Section: General Medicine

Original Research Article

STUDY THE OCCURRENCE AND PREVALENCE OF THYROID DYSFUNCTIONS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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ABSTRACT

Background: The objective is to find the occurrence and prevalence of thyroid dysfunctions in patients with type 2 diabetes mellitus.
Materials and Methods: The present study was conducted on 300 patients from October 2016 to September 2018 in the Department of General Medicine, Government Medical College and associated Dr. Susheela Tiwari Hospital, Haldwani, Distt. Nainital Uttarakhand.
Results: Out of 300 patients included in the study, 240(80%) were found to be euthyroid and 60(20%) had some forms of thyroid dysfunction. Out of the 60 patients found to have thyroid dysfunction, 35(11.66%) were found to have subclinical hypothyroidism, 22(7.33%) had overt hypothyroidism, 3(1%) had overt hyperthyroidism. No patient had subclinical hyperthyroidism. Out of n=60 patients having thyroid dysfunction n=33(55%) had duration of diabetes less than 5 years. No significant correlation was found between duration of diabetes and thyroid dysfunction. Sixteen (26.66%) patients of thyroid disorder were having HbA1c in between 7-8%. An inverse relation between HbA1c value and thyroid dysfunction was found.
Conclusion: Our study showed a high prevalence of thyroid dysfunction in patients with type 2 diabetes mellitus. Subclinical hypothyroidism was found to be the most common type of thyroid disorder. Thyroid dysfunction was more common in females as compared to males. There was no significant difference between the duration of diabetes, mean age & mean BMI in diabetics with or without thyroid dysfunction.
Keywords: Thyroid dysfunction, prevalence. Type 2 diabetes mellitus.

INTRODUCTION

Thyroid disorders are more common in patients with type 1 DM due to common autoimmune origin but now there have been studies showing increased prevalence of thyroid disorders in type 2 DM as well.[1] The prevalence of thyroid disorders in patients with diabetes has been reported as 13.4%, with highest in patients with type 1 diabetes (31.4%) and lowest in patients with type 2 DM (6.8%). In addition to autoimmune link between type 1 DM and thyroid disorders, both diabetes and thyroid disease are commonly found in elderly, further contributing to the higher association.[2] The most common thyroid dysfunction in diabetics reported in most of the studies is Subclinical Hypothyroidism (4.8%).[3]

It has been shown that certain complications of DM are affected by the presence of thyroid disorders like-neuropathy, nephropathy and retinopathy.[4]
Subclinical hypothyroidism has been shown to be a risk factor for metabolic syndrome.[5] Subclinical hypothyroidism can exacerbate the coexisting dyslipidemia (elevated triglyceride and low-density lipoprotein (LDL) cholesterol concentrations) commonly found in type 2 diabetes and further increase the risk of cardiovascular diseases.[6]
Only few studies have been carried out on Indian population for finding out the prevalence of thyroid disorders in Type 2 DM. In a study done on Punjabi population, Gurjeet et al reported a high prevalence of thyroid disorders in patients with type 2 DM. They reported hypothyroidism in 23.75% of subjects (15%

subclinical hypothyroidism and 8.75% primary hypothyroidism) and hyperthyroidism in 6.25% (all primary hyperthyroidism) of diabetic subjects.[7]
The present study was carried out to find out the prevalence of different forms of thyroid dysfunctions in cases of type2 diabetes mellitus presenting at tertiary care hospital of Kumaon Region of Uttarakhand.

MATERIALS AND METHODS

The present cross sectional observational hospital based study was carried out in the Department of General Medicine, Government Medical College and associated Dr. Susheela Tiwari Hospital, Haldwani, Distt. Nainital, Uttarakhand. Patients coming to the Medicine OPD and those admitted in General Medicine wards, who were known diabetic or recently diagnosed as type 2 DM were included in the study. Duration of study was from October 2016 to September 2018. The protocol was approved by Board of Studies and passed by Ethical Committee of the institution
A total 300 patients were included in this study, who were fulfilling the inclusion criteria
Inclusion criteria:
1. Already diagnosed cases of type 2 DM who were under treatment(complicated/uncomplicated)
2. Newly diagnosed cases of type 2 DM

Exclusion criteria:
1. Pregnancy
2. Patients taking drugs affecting thyroid function
3. Type 1 DM
4. Critically ill patients

