

## Research Article

# Thyroid Disorders in Greater Noida: A hospital based study

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### Abstract

**Background:** In India around 42 million suffer from thyroid disorders, the most common cause for which is iodine deficiency disorders. Despite the coverage of National iodine deficiency diseases control program (NIDDCP) in India, iodine deficiency is still prevalent in many parts of India.

**Aim:** To assess T3, T4 & TSH levels and prevalence of thyroid disorder in the population of Greater Noida district.

**Material and method:** Total of 2765 patients having significant histories of thyroid disorder along with altered thyroid profile (T3, T4 & TSH) was selected. T3, T4 & TSH levels were estimated by ECI immunoassay analyzer from Johnson and Johnson. On the basis of T3, T4 and TSH levels patients were classified to euthyroid, hypothyroid and hyperthyroid. Data were represented as percentage, frequency, mean and standard deviation.

**Result:** We found that females are more susceptible to thyroid hormone disorders. Higher prevalence of hypothyroidism was seen in patients who are within the age group of 26-35 years (32%) and hyperthyroidism was in the age group of 36-45 (7.9%).

**Conclusion:** Our study demonstrates that hypothyroidism was high in study region with female preponderance.

**Keywords:** T3, T4, TSH, Hyperthyroidism, Hypothyroidism

## 1. Introduction

Thyroid hormone disorders are the most common form of endocrine disorder in our country<sup>1</sup>. The most common cause of thyroid disorders is a primary failure of the thyroid gland. Disorder due to pituitary or hypothalamic dysfunction or due to generalized tissue resistance to the circulatory thyroid hormone is also found<sup>2</sup>. Thyroid dysfunction affects several systems of our body<sup>3</sup>. The disorder manifests in a wide spectrum of clinical and biochemical disease from clinically undiagnosed disease to myxoedema coma<sup>4</sup>.

In India, with a population of 1.21 billion, an estimated 108 million people suffer from endocrine and metabolic disorders. Of these 108 million, 42 million suffer from thyroid disorders<sup>5</sup>. Iodine is an essential component of thyroid hormones that is triiodothyronine (T3) and tetra iodothyronine (T4). The WHO recommendation for adequate daily iodine intake of 150 µgm/day for man and non pregnant, non lactating women, 250 µgm/day for pregnant and lactating women and a daily intake of iodine of 90 µgm for preschool children (0-59 months) and 120 µgm for school children (6-12 yrs)<sup>6</sup>.

Thyroid function test panel is commonly used for evaluating and screening thyroid disorders. The American Thyroid Association recommends that adults must be screened for thyroid disorders by measurement of the serum thyroid stimulating hormone (TSH) concentration at the age 35 years and every 5 years thereafter<sup>7</sup>.

## 2. Material & Methods

This study was conducted in the Department of Biochemistry in collaboration with Medicine Department, in School of Medical Sciences and Research, Greater Noida and its associated hospital. The present study was started after obtaining ethical clearance from the institutional ethical committee. Informed consent was obtained from the individual patients. Total of 2765 patients having significant history of thyroid disorder along with altered thyroid profile (T3, T4 & TSH) were selected who have undergone thyroid function tests between December 2012 and December 2013 in the central clinical biochemistry laboratory, were enrolled for the study. Patients with incomplete thyroid function test, non-significant thyroid history and all patients with H/O drugs intake one month prior to sampling, which affects thyroid status; were excluded from the study.

After overnight fasting three ml of venous blood samples were collected in morning in plain vials under aseptic conditions. Blood was allowed to clot and centrifuged at 3000 rpm for 15 minutes at room temperature. The supernatant serum was assayed for T3, T4 & TSH by chemiluminescence using ECI immunoassay analyzer from Johnson and Johnson USA. The reference intervals for T3, T4 and TSH for our laboratory were as follows<sup>7</sup>: T3 – 1.23 – 3.23 nmol/L; T4 – 59 – 135 nmol/L; TSH – 0.4 – 4.2 mIU/L.

Those having normal T3, T4 & TSH levels were categorized as euthyroid, those having low T3, T4 & high TSH were hypothyroid and those having normal levels of T3, T4 & low TSH were categorized as hyperthyroid respectively with respect to the reference range.

Data were analyzed by Software Package for Social Sciences version 17 (SPSS 17). Data were represented as percentage, frequency, mean and standard deviation.

### 3. Results

In our study of 2765 subjects for thyroid hormone status, we found that females are more susceptible to thyroid hormone disorders and higher prevalence of hyperthyroidism & hypothyroidism was seen in patients who are in their second & third decade of life. Within different age groups, higher prevalence of hypothyroidism was seen in patients who are within the age group of 26-35 years (32%) and hyperthyroidism was in the age group of 36-45 (7.9%) (Table-1).

