

Original Research Article

TO ASSESS ASSOCIATION BETWEEN THYROID PROFILE AND GLYCATED HAEMOGLOBIN IN PATIENTS WITH TYPE II DM

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Abstract:

Background & Method: The aim of the study is to assess Association between Thyroid Profile and Glycated Haemoglobin in Patients with Type II DM. Patients aged 30 years or more who came for routine health check-up were taken for the study. Basic information, clinical history was taken from the record files. Samples were collected with an aseptic blood collection technique. Three vacutainers: Plain tube for Renal function tests, TSH, TT3 and TT4. Sodium fluoride tube for Fasting plasma glucose and EDTA tube for HbA1c were taken.

Result: Mean age among control groups was lower than the mean age of the case group. Fasting plasma glucose and Glycated haemoglobin were significantly higher (p value <0.05 in both). Mean TSH level were significantly higher in cases while serum Total T3 and Total T4 levels were significantly decreased in cases when compared to controls.

Conclusion: Type 2 Diabetes Mellitus have higher prevalence of thyroid disorders. The most common thyroid disorder found in type 2 Diabetes Mellitus is hypothyroidism. In thyroid disorders, early signs and symptoms of underlying disease remain hidden, undiagnosed thyroid disorders could negatively affect Diabetes and its complications. Hence, routine screening of thyroid profile in diabetic patients is beneficial and advisable to improve quality of life and reduce morbidity rates and its complications.

Keywords: Thyroid, Glycated, Haemoglobin & Type II DM.

Study Designed: Observational Study.

1. Introduction

Diabetes is a major health problem in the world. It produces serious health - related and socioeconomic impact on individual person and also on populations[1]. In addition, the pandemic increase of diabetes is spurred on by transitioning demographic like Population aging, socioeconomic, nutritional and Lifestyle patterns and migratory cause and a joined proliferation in overweight and obese adults and in children[2].

Diabetes is a common endocrine metabolic disorder. It is characterized by increased glucose level from a multiple interaction of hereditary and environmental factors due to decreased insulin secretions or resistance or both[3]. Diabetes is a major health problem affecting large

population worldwide. WHO projected that the total figure of people among DM has risen from 108 million in 1980 to 422 million in 2014. The general predominance of DM in adults above 18 years of age was since 4.7% in 1980 which increased to 8.5% in 2014. It increases with age and approximately half of the cases are occur in people older than 55 years[4].

INDIA is one of the 6 main countries of the IDF SOUTH EAST ASIA (SEA) region. 415 million people have diabetes in the globe and 78 million people in the SEA region[5]. By 2040 this will get higher to 140 million in SEA region. In India, there were 69.1 million cases of DM in 2015 with prevalence of 8.7% of adult population (20-79 years). Most of the diabetics live in underdeveloped and developing countries (up to 80%).

The prevalence of Type 2 DM is increasing rapidly due to reduced activity because of more industrialization. Many factors such as dietary habits, sedentary life style, ethnicity, obesity and hypertension and genetic predisposition to the disease are the major causes to this epidemic[6]. Uncontrolled DM is the major cause of micro and macro vascular complications like blindness, kidney failure, heart attacks, stroke, and lower limb amputation. Because of these long term complications, there are increased mortality and morbidity among diabetic subjects. As per WHO in 2012, 1.5 million deaths were directly due to DM and another 2.2 million deaths were related to high blood glucose[7].

2. Material & Method

Present study was conducted at Amaltas Institute of Medical Sciences, Dewas, M.P. for 01 Year. 100 participants were in the study group and 100 participants in control groups were enrolled by following procedure. Patients aged 30 years or more who came for routine health check-up were taken for the study. Basic information, clinical history was taken from the record files. Samples were collected with an aseptic blood collection technique, 03 vacutainers: Plain tube for Renal function tests, TSH, TT3 and TT4. Sodium fluoride tube for Fasting plasma glucose and EDTA tube for HbA1c were taken. These blood samples were processed and analysed in the biochemistry laboratory for the estimation of FPG, HbA1c, TSH, TT3 and TT4.

Inclusion Criteria:

100 type II Diabetes Mellitus patients diagnosed as per American Diabetes Association (ADA) having FPG >126 mg/dl, HbA1c > 6.5%, Serum Urea < 40 mg/dl , Serum Creatinine < 1.3mg/dl were included in the study as cases.

Exclusion Criteria:

1. Seriously ill patients
2. Adults who are previously diagnosed as cases of Type 1 diabetes mellitus
3. Specific types of Diabetes Mellitus
4. Gestational Diabetes mellitus.(GDM)
5. Known case of thyroid disease.
6. Cancer patients.

3. Results

Table-1: Comparison of Cases and Controls (Mean + SD)

Parameters	Cases	Controls	p value
Age (Years)	55.09 ± 11.03	52.54 ± 9.06	0.079
Gender	42 (46.67%)	48(53.33%)	0.81

Female	58 (52.73%)	52(47.27%)	
Male			
Fasting Plasma Glucose(FPG) (mg/dl)	165.92 ± 45.86	94.63 ± 9.20	<0.0001
Glycated haemoglobin (HbA1c) (%)	8.00 ± 1.58	5.65 ± 0.53	<0.037
Thyroid Stimulating Hormone(TSH) (micro unit/ml)	4.36+2.45	3.32+2.10	<0.046
Total Triiodothyronine (TT3) (nano mol/litre)	1.65+0.52	2+0.62	<0.017
Total Thyroxine (TT4) (nano mol/litre)	99.77+30.49	114+31.47	<0.035

Mean age among control groups was lower than the mean age of the case group. Fasting plasma glucose and Glycated haemoglobin were significantly higher (p value <0.05 in both). Mean TSH level were significantly higher in cases while serum Total T3 and Total T4 levels were significantly decreased in cases when compared to controls.