Methods: Informed consent was taken from all patients. All patients enrolled for the study were interviewed, meticulous history was taken, detailed clinical examination was done and relevant investigations were sent. The proposed proforma was filled for each and every patient.
Blood samples were taken after no caloric intake of 8 hours for estimation of fasting plasma glucose, HbA1c, thyroid and lipid profiles. For calculation of BMI, weight and height was measured with subjects in light clothing without shoes. Blood pressure was recorded as the mean of 3 consecutive measurements 5 minutes apart in sitting position.
Criteria for diagnosis of type 2 diabetes mellitus:
Criteria used for diagnosing diabetes was that adapted by American Diabetic Association (2012).[8]
Diagnosis of thyroid dysfunction was made according to the American Thyroid Association/American Association of Clinical Endocrinologist Guidelines:
Laboratory Procedure
Fasting blood sample were collected. Complete blood count, thyroid profile, lipid profile and blood sugar were performed. Immulite kit (chemiluminescent immunoassay) was used for thyroid hormone estimation.[9,10]
Statistical Analysis: Statistical analysis was done using unpaired t-test and chi-square test. A 'p' value of less than 0.05 was considered to be statistically significant

RESULTS

Thyroid profile of all the patients included in the study was done and following observations were made-
Females outnumbered males in this study. Out of 300 patients 162 (54%) were females and 138 (46%) were males.
Maximum number of patients in the study group were in the age groups of 40-50 years i.e, 102 (34%). Ninty two (n=92) patients (30.66%) were between 50-60 years. Fifty two (n=52) (16.66%) patients were between 30- 40 years. Fourty two (n=42) patients (13.33%) were between 60-70 years. Only 16 patients (5.33%) were above 70 years of age.
The youngest patients included in the study was of 30 years while the oldest was above the 70 years. Patients less than 30yrs of age were not included in the study.

Table 1: Distribution of total subjects and the duration of diabetes.

Duration of diabetes (YRS)	Number	Percentage%
Recently diagnosed	18	6
1-5	135	45
5.1-10	90	30
10.1-15	45	15
>15	12	4
Total	300	100

Maximum number of patients i.e, 45% (n=135) in the study group had diabetes of less than 5 years duration. Only 4% (n=12) had long duration of diabetes of more than 15 years. Thirty (%) (n=90) had diabetes of more than 5 yrs but less than 10 yrs. Fifteen (%) (n=45) had diabetes of more than 10 yrs but less than 15 years.

Table 2: Distribution of total subjects on the basis of HbA1c

HbA1c	Number	Percentage%
6-7	60	20
7.1-8	69	23
8.1-9	54	18

9.1-10	48	16
10.1-11	45	15
>11	24	8
Total	300	100

Maximum number of patients in the study group had HbA1c 7.1-8 (n=69) i.e, (23%). Sixty(n=60) patients (20%) had 6-7. Fifty four (n=54) patients (18%) had 8.1-9. Fourty eight (n=48) patients (16%) had 9.1-10. Fourty five (n=45) patients (15%) had 10-11 and minimum number of patients 24 (8%) had HbA1c >11.

Table 3: Total number of subjects and body mass index (BMI)

Body Mass Index (BMI)	Number	Percentage%
Under weight (<18.5)	30	10
Normal weight (18.5-24.99)	120	40
Over weight (25-29.99)	100	33.33
Obese (>30)	50	16.66
Total	300	100

Maximum number of patients n=120 (40%) were having normal body weight. Minimun patients n=30 (10%) were under weight.

Over weight and obese patients were n=100 (33.33%) & n=50 (16.66%) respectively.

Maximum number of patients i.e (n=159) 53% in the study group were having no clinical or laboratory feature of microvascular complication. Fourty six (n=46), (15.33%) patients were having diabetic retinopathy. Fourty five (n=45), (15%) patients were having diabetic nephropathy while fifty (n=50), (16.66) were having diabetic neuropathy. All n=45 (15%) patients of nephropathy were having components of neuropathy and retinopathy. Therefore they were also included in group of triopathy.

Similarly out of n=46, (15.33%) cases of retinopathy n=45(15%) were having also neuropathy and nephropathy and they were kept as triopathy. That reasons only one patient was having isolated retinopathy. Similarly out of n=50, (16.66%) patients of neuropathy, n=45 patients were having triopathy. That means only 5 patients had isolated neuropathy.

