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Original Research Paper

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A STUDY OF PREVALENCE OF SUBCLINICAL HYPOTHYROIDISM AND OVERT HYPOTHYROIDISM IN BIDAR DISTRICT, KARNATAKA

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ABSTRACT

Background: Subclinical hypothyroidism and overt hypothyroidism are often overlooked afflictions. The aim of the present study was to estimate the prevalence of overt and subclinical hypothyroidism among the adult population of Bidar District. **Materials & Methods:** A prospective hospital study of 1485 subjects who were referred to Department of Biochemistry, Bidar Institute of Medical Sciences, Bidar was undertaken for assessment of thyroid functions investigated between November 2022 to April 2023. Statistical analysis was done in terms of percentage and chi-square test (x2). **Results:** Of the 1485 subjects (198 men and 1287 women); 593 subjects (~40%) were euthyroid, 362 subjects (27 men and 335 women) had subclinical hypothyroidism; 331 subjects (56 men and 275 women) had overt hypothyroidism; 30 subjects (6 men and 24 women) had subclinical hyperthyroidism; 162 subjects (3 men and 159 women) had overt hyperthyroidism; and 7 subjects (02 men and 5 women) had Euthyroid sick syndrome. **Conclusion:** Hypothyroidism appears to be common in Bidar, Karnataka. Community based mass screening for Sub clinical and overt hypothyroidism in high risk group is suggested to identify these patients and treat them.

KEYWORDS : Hypothyroidism, Overt Hyperthyroidism, Prospective Study, Subclinical Hyperthyroidism.

INTRODUCTION

Subclinical Hypothyroidism (sHypo) is defined as an elevated serum thyroid-stimulating hormone (TSH) levels combined with normal levels of serum free thyroid hormones (fT3 & fT4). Unlike overt hypothyroidism, patients with sHypo may present without any clinical features of hypothyroidism and are often identified through routine health examinations. It is a challenge to determine the clinical meaning of this "*Subclinical*" state.[1]

Clinically, there are several important aspects of sHypo to consider, including the diagnosis. The normal range for TSH is determined based on the 95% confidence interval of the healthy population (i.e., the reference population). Patient demographics or characteristics (e.g., age, sex, race, iodine intake, and pregnancy) can affect the Upper Limit of Normal (ULN) for TSH. Additionally, there are individual variations of the hypothalamus-thyroid axis set-point that lead to patient-specific thresholds for sHypo status. Another key sHypo-related clinical aspect is the wide range of effects of thyroid hormone on various organs in particular, the role of thyroid hormone in cardiovascular and cognitive function makes the potential health effects of sHypo worrisome.[2] Common symptoms of overt hypothyroidism are non-specific and include fatigue, lethargy, and dry skin. Although the diagnosis is considered to be straightforward, no single symptom can be used to identify patients with overt hypothyroidism, while many patients with subclinical hypothyroidism are asymptomatic.[3]

Subclinical hypothyroidism is categorized into two groups based on serum TSH levels: mild (Grade 1) and severe (Grade 2). Serum TSH levels in the mild (Grade 1) type are higher than the upper limit (4.5 mIU/L in most cases) and below 10 mIU/L, whereas those in the severe (Grade 2) type are higher than 10 mIU/L.[4]

The most important implication of Subclinical hypothyroidism is, it is highly progressive to overt hypothyroidism and the complications related to hypothyroidism.[2] Subclinical hypothyroidism correlates with an increased risk of fatal and non-fatal Coronary Artery Disease (CAD) events, congestive heart failure and fatal stroke.[5]

Hence in the present study we tried to find out the prevalence of subclinical hypothyroidism which can be treated early to prevent the development of overt hypothyroidism and its complications.

The present study is undertaken with the objective;

1) To estimate the serum T3, T4 and TSH levels.
2) To find out the presence of subclinical and overt hypothyroidism based on biochemical data.

MATERIALS AND METHODS

Source of Data: Patients referred to clinical laboratory, Department of Biochemistry, Bidar Institute of Medical Sciences, for thyroid profile assessment (fT3, fT4 and TSH). After overnight fasting, blood samples were collected and stored for 30 minutes then subjected to centrifugation at 3000rpm, Serum was separated and used for analysis of fT3, fT4 and TSH by CLIA on Maglumi 800 fully automated analyser. Secondary data of the subjects was collected in a standard pre-validated proforma.

Method of Collection Of Data:

Samples were collected from all the patients who visited for evaluation of thyroid profile as per their physician from November 2022 to April 2023.

Inclusion Criteria:

- Healthy subjects in the age group from 20 to 60 years of either sex.

Exclusion Criteria:

- Subjects below the age of 20 years.
- Pregnant women

- Patients with history of medication for any thyroid disorder, thyroidectomy or any exposure to radioactive iodine.
- Patients with history of any renal, hepatic or pancreatic disorder, diabetes mellitus or familial hyper-cholesterolemia.

Statistical Analysis

The data were represented as percentage. The Chi-square test was used to calculate the significance. The data were considered as significant at a *P*-value of 0.05.

RESULTS

In the present study; 44.04% of the subjects were of the age group less than 30 years, 40% were of the age group between 30 and 50 years, and 15.96% were above 50 years. (Table-1).

Of the total 1485 subjects (198 men + 1287 women) were enrolled in the study. 593 subjects (104 men + 489 women) were euthyroid; 362 subjects (27 men + 335 women) had subclinical hypothyroidism, 331 subjects (56 men + 275 women) had overt hypothyroidism; 30 subjects (6 men + 24 women) had subclinical hyperthyroidism; 162 subjects (3 men + 159 women) had overt hyperthyroidism; and 7 subjects (2 men + 5 women) had Euthyroid sick syndrome (Table 2).