Table-2: Distribution of Diabetic Subjects with Abnormal Thyroid Profile

Thyroid Disorders	Cases		Controls
	HbA1c <7.5%	HbA1c >7.5%	
Hypothyroidism(Primary)	04	10	03
Hypothyroidism(Subclinical)	05	14	03
Hyperthyroidism(Primary)	00	02	00
Hyperthyroidism(Subclinical)	00	02	02
Total	09	28	08

Table-3: Correlation of Thyroid Profile with HbA1c

Parameters	Correlation Coefficient	p value
HbA1c – Thyroid Stimulating Hormone(TSH)	0.41	<0.001**
HbA1c – Total Triiodothyronine(TT3)	-0.47	<0.001**
HbA1c –Total Thyroxine (TT4)	-0.41	<0.001**

P value less than 0.001 indicates highly significant value

4. Discussion

Diabetes mellitus is the most important health problem in populations worldwide and inspite of advances in treatment, a huge number of patients present with complications owing to poor glycaemic control. One of the vital factors that contribute to deprived glycaemic control is thyroid dysfunction, which tends to happen down with diabetes mellitus. This study sought to find out the prevalence of thyroid dysfunction in people with type 2 diabetes mellitus in our region[8].

DM is a multi-factorial disorder. There is a complex interaction between DM and thyroid disorder. Because of insulin and thyroid hormones are closely involved in cellular

metabolism, any abnormal levels of one of them may result in the functional derangement of other.

In our study, we demonstrated a 33.5% prevalence of thyroid disease among 170 DM subjects compared to 16% in control group. Among this, 21.2% had subclinical hypothyroidism. It is similar to many studies like Palma et al [9]

Next to SCH, hypothyroidism was common (8.8%) followed by hyperthyroidism (3.5%). So total hypothyroidism is more common (30%) than hyperthyroidism. This also supported by various study which showed 89% hypothyroidism and 11% hyperthyroidism.

The reasons for both high and low level of thyroid hormones in diabetes are the modified TRH synthesis and release [10]. This also due to various medications used for DM. Many studies concluded that the treatment of DM by sulfonylurea leads to an increase in occurrence of goitre and hypothyroidism.

5. Conclusion

Type 2 Diabetes Mellitus have higher prevalence of thyroid disorders. The most common thyroid disorder found in type 2 Diabetes Mellitus is hypothyroidism. In thyroid disorders, early signs and symptoms of underlying disease remain hidden, undiagnosed thyroid disorders could negatively affect Diabetes and its complications. Hence, routine screening of thyroid profile in diabetic patients is beneficial and advisable to improve quality of life and reduce morbidity rates and its complications.

6. References

1. Tiwari, A. K., & Rao, J. M.. Diabetes mellitus and multiple therapeutic approaches of phytochemicals: Present status and future prospects. *Current science*, (2002) 30-38.
2. Singh, R., Hamada, A. J., & Agarwal, A.. Thyroid hormones in male reproduction and fertility. *Open Reprod Sci J*, (2011) 3, 98-104.
3. Bassyouni A, Ebrashy IE, Ismiel A, Amara I, Mahfouz M, Halmy N. Profile of the thyroid function and ultrasound among patients with type-2 diabetes mellitus. *Sci Med J* 2010; 22(2): 15–28.
4. Shaikh AW, Memon AS, Sirichand. Frequency of Hypothyroidism in Type 2 Diabetic Patients. *Pakistan J Med Health Sci*. 2009; 2(4).
5. Canaris, G. J., Manowitz, N. R., Mayor, G., & Ridgway, E. C. (2000). The Colorado thyroid disease prevalence study. *Archives of internal medicine*, 160(4), 526-534.
6. Hage, M., Zantout, M. S., & Azar, S. T. (2011). Thyroid disorders and diabetes mellitus. *Journal of thyroid research*, 2011.
7. Saha HR, Sarkar BC, Khan SA, Sana NK, Choudhury S. A Comparative Study of Thyroid Hormone and Lipid Status in Diabetic and Non Diabetic Adults. 2012; 1:450.
8. Sawant M, Shetty D, Mankeshwar R, Ashavaid F. Prevalence of Dyslipidemia in Young Adult Indian Population. *JAPI*. 2008; 56: 99-102.
9. Vergara Palma C, Pavesi M, Nogueira G, Clemente EL, Pereira Vasconcellos M, Carlos Pereira L, et al. Prevalence of thyroid dysfunction in patients with diabetes mellitus. *Diabetology and metabolic syndrome*. 2013; 5(58): 1-2.
10. Papazafropoulou A, Sotiropoulos A, Kokolaki A et al. Prevalence of Thyroid Dysfunction Among Greek Type 2 Diabetic Patients Attending an Outpatient Clinic. *J Clinical Medicine Research*. 2010; 2 (2): 75-78.