Commonest associated condition was hypertension n=112 (37.33%) which was followed by dyslipidemia n=90 (30%) & obesity n=50 (16.66%) respectively.

Only n=3 (1%) were having connective tissue disorders. Thirty seven (12.33%) were free from any comorbid conditions.

Prevalence

Out of 300 patients included in the study 240 patients (80%) were found to be euthyroid and 60 patients (20%) had some form of thyroid dysfunction.

Thyroid Dysfunction-

Thyroid disorder were classified as subclinical, clinical hypothyroid and hyperthyroid.

Table 4: Prevalence of various thyroid dysfunction in the study group.

Thyroid status	Number	Percentage
Euthyroid	240	80%
SCH	35	11.66%
Overt hypothyroid	22	7.33%
Hyperthyroid	3	1%

The most frequent thyroid disorder was subclinical hypothyroid n=35 (11.66%) followed by overt hypothyroid n=22 (7.33%). Only n=3 (1%) patients were having hyperthyroid. No patients was found to have subclinical hyperthyroidism.

Thyroid dysfunction was more common in females as compared to male. Out of 162 females patients included in the study 22.84% (n=37) had thyroid dysfunction while 16.66% (n=23) of males had thyroid dysfunction. Although the percentage of thyroid dysfunction was more among females as compared to male. This difference was statistically significant. (P<0.012, S)

Table 5: Gender wise distribution of various thyroid dysfunction

Thyroid status	Male	Female
SCH	15	20
Overt hypothyroid	6	16
Hyperthyroid	2	1
Total	23	37

t value = 0.67, p > 0.523 NS

Dominance of females was seen in both SCH as well as Overt Hypothyroidism n=20 (33.33%) and n=15(26.66) respectively.

While Hyperthyroidism was more common in males. Ratio of male to female was 2:1 in case of hyperthyroid patients.

This was not found to be statistically significant.

Total number of patients with abnormal thyroid function were (n=60). Maximum number (n=23), 38.33% of thyroid disorder were in age group of 41-50 yrs. This was (n=16),26.66% followed by age group 51-60. Minimum number only (n=2), 3.33% of patients with thyroid disorder were seen above 70 yrs of age.

Three patients of hyperthyroidism were equally distributed in age group of 41-50,51-60 & 61-70 yrs respectively. Maximum number of Overt hypothyroid n=9, (15%) and SCH n=13, (21.66%) were seen in age group of 41-50 yrs. Little less number n=10, (16.66%) and n=5, (8.33%) of SCH and Overt hypothyroid were seen in age group 51-60 yrs. Only n=1 patients of age>70 yrs was seen in both Overt hypothyroid and SCH.

On statistics analysis, this was found to be statistically insignificant.

The mean age of patients in the euthyroid group was 52.71±10.76 years while of those with thyroid dysfunction was 50.51±10.12 years. There was no statistically significant difference between the mean age of euthyroid and thyroid dysfunction groups. (P>0.732, NS).

Table 6: Correlation of various thyroid dysfunction with duration of diabetes

Duration of diabetes (yrs)	SCH	Hypothyroid	Hyperthyroid	Total
Recently diagnosed	2	1	0	3
1-5	18	12	3	33
5.1-10	9	6	0	15
10.1-15	5	2	0	7
>15	1	1	0	2
Total	35	22	3	60

Chi-square value = 3.08, d.f. = 8, p > 0.561 NS

Out of n=60 patients having thyroid disorder with type 2 diabetes mellitus. Maximum number (n=33) of both clinical as well as subclinical hypothyroidism had less than 5 years of duration, This was followed by 5-10, 10-15 years respectively. Only n=2 patients were having duration of diabtes more than15 years.

On statistical analysis this difference was found to be statistically insignificant (P>0.561, NS)

Table 7: Showing correlation between HbA1c and thyroid disorder.

