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An Observational study on High TSH and Start therapy on Subclinical hypothyroidism

[1]***Dr. Somendra Sahasikdar***, *Director and Sr. Consultant, Department of Obstetrics &Gynaecology, Sharanya Hospital, West Bengal*
[2]***Dr Sumit Roy,*** *Jr. Consultant, Department of Obstetrics &Gynaecology, Sharanya Hospital, West Bengal*
[3]***Dr. Kazi Rokeya Rahaman***, *Sr. Residents Department of Obstetrics &Gynaecology, Sharanya Hospital, West Bengal*
[4]*Dr. Balaram Ghosh, Associate Professor,*
Department of Pharmacology, Midnapore Medical College, West Bengal
Corresponding Author: Dr. Balaram Ghosh

Abstract

Background and Objectives- The absence of characteristic clinical symptoms and an increase in serum levels of free thyroxine (FT4), free triiodothyronine (FT3), and thyroid stimulating hormone (TSH) within the normal range characterize subclinical hypothyroidism (SCH). The goal of the current study was to analyze the comorbidities linked to (SCH), particularly thyroid autoantibodies and therapy for high TSH in SCH.

Methods- The present study was retrospective observational study, which was carried out at Medical Records Section, department of Medicine, of a tertiary care institute. The study period was of 6 months, from July 2022 to February 2023. Medical records of the patients who were diagnosed with SCH during the past two years were analysed.

Results- The most common age group was found to be 21-30 years (34%) followed by 41-50 years (25%). The study was male preponderance (57%). Most common symptom reported was general fatigue, which was encountered in 45 patients, followed by weight gain, menstrual abnormalities, and constipation. Low dose of thyroxin i.e. 12.5 to 50 µg was given in majority of the patients (n=80), 75 µg in 7 patients, and 100 µg in 3 patients. The entire patient on treatment improved clinically.

Conclusion- Despite high prevalence, detection rate of subclinical hypothyroidism is very low. Carrying out epidemiological study on national scale is need of the hour, as lack of typical clinical features makes the detection less likely and it has numerous complications, if untreated.

Keywords- Subclinical hypothyroidism, Thyroxine, TSH, Free T3, Free T4.

Introduction-

The absence of characteristic clinical symptoms and an increase in serum levels of free thyroxine (FT4), free triiodothyronine (FT3), and thyroid stimulating hormone (TSH) within the normal range characterize subclinical hypothyroidism (SCH).[1] It exhibits an increasing daily iodine consumption, rising age, and a significantly larger preference for female sex.[2] Based on a variety of clinical and epidemiological investigations, the prevalence in India is estimated to be between 6 and 15%.[3]

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A significant portion of SCH patients are more likely to experience overt hypothyroidism. Therefore, it makes sense to assume that widespread, routine patient screening for SCH will reduce the general prevalence of overt hypothyroidism.[4]

Research has shown that SCH is linked to a number of comorbid conditions, including increased levels of triglycerides and low-density lipoproteins (LDLs), an increased risk of coronary heart disease and its associated mortality, an increased risk of residual myocardial ischemia, an increased risk of peripheral neuropathies, muscular weakness, and a decreased ability to exercise.[5] SCH has also been linked to a number of neuropsychiatric conditions, including bipolar mood disorders and young people's cognitive impairments. Furthermore, it has been discovered that SCH medication lowers bad cholesterol levels and lessens the risk of atherosclerosis.

Although there are handful of epidemiological studies throwing light on prevalence of SCH, paucity on data regarding its clinical profile and whereabouts still prevails.

Methods and Materials

The present study was retrospective observational study, which was carried out at Medical Records Section, department of Medicine, of a tertiary care institute. The study period was of 6 months, from July 2022 to February 2023. Medical records of the patients who were diagnosed with SCH during the past two years were analysed.

Inclusion criteria

• Age >18 years, any sex, raised TSH (normal range was taken as 0.3 to 4.1μIU/ml, based on laboratory limits), normal T3 (1.2 to 3.2) and T4 (5 to 14 μIU/ml)

Exclusion criteria

• History of thyroid illness, Pregnant patients.

Methodology-

Screening of 310 patients were done and based on inclusion and exclusion criteria 114 patients' record was selected. Demographic data and clinical data were also recorded of all the patients. Treatment pattern and vitals were also recorded. The study was approved by Institutional ethics committee.

Statistical Analysis-

The statistical analysis was performed using SPSS for windows version 22.0 software (Mac, and Linux). The findings were present in number and percentage analyzed by frequency, percent. The critical value of *P* indicating the probability of significant difference was taken as <0.05 for comparison.

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Results-

Table 1- Age and Gender wise distribution of participants (N=114)

Age (Years)		**Frequency (%)**
<20		10 (9)
21-30		34 (30)
31-40		22 (19)
41-50		29 (25)
>51 years		19 (17)
Gender	Male	67 (59)
	Female	47 (41)

As per table 1 the most common age group was found to be 21-30 years (30%) followed by 41-50 years (25%). The study was male preponderance (59%).

