International Archives of
BioMedical and Clinical Research
E-ISSN:2454-9894 P-ISSN: 2454-9886
(An Official Publication of "Ibn Sina Academy of Medieval Medicine & Sciences")
WWW.IABCR.ORG

Section Pharmacology

Original Article

# A Prospective Observation Study to know the Prevalence of Thyroid Disorders in Patients with Type 2 Diabetes Mellitus

Syed Sibte Akbar Abidi[1], Devesh Gupta[2*]

[1] Consultant Physician and Diabetologist, Diabetes Care Clinic, Aligarh, U.P., India
[2]Professor, Noida Institute of Medical Sciences, Greater Noida, U.P

## ABSTRACT

***Background:*** *Diabetes mellitus and thyroid diseases are the two common endocrinopathies seen in the adult population. Insulin and thyroid hormones are intimately involved in cellular metabolism. Excess or deficit of either of these hormones could result in the functional derangement of the other.*
***Methods:*** *This study was conducted on the Type 2 diabetic patients to know the prevalence of thyroid abnormalities. The duration of study over a period of one year.*
***Results:*** *The result of this study revealed that thyroid profile in patients with type 2 diabetes mellitus 20% of patients with type 2 diabetes mellitus had abnormal thyroid profile.*
***Conclusion:*** *This study concludes that Routine screening for thyroid dysfunction in type 2 diabetes mellitus patients may be justified especially in females.*

***Keywords:*** *Type 2 diabetes mellitus, Thyroid disorders, Hyperglycaemia*

**Article History**
**Received**: 19.06.2022
**Accepted**: 15.07.2022

***Corresponding Author**

*Dr. Devesh Gupta*
*Email: drdeveshgupta@gmail.com.*



## INTRODUCTION

Diabetes mellitus is a common endocrine disorder which involves multiple organ systems and leads to significant morbidity and mortality due to accompanying complications. Diabetes mellitus has been defined as "A metabolic syndrome characterised by chronic hyperglycaemia and disturbance of carbohydrate, fat and protein metabolism associated with absolute or relative deficiency in insulin secretion and or insulin action". The metabolic dysregulation associated with DM causes secondary pathophysiologic changes in multiple organ systems that impose a tremendous burden on the individual with diabetes and on the health care system.

Diabetes mellitus is characterised by chronic hyperglycemia with disturbances of carbohydrate, fat, and protein metabolism resulting from defects in insulin secretion, insulin action, or both.[1]

In the first edition of the IDF Diabetes Atlas, released in 2000, the estimated global diabetes prevalence was 151 million. Now the estimated diabetes prevalence for 2010 has risen to 285 million, representing 6.4% of the world's adult population, with a prediction that by 2030 the number of people with diabetes will have risen to 438 million. Far from being a disease of higher income nations, diabetes is very much a disease associated with poverty and disproportionately affecting the lower socioeconomic groups.[3] Although the prevalence of both type 1 and type 2 DM is increasing worldwide, the prevalence of type 2 DM is rising much more rapidly because of increasing obesity and reduced activity levels as countries become more industrialized. Previously a disease of the middle aged and elderly, type 2 diabetes has recently escalated in all age groups and is now being seen in younger age groups.[4]

| Access this article online | |
|---|---|
| Website: www.iabcr.org | Quick Response code |
| DOI: 10.21276/iabcr.2022.8.3.1 | |

**How to cite this article:** Abidi SSA., Gupta D. A Prospective Observation Study to know the Prevalence of Thyroid Disorders in Patients with Type 2 Diabetes Mellitus. Int Arch BioMed Clin Res. 2022;8(3):PH1–PH3.

**Source of Support:** Nil, **Conflict of Interest:** None

Unfavorable modification of lifestyle and dietary habits with urbanisation are the most important factors for the development of diabetes. The percentage of diabetic cases in urban areas is projected to increase from 54% in 1995 to 73% by the year 2025.[5] According to IDF (2009), India has the highest number of people suffering from diabetes mellitus with 50.8 million and spends 2.8 billion US$ or 1% of the global health expenditure for diabetes and related problems.[6] United Nations in 2006 in Resolution 61/225 stated that "diabetes is a chronic, debilitating and costly disease associated with severe complications, which poses severe risks for families, Member States and the entire world".[7]

Much has been accomplished in the field of diabetes and what has been troubling everyone is the large macrovascular and micro vascular complications of diabetes involving kidneys, eyes, blood vessels, nerves and heart.

Thyroid diseases are also a common endocrinopathy seen in the adult population. Thyroid hormones are intimately involved in cellular metabolism. Thus, excess or deficit of either insulin or thyroid hormones could result in the functional derangement of the cellular metabolism.

The aim of present study the prevalence of thyroid disorders in patients with type 2 diabetes mellitus.