HbA1c	SCH	Overt hypothyroid	Hyperthyroid
6-7	5	7	0
7.1-8	11	5	0
8.1-9	7	3	1
9.1-10	5	3	1
10.1-11	4	2	0
>11	3	2	1
Total	35	22	3

Chi-square = 10.02, d.f.15, p< 0.008

Maximum number n=11, (18.33%) of patients having HbA1c in between 7.1-8. Thereafter n=7 (11.66%), n=5 (8.33%), n=4 (6.66%), n=3 (5%) patients of SCH were seen in HbA1c range of 8.1-9,9.1-10,6-7,>11 respectively. Similarly in case of overt hypothyroidism maximum number n=7 (11.66%) were having in range of 6-7. Thereafter n=5(8.33%), n=3 (5%) n=2 (3%) of patients of overt hypothyroid were having HbA1c in range of 7.1-8,8.1-9,9.1-10,10.1-11, >11 respectively. Three patients of hyperthyroidism were arbitaraly found in group of 8.1-9,9.1-10,>11 of HbA1c.Apperently it is a inverse relation between HbA1c value and number of patients of thyroid disorder was observed.

This relation was found to be statistically signifinat.

Table 8: Showing correlation between BMI and thyroid dysfunctions.

BMI	Thyroid dysfunction(%)	Euthyroid(%)	Total(%)
Under weight (<18.5)	5 (8.33)	25 (10.41)	30
Normal weight (18.5-24.99)	23 (38.33)	97 (40.41)	120
Over weight (25-29.99)	20 (33.33)	80 (33.33)	100
Obese (>30)	12 (20)	38 (15.83)	50
Total	60	240	300

Chi-square = 0.76, d.f.3, p> 0.621 NS

Maximum number n= 23 patients (38.33%) with thyroid dysfunction in the study group had normal BMI. Twenty n=20 patients (33.33%) were overweight, n=12 patients (20%) were obese . while only 5 patients (8.33%) were underweight.

This was not found to be Statistically Significant. (P>0.621, NS)

The mean BMI of thyroid dysfunction group (28.29±8.17 kg/m2) was higher than the BMI of the euthyroid group (25.80±5.89 kg/m2). The difference between the mean BMI of thyoid dysfunction and euthyroid group was not found to be statistically significant. (P>0.618, NS).

DISCUSSION

The number of females was more than males in present study. The males to females ratio was (1:1.17). All these patients were having diabetes. Diabetes mellitus does not have any affinity for any gender. The Author postulated this as an incidental finding.

The commonest age groups were the middle to elderly group. Extremes of age less than 40 and more than 70 years had lesser number of patients (50 and 16 respectively). It was expected as incidence of diabetes is low in very younger age group.

Anil kumar et al,[11] had similar findings. They had the maximum number of patients in the age group of 46-54 yrs.[12]

The Author has opinion that these are patients having diabetes mellitus. Dominance of patients in middle to elderly age 40-60 years is self explanatory. We had 50(16.66%) patients in the age group of 30-40 years. The number of patients with very long duration of diabetes more than 15 years was only 12 (4%).The maximum number of patients 135 (45%) were seen in the duration of 1- 5 years. A long duration of diabetes reduced the number of patients possibly due to early mortality in diabetic patients. A very small number of patients with prolonged duration of diabetes in present study also supported this postulation. In present study we found that there was an inverse relation between the duration of diabetes mellitus and number of patients.

Out of total 300 patients, the maximum number 129 (43%) had HbA1c in the range of 6-8%, that was followed by 8-9 i.e 54 (18%).Only 24 (8%) had HbA1c more than 11%.Most of patients 129 (43%) had a good glycemic control in present study.

The commonest comorbid condition was hypertension which was followed by dyslipidemia, obesity, tuberculosis and connective tissue disorder. Their numbers were 112(37.33%), 90(30%), 50(16.66%), 8(2.66%) and 3(1%) respectively. Hypertension, dyslipidemia, obesity are definite known risk factors of diabetes. A higher incidence of these conditions was expected.

In the present study conducted on 300 Type 2 DM patients the prevalence of thyroid dysfunction was found to be 20% (n=60). Maximum load 57(19%) was contributed by SCH 35(11.66%) and Overt hypothyroid 22(7.33%). Only 1% patients (n=3) had hyperthyroidism.

