Research Paper

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Prevalence of Thyroid Dysfunction in the Patients Visiting Tertiary Health Care Hospital, Faridabad; Haryana

Biochemistry

KEYWORDS : Hypothyroidism, Hyperthyroidism, T3, T4 & TSH

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ABSTRACT

The present study was conducted to determine the prevalence of thyroid dysfunction in patients attending Gold Field Institute of Medical Sciences & Research & its associated hospital. This retrospective hospital based study involved 586 patients having undergone thyroid hormones function assay, in the central clinical biochemistry laboratory. These patients were evaluated for thyroid hormone assay tri-iodo thyronine (T3), tetra-iodo thyronine (T4) & thyroid stimulating hormone (TSH) by Mini Vidas auto analyzer using enzyme linked fluorescent assay technique. Our study revealed that the prevalence of Hypothyroidism was 23% & Hyperthyroidism 7% & in our study area, thyroid dysfunction is more prevalent in females who are in the age group of 21-35 years.

Introduction

Thyroid diseases are one of the most prevalent endocrinopathies across the world. While the epidemiology of thyroid illness has been reviewed in Indian journals [1]. They are the second most common glandular disorder of the endocrine system and are increasing, predominantly among women [2]. The recently published eight-city study on prevalence of thyroid dysfunction and disease brings thyroidology to centre stage at once again [3]. 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 [4]. Thyroid function test panel is commonly used for screening and evaluating thyroid dysfunctions. The American Thyroid Association recommends that adults must be screened for thyroid dysfunction by measurement of the serum thyrotropin concentration at the age 35 years and every 5 years thereafter [5]. So, there is a requirement for multiple studies from different locations, the spectrum of thyroid disorders range from a condition of hypothyroidism (under active) to hyperthyroidism (over active). The biochemical and clinical classification of thyroid disorders include primary disorders due to thyroid gland dysfunction itself such as primary hypothyroidism & primary hyperthyroidism. Secondary disorders due to pituitary gland disorder include secondary hypothyroidism and secondary hyperthyroidism. Tertiary disorders are due to hypothalamic diseases include tertiary hypo and hyperthyroidism [6]. Thyroid disorders may occur at any age and in both genders, but its occurrence is different in different geographical areas and in different age and sex groups [7]. Thyroid dysfunction manifestations vary considerably from area to area and are determined principally by the availability of iodine in the diet. Almost one-third of the population lives in areas of iodine deficiency [8]. With severe and prolonged iodine deficiency, the effects of a deficient supply of T3 and T4 hormones may occur (WHO-UNICEF-ICCIDD, 1994) [9].

Therefore a study was planned to find the prevalence of various thyroid disorders in different age and sex groups in patients attending Gold Field Institute of Medical Sciences & Research & its associated hospital.

Materials & Methods

This study was conducted in the Department of Biochemistry of Gold Field Institute of Medical Sciences & Research & its associated hospital. The present study was started after obtaining ethical clearance from the institutional ethical committee. Total of 586 patients having significant history of thyroid disorder along with altered thyroid profile (T3,T4 &TSH) were selected.

Inclusion criteria: All patients referred from different units of the hospital for thyroid profile in the central clinical biochemistry lab irrespective of age and sex.

Exclusion criteria: Patients with incomplete thyroid function test & with no clinical history suggestive of thyroid disorders.

All patients with H/O drugs intake one month prior to sampling, which affects thyroid status.

Data Collection Procedure:

Sampling technique: Purposive sampling was done.

Performa was designed to collect the data regarding the history and clinical examination. The laboratory investigations included the complete thyroid profile i.e. TSH, T4 & T3.

Specimen collection & processing: After overnight fasting 3ml of venous blood samples were collected 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 enzyme linked fluorescent assay (ELFA) technique using Mini Vidas auto analyzer. The reference intervals for T3, T4 & TSH for our laboratory were as follows [10]: T3-1.23-3.23 nmol/L; T4-59-135 nmol/L; TSH-0.4-4.2 mlU/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.

Statistical analysis was performed with software Package for Social Sciences version 20 (SPSS 20). ANOVA was applied to analyze the significance between the means of two groups. Data were present as (Mean ± SD). Inter-group differences were tested by independent sample test (two groups). $P < 0.05$ were considered statistically significant.

Result

We study 586 patients for thyroid hormone disorders, out of which 437 (75%) were females & 147 (25%) are males. The ratio of females to male in our study is around 3.9:1. The thyroid hormonal levels (Mean ± SD) of males in our study was T3 ;(1.84±0.5), T4 ;(89.44±21.5) & TSH; (2.78±2.3) & that of females were T3; (1.83±1.0), T4; (88.7±36.4) & TSH; (3.93±1.6) (Table 1).

