



**PREVALENCE OF THYROID DISORDERS IN RURAL REGION OF DENTAL
TERTIARY CARE CENTER AT KANPUR, UTTAR PRADESH**

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ABSTRACT

Background: Thyroid disorders are a widespread endocrinological problem, but data on its prevalence in India is scanty. **Aims & Objective:** The aim of the present study was to assess the proportion of various thyroid disorders in subjects attending a dental tertiary care center. **Material and Methods:** This retrospective hospital based study was done from July 2020 – March 2021, involving 3033 patients who underwent thyroid function test, in the central clinical biochemistry. Thyroid function tests were performed on Siemens Centaur immunoassay analyzer. Statistical analysis was performed by SPSS v21 software. **Results:** We found 20.79% subjects having thyroid dysfunction in our study population. Out of these, 3.92% were overt hypothyroid, 7.48% were subclinical hypothyroid, 2.93% overt hyperthyroid and 6.46% were found to be subclinical hyperthyroid. **Conclusion:** The present study suggested that the prevalence of thyroid disorders in our study population is high and hypothyroidism is more common than hyperthyroidism. Highest prevalence of thyroid disorder was found in 30-49 years age group.

KEYWORDS: Hypothyroidism, hyperthyroidism, thyroid stimulating hormone.

INTRODUCTION

Diseases of the thyroid gland are among the most abundant endocrine disorders worldwide second only to diabetes, India is no exception. Recent report shows that 300 million people in the world are suffering from thyroid disorders and among them about 42 million people reside in India.^[1] Thyroid disorders are more common in women than in men. One in every eight women during their life time has risk for thyroid disorder. The exact reason is not known. The higher prevalence in females may be associated with estrogen and progesterone.^[1]

Our understanding of the effects of thyroid hormones under physiological circumstances, as well as in pathological conditions, has increased dramatically during the last two centuries and it has become clear that overt thyroid dysfunction is associated with significant morbidity and mortality. Both hypothyroidism and hyperthyroidism have been linked with increased risk from cardiovascular disease and the adverse effects of thyrotoxicosis in terms of osteoporosis risk are well established. Hypothyroidism itself contributes to morbidity from osteoporosis, hyperlipidemia, hypercholesterolemia, cardiovascular and neuropsychiatry disease in the population. The seriousness of thyroid disorders should not be

underestimated as thyroid storm and myxedema coma can lead to death in a significant number of cases.^[2,3]

Furthermore the prevalence and pattern of thyroid disorders depends on sex, age, ethnic and geographical factors and especially on iodine intake. After successful salt iodination adopted by the Indian government, World Health Organization assessment status classified India as having optimal iodine nutrition in 2004. Still thyroid disorders especially hypothyroidism, both subclinical and overt, contributes significantly to burden of thyroid disorders in India. Data available on the prevalence of hypothyroidism and hyperthyroidism for Indian population is scanty.^[4,5] The present study aimed to carry out hospital based study on the proportion of various thyroid disorders. We therefore evaluated cases with high suspicion of thyroid disorders over a nine month period to estimate proportion of various thyroid disorders in subjects attending our tertiary care centre.

MATERIAL AND METHODS

Serum of individuals with suspicion of thyroid dysfunction was subjected to thyroid profile (Total T4, Total T3, Free T4, Free T3 and TSH) using Siemens Centaur immunoassay analyzer. The TSH levels of serum samples were analyzed using a 3rd generation chemiluminescence sandwich immunoassay. The

analytical sensitivity was 0.004 μ IU/ml. The T3, T4, FT4 and FT3 levels were also analysed by chemiluminescent immunoassay using Siemens Centaur immunoassay analyzer. The laboratory's reference values were TSH: 0.55- 4.78 μ IU/ml; fT3: 2.3- 4.2pg/ml; fT4: 0.89- 1.76ng/dl; T3: 60 -181ng/dl and T4: 4.5- 12.60 μ g/dl. Analytical sensitivity was 0.004 μ IU/ml for TSH, 0.4 μ g/dl for T4, 35ng/dl for T3, 0.05ng/dl for FT4 and 1.0 pg/ml for FT3. Coefficient of variation was < 10% for TSH, T4, T3, FT4 and FT3.