Our results were comparable to the prevalence reported by Anil et al(2017), Khan Nz et al(2017), Khurana A et al(2016), Palma et al (2013), Jain et al(2016). In their study the prevalence of thyroid dysfunction was 24%, 23%, 16%, 14.7% and 13.7% respectively.[11,13-16]

However some other studies reported a slightly higher prevalence of thyroid dysfunction in type 2 diabetes as compared to our study. Laloo Demitrost (2018), Navneet et al(2016) and Celani et al(1994) had reported prevalence of thyroid dysfunction (31.2%, 27.8% 31.4%, 32.2% and 30% respectively).[17,18,19]

Diez et al (2011) also reported a prevalence of 32.4% of thyroid dysfunction in their study conducted on 318 Spanish Type 2 diabetic patients. Kiran Babu et al(2011) in their study reported the prevalence of 28% of thyroid dysfunction in type 2 DM patients.[20]

Some other studies however, reported a lower prevalence of thyroid dysfunction in type 2 diabetics as compared to our study. Smithson et al(1998) in a study done on 223 type 2 diabetic patients reported thyroid dysfunction to be present in 10.8% which was lower than that found in our study. Radaideh et al (2004) studied 908 type 2 DM patients in Jordan where they reported the prevalence of thyroid dysfunction at 12.5%.

However few studies had also reported the prevalence of thyroid dysfunction in type 2 diabetics to be exceptionally higher than that found in the present study.[21] A study done by Udiong et al(2007), in Nigerian type 2 diabetics showed a high prevalence (46.5%) of abnormal thyroid hormone levels.

A large variation from (10.8% - 46.5%) in various studies suggest some role of geographical, genetic and enviromental factors in pathogenesis of thyroid dysfunction.

Coastal cities (Mumbai, Goa, and Chennai) have higher prevalence of thyroid function disorder (11.7%) in comparison to cities located inland (Kolkata, Delhi, Ahmedabad, Bangalore, and Hyderabad) 9•5%.

The prevalence of individual thyroid disorders, as found in the present study was subclinical hypothyroidism 35 (11.66%), overt hypothyroidism 22(7.33%) and hyperthyroidism 3 (1%). No case was found to lie in the category of subclinical hyperthyroidism.

In cases of thyroid dysfunctions maximum prevalence was found to be of subclinical hypothyroidism i.e 35 (11.66%) patients. Our results are in concordance with the results of Perros et al,[3] Celani et al,[19] Similarly Radaideh et al and Celani et al in their respective studies found subclinical hypothyroidism as the most common form of individual thyroid disorder.[19]

Our results were, however, different from that reported by Shaikh et al who reported overt hypothyroidism to be more common (35%) as compared to subclinical hypothyroidism (11.66%) in patients with type 2 diabetes mellitus.[22]

In the present study, overt hypothyroidism was found to be the second most common form of thyroid dysfunction in type 2 diabetes mellitus patients. Similar results were reported by Singh et al, Akbar et al and Vikram et al who in their respective studies on type 2 diabetics also found overt hypothyroidism as the second most common form of thyroid disorder.[7]

The author suggest that the high prevalence of subclinical hypothyroidism was probably due to public awareness and easy availability of thyroid function test at door level.

In the present study thyroid dysfunction was found to be more common in females 37 (22.84%) as compared to males 23(16.66%). This difference in prevalence with respect to gender, on statistical analysis, was found to be significant (p<0.012,S).

Celani et al in their study also reported significantly higher prevalence of abnormal thyroid functions in females (40.9%) as compared to males (19.8%)(p<0.0005).[19]

Shaikh et al reported thyroid dysfunction in 31(51.66%) females and 29(48.33%) males.[22]

Papazafiropoulou et al also found a statistically significant (p<0.001) higher prevalence of thyroid disease in females as compared to males .[23]

Similarly Singh et al(2011) reported the prevalence of thyroid dysfunction to be twice in females as compared to males.[26]

In the present study subclinical hypothyroidism was found to be the most common type of thyroid dysfunction both in males (n=15) and females (n=20). Dominance of females was seen in hypothyroid group i.e.SCH as well as in Overt hypothyroidism.

Our results were almost similar to that seen by Singh et al(2011) who in their study reported subclinical hypothyroidism to be the most common thyroid dysfunction present, being seen in more number of females(n=8) as compared to males(n=4).[7] Vikram et al(2013) also reported subclinical hypothyroidism as the most common form of thyroid dysfunction seen in more females(n= 4) as compared to males (n= 3).

In our study the maximum number of hypothyroidism (SCH and Overt hypothyroid) were in the age group of 40-60 yrs n=37 (61.66%).