Table1. Comparison of T3, T4 & TSH Level (Mean ± SD) in Males & Females

SEX	HORMONAL LEVEL		
	T3 (nmol/L)	T4(nmol/L)	TSH (mIU/L)
MALE	1.84 ± 0.5	89.44 ± 21.5	2.78 ± 2.3
FEMALE	1.83 ± 1.0	88.7 ± 36.4	3.93 ± 1.6

The patients were classified according to thyroid status as Hypothyroid, Hyperthyroid & Euthyroid respectively with respect

to the reference range & the distribution of these patients in various age groups has been shown in (Table 2).

Table2. Thyroid disease spectrum in different Age groups of Males & Females

Hormonal Disorders	Age groups (years)					TOTAL
	20 & under	21-35	36-50	51-65	> 65	
Euthyroid	28 (6.8%)	157 (38.2%)	136 (33.1%)	74 (18.0%)	15 (3.6%)	410 (69.9%)
Hypothyroid	8 (5.8%)	61 (44.8%)	43 (31.6%)	18 (13.2%)	6 (4.4%)	136 (23.2%)
Hyperthyroid	2 (5%)	17 (42.5%)	14 (35%)	6 (15%)	1 (2.5%)	40 (6.8%)

Comparison of thyroid hormones levels as (Mean ± SD) among various thyroid disorders are shown in (Table 3).

Table 3. Comparison of thyroid hormones levels among various thyroid disorders

Thyroid Hormones	Euthyroidism (Mean ± SD)	Hypothyroidism (Mean ± SD)	Hyperthyroidism (Mean ± SD)
T3	1.81 ± 0.6	1.67 ± 0.3	2.88 ± 0.2
T4	87.94 ± 28.7	84.53 ± 37.6	113.75 ± 68.4
TSH	2.20 ± 0.9	9.83 ± 0.6	0.33 ± 0.1

High prevalence of hyperthyroidism & hypothyroidism was seen in patients who are in their second & third decade of life with a female vulnerability. Within different age groups, higher prevalence of hyperthyroidism & hypothyroidism was seen in patients who are within the age group of 21-35 years.Our study revealed that females are more vulnerable to hypothyroidism & hyperthyroidism in our study area.

Discussion

In our study we have found that the prevalence of thyroid disorder was high in patient. Although all age groups presented with a high prevalence of thyroid disorder, higher number of patients was observed between age group of 21-35 & the females are more vulnerable to thyroid disorders which is in accordance with study conducted in Meerut, U.P. by Naved Ahmad et.al. [11]. which shows high prevalence of abnormal thyroid hormone levels with in the patients who are in their 2nd & 3rd decade of life. In another study conducted by Meena Desai et.al. [12]. revealed presence of thyroid disease in 26%. A study conducted in Tayside, Scotland Researchers identified 620 incident cases of hyperthyroidism, There were 3,486 incident cases of diagnosed primary hypothyroidism, for both hyperthyroidism and hypothyroidism, the incidence increased with age and females were affected two to eight times more than males across the age range [13], which is in accordance to our study that shows females were more affected than males within different age groups.

We have found F:M ratio of thyroid disorders was 2.9:1, But a descriptive study that took place in Nigeria, Researchers found that the total number of patients with thyroid disorders seen in a 15- month period was 78 with the female: male ratio was 5:1 [14]. Our study also found the link with the study conducted by Usha Menon V et.al. which shows that thyroid function abnormalities were present in 19.6% of subjects [15]. In a study conducted in the Department of Biochemistry, G.B. Pant Hospital, Delhi, Researchers found the majority of the patients (approximately 85%) were Euthyroid . only 1.22% of the total number of referred patients turned out to be hyperthyroid. Hypothyroidism was more prevalent i.e. 13.2% [16]. Our study also shows higher prevalence of hypothyroidism. In another study from kolkatta 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 [17].

CONCLUSION

As the present study was a hospital based study, it may not represent the whole population, the study revealed that prevalence of Hypothyroidism is higher in the study population & is more prevalent in females. Study has opened up a new era where the results can be used as baseline data to further extend the study on larger cross section of population in terms of deciphering the causative factors behind this disease pattern so as to lessen it burden. Study suggests: thyroid disease should be considered during routine evaluation of susceptible population & should be followed by detection & early treatment which helps to avoid complications, as the diagnosis & management of thyroid dysfunction are still suboptimal. Therefore such studies may be helpful to determine the scope of the burden of thyroid disorders & supports the usefulness of screening of thyroid function, which may help Govt. & other agencies to control this problem by changing policies in the near future.

We hope to extend our study to a larger cross section of population in this region keeping in mind individual's body habitus, stress level & causative factors like auto immunity & status of Iodine.

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