Statistical Analysis

The data collected were analyzed using Excel 2007, R2.8.0 Statistical Package for Social Sciences (SPSS) for windows version 21.0 (SPSS Inc.; Chicago, IL, USA).

We calculated the odds ratio (OR) and their 95% Confidence Interval (95% CI).

RESULTS

The current study was a retrospective hospital based study, carried out from July 2020 – March 2021 involving 3033 subjects (441 males and 2592 females) with suspicion of thyroid disorder who were subjected to thyroid function assay. The overall frequency of thyroid disorders and age wise distribution are described in Table 1 and table 2 while gender wise distribution given in Table 3 and table 4. Out of 3033 patients, 3.92% were overt hypothyroid, 7.48% were subclinical hypothyroid, 2.93% overt hyperthyroid and 6.46% were found to be subclinical hyperthyroid. [Table-1].

Table 1: Overall distribution of thyroid disorders.

	Number of patient	Percentage	LL*	UL**
Euthyroid	2402	79.19%	77.71	80.63
Subclinical hypothyroid	227	7.48%	6.57	8.48
Overt hypothyroidism	119	3.92%	3.26	4.68
Subclinical hyperthyroidism	196	6.46%	5.61	7.40
Overt hyperthyroidism	89	2.93%	2.36	3.60
Total	3033			

*lower limit, ** upper limit

Table-2 shows the distribution of patients according to age and sex. In the age 10-19 years age group, 131 females and 18 males were there out of which 84 females were suffering from euthyroid. The 20-29 years age group comprised our largest group with suspicion of thyroid disorders. This group consisted of 710 cases (107males, 663 females), 498 females were euthyroid and 48 females were subclinical hypothyroid.

males were 441 and 55.7% were affected with euthyroid while 2592 females were present with 83.1% of euthyroid disorder. The mean TSH concentration increased with age in euthyroid, hypothyroid (both overt and subclinical) and hyperthyroid (both overt and subclinical) groups studied. The highest TSH concentration was seen in the age group 60- 69 years and lowest TSH was seen in age group 10 – 19 years. [Table-5]

Table 3 and 4 shows gender wise occurrence of various thyroid disorder. In the present study total number of

Table 2: Distribution of thyroid disorders according to age and sex.

Age group (years)	Total		Euthyroid		Subclinical thyroid		Overt hypothyroid		Subclinical hyperthyroidism		Overt hyperthyroidism	
	M	F	M	F	M	F	M	F	M	F	M	F
10--19	18	131	8	84	6	24	0	6	4	11	0	6
20-29	107	603	48	498	21	48	14	22	16	24	8	11
30-39	136	881	86	749	12	56	11	24	14	38	13	14
40-49	109	768	58	687	15	33	6	16	19	27	11	5
50-59	42	125	25	88	3	2	0	14	5	19	9	2
60-69	29	84	21	50	1	6	0	6	1	18	6	4

Table 3: Distribution of thyroid disorders in males.

	Number. Of patient	Percentage	LL*	UL**
Euthyroid	246	55.78%	51.01	60.48
Subclinical hypothyroid	58	13.15%	10.14	16.67
Overt hypothyroidism	31	7.02%	4.83	9.83
Subclinical hyperthyroidism	59	13.37%	10.34	16.92
Overt hyperthyroidism	47	10.65%	7.94	13.92
Total	441			

*lower limit, **upper limit

Table 4: Distribution of thyroid disorders in females.

	Number of patient	Percentage	LL*	UL**
Euthyroid	2156	83.17%	81.68	84.60
Subclinical hypothyroid	169	6.5%	5.60	7.54
Overt hypothyroidism	88	3.39%	2.73	4.17
Subclinical hyperthyroidism	137	5.28%	4.46	6.22
Overt hyperthyroidism	42	1.62%	1.17	2.18
Total	2592			

*lower limit, **upper limit

Table 5: Mean TSH values in different age groups.