Table-1: Age wide distribution of the study subjects.

Age group	n (%)
< 30 years	654 (44.04)
30-50 years	594 (40.00)
> 50 years	237 (15.96)
Total	1485 (100)

Table-2: Thyroid status among study subjects.

THYROID STATUS	Men n (%)	Women n (%)	Sub-Total
Euthyroid	104 (17.54)	489 (82.46)	593
Subclinical hypothyroid	27 (7.46)	335 (92.54)	362
Overt hypothyroid	56 (16.92)	275 (83.08)	331
Subclinical hyperthyroid	6 (20)	24 (80)	30
Overt hyperthyroid	3 (1.85)	159 (98.15)	162
Euthyroid sick syndrome	2 (28.57)	5 (71.43)	7
Grand Total	198 (13.33)	1287 (86.66)	1485
x2: 44.607, degree of freedom: 5, P value: <0.05			

DISCUSSION

Thyroid diseases are among the most common endocrine disorders worldwide. These disorders are frequently misdiagnosed. In general, a lack of awareness and comprehension of the impact of thyroid disorders can lead to people going undiagnosed. Thyroid function is crucial to human health, so any disruption to that function can have serious consequences.[6]

The prevalence of hypothyroidism in various studies around the world shows a considerable variation, and its current prevalence ranges from as low as 1% to as high as 10%.[7,8,9]

In this prospective study of 1485 adults general population, 44.04% of the subjects were of the age group less than 30 years, 40.2% were of the age group between 30 and 50 years and 19.4 % were above 50 years (Table-1). These finding are similar to the study done by Narayana Murthy C, *et al*.[10] Whereas a study done by Taylor PN *et al* concludes that Thyroid hormone reference intervals have differential effects across age groups. The current reference ranges in their study could potentially lead to an inappropriate treatment in older individuals, but on the other hand could result in missed opportunities for risk factor modification in the younger and middle-aged groups.[11]

Of the total 1485 subjects in the present study, 'euthyroid' was seen in 593 (39.93%) subjects. Of these 593 euthyroid subjects 104 (17.54%) were males, and 489 (82.46%) were females. The prevalence of male euthyroid in comparison to the total study subjects (1485) was 7%, while the female prevalence of euthyroid in comparison to the total study subjects (1485) was 32.93%.

Of the total 1485 subjects in the present study, 'subclinical hypothyroidism' was seen in 362 subjects (24.38%). Of these 362 subclinical hypothyroid subjects 27 (7.46%) were males, and 335 (92.54%) were females. The prevalence of male subclinical hypothyroidism in comparison to the total study subjects (1485) was 1.82%, while the female prevalence of subclinical hypothyroidism in comparison to the total study subjects (1485) was 22.56%.

Of the total 1485 subjects in the present study, 'overt hypothyroidism' was seen in 331 (22.29%) subjects. Of these 331 overt hypothyroid subjects 56 (16.92%) were males, and 275 (83.08%) were females. The prevalence of male overt hypothyroidism in comparison to the total study subjects (1485) was 3.77%, while the female prevalence of overt hypothyroidism in comparison to the total study subjects (1485) was 18.52%.

Of the total 1485 subjects in the present study, 'subclinical hyperthyroidism' was seen in 30 subjects (2.02%). Of these 30 subclinical hyperthyroid subjects 6 (20%) were males, and 24 (80%) were females. The prevalence of male subclinical hyperthyroidism in comparison to the total study subjects (1485) was 0.4%, while the female prevalence of subclinical hyperthyroidism in comparison to the total study subjects (1485) was 1.62%.

Of the total 1485 subjects in the present study, 'overt hyperthyroidism' was seen in 162 subjects (10.91%). Of these 162 overt hyperthyroid subjects 3 (1.85%) were males, and 159 (98.15%) were females. The prevalence of male overt hyperthyroidism in comparison to the total study subjects (1485) was 0.20%, while the female prevalence of overt hyperthyroidism in comparison to the total study subjects (1485) was 10.70%.

Of the total 1485 subjects in the present study, 'Euthyroid sick syndrome' was seen in 7 subjects (0.47%). Of these 7 'Euthyroid sick syndrome' subjects, 2 (28.57%) were males and 5 (71.43%) were females. The prevalence of male Euthyroid sick syndrome in comparison to the total study subjects (1485) was 0.13%, while the female prevalence of Euthyroid sick syndrome in comparison to the total study subjects (1485) was 0.34%.

A study done by Yan Y *et al* concludes that the median UIC (Urinary Iodine Concentration) was significantly lower in rural residents than in urban residents. Although the coverage rate of iodized salt was much higher in rural residents than in urban residents, the percentages of seafood intake, iodine-containing drug consumption, and iodine contrast medium injection were lower in rural residents than in urban residents. Both the prevalence of thyroid goitres and nodules was significantly higher in rural residents than in urban residents. Living in rural areas was associated with thyroid goiter.[12]

CONCLUSION

The present prospective study concludes that the prevalence of thyroid disorder is high in the age group of below 30 years. Prevalence of Subclinical and overt hypothyroidism should not be ignored in the general population. Further, community based mass screening for Sub clinical and overt hypothyroidism in high risk group is suggested to identify these patients and treat them.

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Conflict of Interest: None declared.

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