

## A Study on Prevalence of Thyroid Function Disorders Amongst The Population of Barpeta District, Assam.

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**Abstract:** *Introduction and objectives -Thyroid diseases are amongst the commonest endocrine disorders worldwide. India too is no exception. In India sub Himalayan belt extending from Kashmir to Assam is well a recognized area of endemic iodine deficiency. The main aim of the study was to find out the prevalence of thyroid disorders amongst the adult population of Barpeta town and to create awareness among the population about the disorder. Material and methods- The current study was a cross sectional study conducted in the Barpeta district, Assam at Fakhruddin Ali Ahmed Medical College and Hospital. 600 participants were included in the study after taking proper consent after explaining the procedure to each subjects. Assays for thyroid hormones (T3 ,T4) and TSH were performed by Electrochemiluminescence(ECL) technology using Immunoassay analyzer Roche Cobas e411. Anti TPO antibodies were also measured by the same analyzer. The prevalence of different thyroid function disorders was summarized as count and percentages. A chi square test was used to assess the trends in the prevalence of the disorders among different age groups and genders.*

*Result- Of the total study population 443 (73.83%) subjects had normal levels of serum T3, T4 and TSH values without history of thyroid medication. Other 157 (26.17%) subjects had abnormal serum thyroid hormones and TSH levels, who were categorized as hypothyroid, subclinical hypothyroid, hyperthyroid and subclinical hyperthyroid. The prevalence of hypothyroidism in the overall study population was 9.67 %(n=58) , of which 6.33%(n=20) were self reported cases and 6.33%(n=38) were previously undetected. Subclinical hypothyroidism was observed in 4% of the study population. Hyperthyroidism –a total of 25 (4.17%) participants including 14 females were diagnosed with hyperthyroidism. Subclinical hyperthyroidism was seen in 10 subjects including 6 female subjects though significant association between the frequency of the disorder with age or gender was not seen. Anti TPO antibody positivity was seen in 40 subjects without significant variation as per gender and age.*

*Conclusion- Our study demonstrates that hypothyroidism was higher in the older adults with a female preponderance and there is a significant prevalence of hyperthyroidism too.*

**Keywords:** TSH, T3, T4, hypothyroidism, hyperthyroidism

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### I. Introduction

Serum TSH measurement is the most important and sensitive test of screening of hypothyroidism, because, serum TSH has a long linear relationship with circulating thyroid hormone level. A twofold change in the free thyroxin will produce a 100 fold change in the TSH [1]. Sign and symptoms of overt hyper and hypothyroidism are well known, subclinical thyroid condition have subtle clinical manifestation and may mimic other diseases. Hence it is important develop national laboratory strategies to differentiate the various conditions to guide the physicians towards correct diagnosis and treatment [2].

Thyroid diseases are arguably amongst the commonest endocrine disorders worldwide .India too is no exception. According to a project from various studies on thyroid diseases, it has been estimated that about 42 million people in India suffer from thyroid diseases [3]. Almost one third of the Indian population lives in the areas of Iodine deficiency [3]. Iodine deficiency disorder is a major public health problem in India. When dietary intake of iodine falls down to 10 microgram per day thyroid hormone synthesis is inadequate and secretion declines [4]. Its deficiency leads to a host of physical and neurological abnormalities which are collectively referred to as IDD ( Iodine deficiency disorders). In a developing and diversely populated country like India communicable diseases are priority health concern due to their large contribution to the national disease burden[5]. In India hypothyroidism was usually categorized under the cluster of IDD, which were represented in terms of total goiter rate and urinary iodine concentration, typically assessed in school aged children [5,7,8]. Even since India adopted the universal salt Iodization program in 1983[ 9], there has been a decline in goiter prevalence in several parts of the country , which were previously endemic[10,11,12]. A recent

review of studies conducted in post iodization phase gives some indication of the corresponding change in the thyroid status of the Indian population[13]. In India sub Himalayan belt extending from Kashmir to Assam is well a recognized area of endemic iodine deficiency. Though a large cross sectional study was required to provide a clearer picture of the evolving thyroid profile of the area, due to certain limitation we conducted a localized cross sectional study. The main aim of the study was to find out the prevalence of thyroid disorders amongst the adult population of Barpeta town and to create awareness among the population about the disorder, so that early diagnosis and adequate management is possible which will prevent development of further systemic complication related to abnormal thyroid status.