**Table.1 Thyroid status in different age groups of males & females**

Thyroid Status	Age group (years)			
	15-25	26-35	36-45	46-55
Euthyroid	153 (5.5%)	287 (10.3%)	166 (6.0%)	142 (5.1%)
Hypothyroid	198 (7.1%)	885 (32.0%)	208 (7.5%)	189 (6.8%)
Hyperthyroid	68 (2.4%)	137 (4.9%)	221 (7.9%)	111 (4.0%)
Total	419(15.1%)	1309(47.3%)	595(21.5%)	442(15.9%)

Mean  $\pm$  SD value of T3 and TSH were higher in females while T4 values were higher in males (Table-2)

**Table.2 Mean  $\pm$  SD values of T3, T4 and TSH in study subjects**

Hormonal Status	Males	Females
T3 (nmol/L)	1.68 $\pm$ 0.5	1.86 $\pm$ 0.9
T4 (nmol/L)	88.23 $\pm$ 17.3	79.7 $\pm$ 33.4
TSH ( $\mu$ IU/L)	2.34 $\pm$ 1.3	3.86 $\pm$ 1.6

### 4. Discussion

The prevalence of Thyroid disorder was found to be high in the patients of our study area. Although all age group presented with a high prevalence of Thyroid disorder, higher number of subjects was observed between age groups of 26-35 years of age. Our study also revealed higher prevalence of thyroid hormone levels in the patients who are in their late 2<sup>nd</sup> and early 3<sup>rd</sup> decade of life which is in accordance with the study in Meerut district by Ahmad *et al*<sup>4</sup>.

Their study also showed high prevalence of abnormal thyroid hormone levels in the patients who are in their 2<sup>nd</sup> and 3<sup>rd</sup> decade of life. In another clinic-based study from Mumbai, out of 800 children with thyroid disease, 79% had hypothyroidism. Common causes of hypothyroidism in these children were thyroid dysgenesis, dyshormonogenesis and thyroiditis<sup>8</sup>. A study conducted in Tayside, Scotland, researchers identified 620 incident cases of hyperthyroidism and 3,486 incident cases of hypothyroidism. The incidence increased with age and females were affected two to eight times more than males for hyperthyroidism & hypothyroidism<sup>9</sup>, which is in accordance to our study that shows females were more vulnerable than males.

In a study conducted by Menon<sup>10</sup> in adult south Indian population, they revealed thyroid function abnormalities were present in 19.6% of subjects; Subclinical hypothyroidism was present in 9.4%. A study from Kolkata shows the prevalence of hypothyroidism was 25.7%, among 232 hypothyroid cases, 181 (78.02%) were females and 51 (21.98%) were males. The maximum number of patients belonged to the age group of 36-45 years with a clear female preponderance<sup>11</sup>.

According to Niafar *et al*<sup>12</sup> hypothyroidism was common in Iranian population, as 12.8 % of woman and 4.7% of man had hypothyroidism. As in others studies in developed countries, hypothyroidism tends to increase with age and is more common in women<sup>13,14</sup>. Das *et al*<sup>15</sup> found that the prevalence of hypo or hyperthyroidism (19.2% and 14.2%) is more common above 40 yrs of age.

A study reported that hypothyroidism was more prevalent (40.5%) in the age group of 36-45 yrs with obvious female preponderance<sup>3,13</sup>. A study in Makkah exhibited similar age group predominance of 40  $\pm$  12 years on the prevalence of thyroid disorders<sup>16</sup>. A study conducted by Jha *et al*<sup>5</sup> in a tertiary health care hospital revealed the prevalence of Hypothyroidism 23% & Hyperthyroidism 7% and concluded that thyroid dysfunction is more prevalent in females in their study area which is in accordance to our study which revealed that females are more vulnerable to thyroid dysfunction. Ahmad *et al*<sup>17</sup> in their study on 4739 patients revealed that females are more vulnerable to hypothyroidism which is also in accordance to our study which revealed that females are more susceptible to hypothyroidism.

### 5. Conclusion

Our study demonstrates that hypothyroidism was high in study region with female preponderance. The prevalence of hypothyroidism was more significant in the age group of 25-35 years & hyperthyroidism in the age group of 36-45 years. This indicates that thyroid disease should be considered during routine evaluation of this susceptible group followed by appropriate detection and treatment, despite the coverage of National iodine deficiency diseases control program (NIDDCP) in India, iodine deficiency is still prevalent in many parts of India<sup>18</sup>. In this study, an attempt is made to describe the epidemiology of thyroid diseases in Greater Noida, India, from the limited available data and recommendations are made for thyroid disease screening.

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