Age group (years)	10--19	20-29	30-39	40-49	50-59	60-69
Euthyroid	2.13	2.28	2.29	2.48	2.89	2.47
Subclinical hypothyroid	4.8	6.54	6.43	6.32	6.57	7.4
Overt hypothyroidism	27	28.67	33.89	35.47	38.41	39.14
Subclinical hyperthyroidism	0.4	0.3	0.28	0.29	0.34	0.28
Overt hyperthyroidism	0.04	0.045	0.046	0.041	0.049	0.042

DISCUSSION

Thyroid disorders are amongst the most common endocrine diseases in India. However data on the prevalence of thyroid disorders in India is relatively scanty. This retrospective hospital based study was carried out from July 2020 – March 2021 involving 3033 subjects (441 males and 2592 females) with suspicion of thyroid disorder who were subjected to thyroid function assay.

We found 20.79% subjects having thyroid dysfunction in our study population. Rebecca et al reported prevalence of 15.8 % of thyroid dysfunction in a study conducted on 505 women in Pondicherry whereas Arindam Bose et al found prevalence of 15.35% in central India in their study.^[5,6] Various studies have reported variable prevalence of subclinical hypothyroidism. We found 7.48% of our population having subclinical hypothyroidism. The Rotterdam study reported an overall prevalence of 10.8% and Rebecca et al found 9.5% prevalence which was very similar to our finding.^[2,6] In females above 55 years of age, the prevalence was much higher 12.5% as reported by Rebecca et al, similar to the present study.^[6] Colorado study and NHANES III study found 9.5% (TSH >5.1 μ IU/ml) and 4.3% prevalence of subclinical hypothyroidism respectively.^[7,8] The prevalence of overt hypothyroidism in our study population was 3.92%. Rebecca et al reported 2%, a study from Cochin on 971 adults revealed 3.9% subjects to be hypothyroid whereas study by Arindam Bose et al reported 1.1% and 7.45% respectively and study by Usha Menon V reported the similar results to our study.^[5,6,9]

Our study population revealed 6.46% subjects to be subclinical hyperthyroid whereas 2.93% were overt hyperthyroid. Rebecca et al reported 1.8% of their study population to be hyperthyroid out of which 1.2% were overt hyperthyroid and 0.6% were subclinical hyperthyroid and study by Verma A reported the similar results.^[6,10] Arindam Bose et al reported 1.79% as hyperthyroid in their study whereas the Hoogendoorn

study found 0.4% o and 0.8% prevalence of overt and subclinical hyperthyroidism respectively.^[5,11]

Our study suggested that the prevalence of thyroid disorders in our study population is high and hypothyroidism is more common than hyperthyroidism. The prevalence of subclinical hypothyroidism (7.48%) as well as subclinical hyperthyroidism (6.46%) is much higher than overt hypothyroidism (3.92%) or overt hyperthyroidism (2.93%).

Various studies have shown female preponderance in thyroid disorders similar to the present study. We believe this bias was introduced in the study since more number of females with complaints of menstrual irregularity, polycystic ovary syndrome (PCOS), and infertility were subjected to thyroid function test as a part of routine protocol. However, only those males with suspicion of thyroid disorders were subjected to thyroid function test (TFT).

Also, we found that highest no of subjects with hypothyroidism (both overt and subclinical) was between 30-49 years age group. Other studies like Arindam Bose et al (19-45 years), Vanderpump MP et al (34 years & above) have reported similar age groups.^[5,12] The mean thyroid stimulating hormone value was found to increase with age in euthyroid, hypothyroid (both overt and subclinical) and hyperthyroid (both overt and subclinical) subjects.^[13,14,15]

CONCLUSION

Our study suggested thyroid disorders are common in our study population, with hypothyroidism being more common than hyperthyroidism. The 30-49 age group had the highest prevalence of thyroid disorder. In the euthyroid, hypothyroid (both overt and subclinical), and hyperthyroid (both overt and subclinical) groups studied, the mean TSH concentration increased with age. We believe this bias was introduced into the study because more females with complaints of menstrual irregularity, PCOS, and infertility were subjected to thyroid function

tests as part of the routine protocol. Only males suspected of having thyroid disorders were subjected to TFT. The finding that a large number of subjects unknowingly have laboratory evidence of thyroid dysfunction supports the usefulness of screening of thyroid function after age of 30 years, for early detection and treatment to reduce the ill effects of thyroid dysfunction.

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