## **II. Material And Methods**

The current study was a cross sectional study conducted in the Barpeta district, Assam at Fakhruddin Ali Ahmed Medical College and Hospital. The study was conducted after obtaining the ethical clearance from the institutional ethics committee. This study was conducted from January 2016 to January 2017. A total 600 participants were included in the study after taking proper consent on explaining the procedure to each subjects. All male and female patients referred to central laboratory for thyroid function tests were included in the study excluding them who were under any medication for thyroid diseases. Besides participants were excluded if they are pregnant or have any acute or chronic systemic diseases or if they were receiving drugs like lithium or steroids which could interfere with thyroid function tests.

All the subjects underwent general clinical examination before enrollment including examination of the thyroid gland. Routine haematological and biochemical investigations were done for all subjects. Evaluation of thyroid profile was done in the central clinical laboratory of our hospital.

Assays for thyroid hormones (T3, T4) and TSH were performed by Electrochemiluminescence(ECL) technology using Immunoassay analyzer Roche Cobas e411. Anti TPO antibodies were also measured by the same analyzer.

Based on the previous history and present thyroid function status, participant were classified following definitions-

Hypothyroid- Serum thyroxin (T4) < 5ng/ml and TSH > 5.50  $\mu$ U/ml.

Hyperthyroid- T4 > 14ng/ml and TSH < 0.35  $\mu$ U/ml.

Subclinical hypothyroidism- normal serum T4 and TSH > 5.50  $\mu$ U/ml

Subclinical hyper thyroidism - normal serum T4 and TSH < 0.35  $\mu$ U/ml.

AntiTPO antibody positive – Presence of Anti TPO antibody above 35 IU/ml.

The prevalence of different thyroid function disorders was summarized as count and percentages. A chi square test was used to assess the trends in the prevalence of the disorders among different age groups and genders.

## **III. Results**

Six hundred participants were enrolled from Barpeta district from August 2015 to August 2016. Out of this 600 participants 350 (56.33%) were male and 250 (41.67%) were female. The mean age was 41.24 years with a range of 19 to 82 years. All the participants were reportedly consuming iodized salt. 90 subjects (15%) of the study group gave a history of thyroid dysfunction including thyroid surgery. Thyroid medications were currently used by around 10% of the study population. The age wise and the gender wise breaking of the study group are explained by the TABLE 1 and 2 respectively.

Of the total study population 443 (73.83%) subjects had normal levels of serum T3, T4 and TSH values without history of thyroid medication. Other 157 (26.17%) subjects had abnormal serum thyroid hormones and TSH levels, who were categorized as hypothyroid, subclinical hypothyroid, hyperthyroid and subclinical hyperthyroid.

The prevalence of hypothyroidism in the overall study population was 9.67 % (n=58), of which 6.33% (n=20) were self reported cases and 6.33% (n=38) were previously undetected. Out of the 20 self reported cases 12 were under thyroxin therapy.

Logistic regression analysis demonstrated a statistically significant ( $p < 0.05$ ) interaction of subjects age and gender with the prevalence of hypothyroidism. As compared to the young adults (20-39 years) group, older adults group had greater chances of being diagnosed as hypothyroid. However in population above 65 years comparatively lesser prevalence of hypothyroidism recorded. Prevalence of hypothyroidism was highest in the age group of 40-64 years (4.16%) and lowest in the age group of >65 years (1.67%). A larger population of females than males was found to be affected by hypothyroidism (6.33% vs 4%). Subclinical hypothyroidism was observed in 4% of the study population. Frequency of subclinical hypothyroidism is lowest (1.33%) in age group of above 65 years and highest (4.16%) in the age group of 40-64 years. A significantly higher number of females (2.5%) than males (1.5%-6%) were detected to have SCH.