Table 2- Clinical features and serum TSH values in study patients

Category	**Sub-category**	**Frequency (%)**
Symptoms*	Fatigue	50 (44)
	Constipation	22 (19)
	Loss of appetite	19 (17)
	Menstrual irregularities	13 (11)
	Cold intolerance	10 (9)
	Asymptomatic	10 (9)
	Weight gain	21 (18)
Signs	Dry skin	23 (20)
	Pedal edema	11 (10)
	Delayed tendon reflexes	9 (8)
	Goitre	7 (6)
Serum TSH	Mean	10.7
	Range	5 to 20
	>10	17

*multiple responses

Most common symptom reported was general fatigue, which was encountered in 50 patients, followed by constipation and weight gain, menstrual abnormalities. Multiple symptoms in most patients 10 patients were asymptomatic. Most common clinical sign reported in these patients was dry skin, which was found in 23 patients, followed by pedal edema, delayed tendon reflexes, and goiter. Serum TSH range in the patients was 5 to 20.1 μIU/l, while mean TSH was 10.7 μIU/l. 17 patients were found to have serum TSH>10.

Table 3- Treatment pattern in study participants

Category	**Frequency (%)**
No treatment	20 (18)
Treatment	
positive TPO Ab	13 (11)
TSH of 5-10 μIU/l with clinical features	50 (44)

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TSH>10±clinical feature	24 (21)
Others co-morbidities	7 (6)
Dose of thyronorm	
12.5 to 50µg	84 (74)
75 µg	7 (6)
100 µg	3 (2)

As per table 3 on analysing treatment pattern in these patients, it was found that no treatment was given to 20 patients. Out of the 94 patients, who received treatment majority had presence of TSH of 5-10 µIU/l along with clinical symptoms/signs comprising of 50 patients, while 24 patients had TSH>10 with/without presence of clinical symptoms/signs, and 13 patients had positive anti TPO antibodies. Low dose of thyroxin i.e. 12.5 to 50 µg was given in majority of the patients (n=84), 75 µg in 7 patients, and 100 µg in 3 patients. The entire patient on treatment improved clinically.

Discussion-

The primary focus of the current study is the epidemiology of thyroid disorders in Indian patients, with a particular emphasis on subclinical hypothyroidism, which is difficult to diagnose and often goes unnoticed. The primary reason for these results could be the subclinical hypothyroidism's relative mildness or lack of clinical symptoms. These studies have been conducted elsewhere in the world.[6]

Specifically, the identification of subclinical hypothyroidism is difficult, whereas frank hypothyroidism does not have symptoms that are absent or only mildly present. In the current study, 10% of the patients had no symptoms at all, and 45% reported vague generalized weariness, which is typically linked to a number of disorders and can be ascribed to a busy lifestyle.[7,8] Therefore, even though they may not be evident in the majority of patients, clinical symptoms are crucial in the diagnosis of subclinical hypothyroidism.

Only a small number of studies revealed that 8–9% of people had subclinical hypothyroidism.[5,6,9] The bulk of the patients in this study fell into two age groups: those over 51 and those between 21 and 30. Nonetheless, a more thorough screening of these people in the age range will be aided by the demographic distribution of subclinical hypothyroidism. This is crucial since prompt management will lower the likelihood of overt disease, and screening that targets vulnerable populations is likely to detect disease more frequently.[10]

Present study was male prepondernant. The current study's findings are against by the fact that the prevalence was twice as high in girls as in males.[11,12] Numerous issues with female fertility, maternal and fetal outcomes during pregnancy, and subclinical hypothyroidism exist. Numerous studies have reported that the incidence of subclinical hypothyroidism increases with age.[13] However, it should be mentioned that the number of young individuals with subclinical hypothyroidism is increasing. The most likely cause of such an occurrence is a combination of increasing junk food consumption and inactivity.

The current study's TSH upper limit of the normal range was 5 µIU/ml, marginally greater than that of previous studies.[5,11] Additionally, the current research's mean TSH was higher

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than that of the previous study. This could be caused by insufficient dietary iodine intake and local ignorance of the illness.11% of the patients had positive 20 Anti-TPO antibodies, which is lower than other studies that found more than 20% of patients to have this antibodies.[13] Thyroid dysfunction are clearly caused by an autoimmune component in these patients. The size of the thyroid gland may or may not change.

Based on an analysis of treatment patterns, the majority of patients in this study had serum TSH levels between 5 and 10 with clinical symptoms. The main factors that led to the start of thyroxine therapy were the existence of clinical symptoms along with a TSH of 5 to 10 μIU/ml, TSH >10, and positive anti-TPO antibodies. According to one study, the chance of overt hypothyroidism increased many times when there was a continuous rise in TSH and high anti-TPO antibody levels. Clinical records indicate that all patients had improved symptomatically, which is consistent with other study outcomes.[12,13]

Conclusion-

The identification rate of subclinical hypothyroidism is quite poor, despite its significant frequency. It is imperative to conduct nationwide epidemiological studies because the condition has many untreated consequences and is harder to diagnose if it lacks normal clinical signs. It should be standard procedure to scan vulnerable populations more frequently.

Conflict of Interest- None declared

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