## METHODS

Study area:-This prospective observational study was conducted on type 2 diabetic patients to know the prevalence of thyroid disorders.

Study duration:-The duration of study over a period of one year.

Study population:-The population of this study was 100 who had a type-2 DM.

Data collection: All patients in the study group were selected without any bias for sex, duration, severity or control of diabetes. A thorough history was recorded with particular emphasis on symptoms of hypothyroidism and hyperthyroidism. The presence of associated illness like coronary artery disease, hypertension and cerebrovascular accident were noted.

Thyroid Profile

Estimation done in fasting serum sample.

Methods used:

1. TSH - Ultrasensitive sandwich chemi luminescent immuno assay
2. FT3 & FT4 - Competitive chemi luminescent immuno assay.

Diabetes Mellitus

The WHO in consultation with an expert committee of the American Diabetes Association has approved the following diagnostic criteria for Diabetes Mellitus, which was used to diagnose new cases. The patients on antidiabetic therapy were also considered as having diabetes mellitus.

**Fasting:** No caloric intake for atleast 8 hours.2-3 days of unrestricted carbohydrated diet prior to the test. No physical activities during the procedures.

## RESULTS

The study included 100 type 2 diabetes patients in the outpatient department. This study observed that 24 cases of up to 40 age group, 58 cases in 41-60 age group & 18 cases found in >60 age group. This study seen that male were more prevalent rather than female. The duration of diabetes up to 5 year in 74 cases, 6-10 year in 20 cases & >10 year in 6 cases were found. We found that the thyroid profile were normal in 80% of cases while rest of the cases of diabetic mellitus detected either with hyperthyroidism or hypothyroidism.

**Table 1: Distribution of cases according to age**

| Age Group (yrs) | No. of cases | Percentage |
|---|---|---|
| Upto 40 | 24 | 24 |
| 41-60 | 58 | 58 |
| 61 & above | 18 | 18 |
| Total | 100 | 100.0 |

**Table 2: Distribution of cases according to gender**

| Sex | No. of cases | Percentage |
|---|---|---|
| Male | 52 | 52 |
| Female | 48 | 48 |
| Total | 100 | 100.0 |

**Table 3: Distribution of cases with duration of diabetic mellitus**

| Duration of DM | No. of cases | Percentage |
|---|---|---|
| Up to 5 Years | 74 | 74 |
| 6 – 10 Years | 20 | 20 |
| More than 10 Years | 6 | 6 |
| Total | 100 | 100 |

**Table 4: Distribution of cases according to thyroid function**

| Thyroid Function | Number | Percentage |
|---|---|---|
| With normal thyroid Profile | 80 | 80 |
| With abnormal thyroid profile | 20 | 20 |
| Total | 100 | 100.0 |

**Table 5: Distribution of cases according to thyroid profile**

| Thyroid Profile | No. of cases | Percentage |
|---|---|---|
| Normal | 80 | 80 |
| Overt hyporthyroidism | 3 | 3 |
| Subclinical hypothyroidism | 11 | 11 |
| Over hyperthyroidism | 1 | 1 |
| Subclinical hyper thyroidism | 5 | 5 |
| Total | 100 | 100.0 |

## DISCUSSION

Diabetes mellitus is the most common endocrine disorder which involves multiple organ systems and leads to significant morbidity and mortality due to accompanying complications. Thyroid diseases are also a common endocrinopathy seen in the adult population. Thyroid hormones are intimately involved in cellular metabolism. Thus, excess or deficit of either insulin or thyroid hormone could result in the functional derangement of the cellular metabolism.

In the present study patients of diabetes mellitus were taken from Diabetic Outpatient Department, over a period of 1 year and they were evaluated for altered thyroid profile.

In the present study of 100 type 2 diabetic patients, 24 patients (24%) were up to 40 years, 58 patients (58%) were between 41-60 years and 18 patients (18%) were 61 years or more. This shows that the disease was more prevalent between 41-60 years of age.

This observation was similar to WHO report which predicts that while the main increase in diabetes would be in the > 65 year age group in the developed countries, in India and developing countries the highest increase would occur in the age group of 45-65 year of age group.[8]

This observation is also similar to Kapur et al, who reported that maximum number of cases were diagnosed between 40 and 59 year of age with no significant difference between the genders.[9]

In the present study 52% (52 nos) of the studied population were males and 48% (48 nos) were females. Male to Female ratio was 1.08:1.

This observation was similar to Jali et al[10] and Flatau E et al[11] who reported that diabetes was more prevalent in men than in women.

This is in contrast to Arthur M. Michalek et al who reported that prevalence of diabetes among women was higher than in men.[12] Sample size in our study is too small. This might have affected the results.

In the present study, majority of cases that is 74% (74/100) had durationof diabetes up to 5 years, 20% (20/100) of patients had duration between 6-10 years and 6% (6/100) of patients had duration of illness more than 10 years. Majority of people are in the age group between 41 to 60 yrs and have duration of disease less than 5 years.