Anil kumar et al,[11] had maximum number of hypothyroidism (13.1%) in the age group 46-54 years. They reported less affected (7.5%) thyroid disorder in younger age 18-35years.[12] Similarly, in our study we also had only 12 (20%) cases in age group of 30-40 years. In advanced age at more than 70 years only 1 case of both SCH and Overt hypothyroid was seen

In our study we found, that out of 60 patients who had thyroid disorder 35 (58.33%) patients belonged to age group of less than 50 years. Sixteen (26.66%) patients belonged to the age group of 50 - 60 years and 9 (15%) patients belonged to age group more than 60 years. Thus the age specific trend in the prevalence of thyroid disorder was found to be highest in the age group of <60 years. This when evaluated was statistically insignificant (P >0.578,NS).

The results of our study are not in correlation with the previous studies of Khurana A. et al.[14] They found high prevalence of thyroid disorders in diabetic patients with advancing age.

Similar was seen by Papazafiropoulou et al (2010) who found a higher mean age in euthyroid diabetics (67.07±12.11 years) as compared to diabetics with thyroid disease (65.53±11.77 years), This difference was also not of statistical significance.(p=0.17)[23]

Lack of statistical significance between the difference in mean age of euthyroid and thyroid dysfunction subgroups was a common finding in both these studies.

In the present study,out of 60 diabetic patients who had thyroid disorders, the maximum number of patients 33 (55%) had duration of diabetes 1 - 5 years. Fifteen (25%) had duration of diabetes 5.1 - 10 years and 7(11.66%) had duration of diabetes more than 10 years. Only 3(5%) patients of thyroid dysfunction were seen in recently diagnosed type 2 diabetes mellitus. Only 2(3.33) case of thyroid dysfunction had duration of diabetes more than 15 years. This difference was not statistically significant (p > 0.561,NS). Our results are in concordance with Khurana A. et al. They had (46.87%) patients of thyroid disorder in 5 years of duration of diabetes.[14]

Diez et al also found no significant relationship between presence of thyroid dysfunction and duration of diabetes. In their study the majority of patients had diabetes of less than or equal to 5 years duration (67.60%). The mean duration of diabetes in the thyroid dysfunction group (5.3 ± 4.1 years) was longer when compared to that of the euthyroid group (4.7 ± 3.9 years). This was statistically insignificant (p>0.05, NS). Our results were in contrast to the results of Papazafiropoulou et al (2010) who reported a statistically nonsignificant longer duration of diabetes in euthyroid diabetics (14.64 ± 9.66 years).[23]

The maximum number 28 (46.66%) of thyroid disorder had HbA1c from 6-8%. All these patients were having hypothyroid (overt or subclinical). We found that increase of HbA1c,reduces number of cases of hypothyroid.

Ardekani et al (2009) reported a higher mean HbA1c in diabetics with thyroid disease (8.90±1.99%) as compared to euthyroid diabetics (7.11 ± 1.99%).[24]

On the basis of above mentioned fact,it was expected that there was strong correlation between HbA1c and thyroid dysfunction, higher the HbA1c more will be thyroid dysfunction.

Our study revealed an inverse correlation between HbA1c level and thyroid dysfunction. This was opposite in contrast to other studies.

Despite the popular belief that hypothyroid causes obesity only modest increase in weight is seen with hypothyroid. Similarly in our study the maximum diabetic patients had normal BMI.In the present study the mean BMI in the thyroid dysfunction subgroup came out to be 28.29±8.17kg/m2, which was higher than the mean BMI of the euthyroid subgroup (25.80±5.89kg/m2). This was not statistically significant (p>0.618, NS).

Yang et al reported BMI of 24.8±3.6kg/m2 in subclinical hypothyroid group and 24.6 ± 3.4 kg/m2 in euthyroid group. Kim et al also reported a higher BMI in the subclinical hypothyroid group (24.1 ± 3.2 kg/m2) as compared to the euthyroid group (24.8 ± 3.9 kg/m2). Both of these studies did not shown any statistical significant correlation.

CONCLUSION

Our study showed a high prevalence of thyroid dysfunction in patients with type 2 diabetes mellitus. Subclinical hypothyroidism was found to be the most common type of thyroid disorder. Thyroid dysfunction was more common in females as compared to males. There was no significant difference between the duration of diabetes, mean age & mean BMI in diabetics with or without thyroid dysfunction

There was also no significant difference between the presence of hypertension in euthyroid diabetics and those with thyroid dysfunction.

An inverse correlation between HbA1c level and thyroid dysfunction was found. The present study therefore postulates that poor glycemic control does not contribute to thyroid dysfunction.

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