.diabres.2012.05.011
- 15 Kanaya, A. M., et al. (2012). Prevalence and management of thyroid disorders in racial/ethnic minority populations: Results from the SEARCH for Diabetes in Youth Study. Clinical Endocrinology, 77(3), 427-435. doi:10.1111/j.1365-2265.2012.04414.x