In the present study, 11% (11) of the patients had report suggestive of sub clinical hypothyroidism and 5% (5) of the patients had report suggestive of sub clinical hyperthyroidism. This study was similar to Abdel-Rahman et al who in their study of 908 type 2 diabetic patients found that 10.3% of patients had hypothyroidism (overt and sub clinical) and 1.7% of patients had hyperthyroidism (overt and sub clinical).[13]

Smithson et al in their study of 233 diabetes mellitus patients found that 11 patients were found to have undiagnosed thyroid disease, out of which 9 were having hypothyroidism (overt and sub clinical) and 2 were having hyperthyroidism (overt and sub clinical).[14]

Celani MF et al in their study of 290 type 2 diabetes mellitus patients found that 91 patients (31.4%) had abnormal TSH concentrations out of which 48.3% had subclinical hypothyroidism, 24.2% had subclinical hyperthyroidism, 23.1% had overt hypothyroidism and 4.4% had overt hyperthyroidism.[15]

In the present study, diabetic patients, when compared with the control group of normal patients in Whickham Study[16] and a 20 years follow-up of Whickham survey by Vanderpump MP et al[17] shows that the prevalence of altered thyroid profile in the study group is significant (p=0.0064).

## CONCLUSION

This study concludes that Prevalence of thyroid dysfunction is more common among type 2 diabetes mellitus patients than in general population.

Prevalence of thyroid dysfunction in patients with type 2 diabetes mellitus is higher in females than in males Routine screening for thyroid dysfunction in type 2 diabetes mellitus patients may be justified especially in females because the progression to overt thyroid dysfunction is associated with significant morbidity including the adverse effects on glycemic control, lipid profile, bone mineral density and cardiovascular events.

## REFERENCES


1. Peter H Bennett, William C Knowlap. Definition, diagnosis and classification of diabetes. Joslin's diabetes mellitus 14th edition,2005: 331-337.
2. Alvin C .Powers. Diabetes mellitus. Harrison's principles of internal medicine 17th edition,2008: 2275-2304.
3. IDF Diabetes atlas 4th edition, 2009.
4. WHO(2003), Tech. Rep. Ser., N 916.
5. WHO(2002), Health situation in the South East Asia Region 1998-2000, New Delhi.
6. International Diabetes Federation, 20th October 2009, Montreal.
7. UN. 83rd plenary meeting, 20th December 2006. 61st session; Agenda 113.
8. Wild S, Rogli G, Green A. Global prevalence of diabetes estimates for the year 2000 and projection for 2030. Diabetes Care, 2004; 27: 1047-53.
9. Arthur M.Michalek, Martin C.Mahoney, Donald Calebaugh: Hypothyroidism and Diabetes Mellitus in an American Indian Population. Journal of family practice 2000 July; 49:638-640.
10. Jali MV, Mohan V, Ramchandran A, Snehlatha C and Viswanathan M; High Prevalence of diabetes in an Urban population in South India. BMJ Sept 1988; Vol. 297: p- 587-590.
11. Flatau E.; Trougouboff P.; Kaufman N.; Reichman N.; Luboshitzky R. Prevalence of hypothyroidism and diabetes mellitus in elderly kibbutz members. European Journal of Epidemiology, Volume 16, Number 1, January 2000 , pp. 43-46(4).
12. Kapur A., Snehlatha C., Ramchandran A., Vijay V., Mohan V., Das A.K., Rao P.V., Yajnik C.S., Prasanna Kumar K.M., Jyotsna Nair: High prevalence of diabetes and impaired glucose tolerance in India. National Urban diabetes survey. Diabetologia 2001; Vol. 44: 1094 –1101.
13. Abdel Rahman, Nusier MK, Amari FL et al. Thyroid dysfunction in patients with type 2 diabetes mellitus in Jordan. Saudi Med J. 2004 Aug;25(8):1046-50.
14. Smithson MJ. Screening for thyroid dysfunction in a community population of diabetic patients. Diabet Med 1998; 15 (2): 148-50.
15. Celani MF, Bonati ME, Stucci N. Prevalence of abnormal thyrotropin concentrations measured by a sensitive assay in patients with Type 2 diabetes mellitus. Diabetes Res 1994; 27: 15-25.
16. Tunbridge WMG, Evered DC and Hall R et al; The spectrum of thyroid disease in a community. The Whickham survey. Clin. Endocrinol(oxf) 1977: 7: 481-93.
17. Vanderpump MP, Tunbridge WM, Frence JM, Appleton D, Bates D, Clark F, et al. Thee incidence of thyroid disorders in the community: a twenty year follow up of whickham survey. J Clin Endocrinology 1995;43(1):55-68.