A total of 25 (4.17%) participants including 14 females were diagnosed with hyperthyroidism. There was no association between hyperthyroidism and age or gender. Subclinical hyperthyroidism was seen in 10 subjects including 6 female subjects though significant association between the frequency of the disorder with age or gender was not seen. Anti TPO antibody positivity was seen in 40 subjects without significant variation as per gender and age.

**Table 1-**gender wise distribution of study group.

Total	N=600	100%
Male	350	56.33%
Female	250	41.67%

**Table 2-** Age wise distribution of the study group.

Age (years)	N=600	%
20-39	175	19.16
40-64	325	54.16
>65	100	16.67

**Table 3-**overall prevalence of

Type of disorder	Number of subjects	%
Hypothyroidism	58	9.67%
Subclinical hypothyroidism	24	4%
Hyperthyroidism	25	4.17%
Subclinical hyperthyroidism	10	1.6%
Anti TPO positive	40	6.67%

thyroid disorders in the study population.

**Table 4-** gender wise distribution of the thyroid disorders.

Types of disorders	Female (n=350)	Male ( n=250)
Hypothyroidism(58)	38 (6.33%)	24 (4%)
Subclinical hypothyroidism(24)	15 (2.5%)	9 (1.5%)
Hyperthyroidism(25)	14 (2.3%)	11 (1.83%)
Subclinical hyperthyroidism(10)	6 (1%)	4 (0.67%)

**Table 5-** Age Wise Distribution Of The Study Group With Different Thyroid Disorders

Disorder	20-39 years	40-64 years	>65 years
Hypothyroidism (58)	23(3.83%)	25(4.16%)	10(1.67%)
Subclinical hypothyroidism(24)	7(1.67%)	15 (4.16%)	2(0.33%)
Hyperthyroidism(25)	10(1.67%)	11(1.83%)	4(0.67%)
Subclinical hyperthyroidism(10)	3(0.5%)	4(0.67%)	3(0.5%)

#### IV. Discussion

In the current study we assessed the prevalence of thyroid disorders particularly hypothyroidism in population residing in Barpeta District, Assam. Hypothyroidism was found to be a common cause of thyroid dysfunction affecting 9.67% of population. This observation has similarity with a study conducted in other parts of India suggesting the nationwide higher prevalence of hypothyroidism in India[14,15,16].This suggests the requirement of regular monitoring of the thyroid status of the population who are at greater risk of developing hypothyroidism particularly the older adult group. Exposure to industrial and agricultural contaminants has been identified as one of the thyroid disruptors as a matter of concern. Prevalence of subclinical hypothyroidism was 4% indicating that a significant proportion of the population may go undetected and untreated even if it impairs their quality of life. In general India is now considered to be in the post iodization phase. Our result suggests that nationwide, the prevalence of hypothyroidism in adult is very high in this era. Unfortunately we did not get any data on the prevalence of hypothyroidism in adult in pre iodization phase.

There was a predominance of thyroid dysfunction in women in our study, and is consistent with worldwide report specially those in midlife. There is always a association between thyroid disorders and cardiovascular risk factors such as hypertension and dyslipidaemia[13] ,the prevalence figure observed for women in this study suggest growing health needs of this important segment of the population. In a population based study done in Cochin on 971 adult people , the prevalence of hypothyroidism was 3.9%.The prevalence of subclinical hypothyroidism was also high in this study (9.4%)[15].Current study has observed the consistent result with that.

Prevalence of hyperthyroidism has been studied in several studies. In an epidemiological study in Cochin, Subclinical and overt hyperthyroidism was found in 1.6% and 1.3% of subjects in a community survey [16]. Similar result has been observed in the current study. In a study in Puduchery on women overt hyperthyroidism was present in 0.6% study population [17]. In contrast in the current study we are getting 2.3% women having overt hyperthyroidism. Hyperthyroidism is also a subject of concern for urgent intervention.

## V. Conclusion

Our study demonstrates that hypothyroidism was higher in the older adults with a female preponderance and there is a significant prevalence of hyperthyroidism too. This indicates thyroid function screening should be a part of laboratory investigation in this susceptible group of population followed by appropriate detection and management. Despite the coverage of national iodine deficiency control program in India iodine deficiency is still prevalent in many parts of India [18].

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