Original Article

Clinical profile of subclinical hypothyroidism: A retrospective study

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ABSTRACT

Background: *Subclinical hypothyroidism occurs due to an under functioning thyroid gland and presents with varied symptoms and signs. Thyroid disorders are common in Indian population and the prevalence of subclinical hypothyroidism is high.*

Objective: *This study intended to assess the clinical profile of patients presenting with subclinical hypothyroidism.*

Materials and Methods: *This was a retrospective study that analyzed the medical records of adult patients diagnosed with subclinical hypothyroidism for a period of three years.*

Results: *71 patients within the age range of 18 years to 77 years were diagnosed with subclinical hypothyroidism. Among these 53 (75%) patients had various clinical symptoms. Body pains were the most common symptom (38 %) followed by weight gain(27%) and tiredness (20%). A significant number of patients were obese (25%). Enlarged thyroid(14%) and dyslipidemia (25%) were also recorded. 63 (75%) patients were initiated on low dose levothyroxine.*

Conclusion: *Patients with subclinical hypothyroidism present with varied non-specific clinical symptoms. Treatment with low dose levothyroxine resulted in lowering of serum TSH to normal range and relief of symptoms.*

Key Words: *Hypothyroidsm, Thyroid stimulating hormone (TSH), Thyroxine (T4), Triiodothronine (T3), levothroxine*

Introduction

Subclinical hypothyroidism is a mild disorder of thyroid characterized by elevated serum thyroid stimulating hormone (TSH) and normal free thyroxine level.[1,2] It is confirmed if the laboratory estimation of thyroid function remains stable for a period of one month in the absence of any severe non thyroidal illness. An elevated serum TSH level indicates an under-functioning thyroid gland. Though, controversies exist with regard to population screening and effect of treatment on overall mortality, progression to overt hypothyroidism has been demonstrated.[3]

Subclinical hypothyroidism is more common in females and increases with age. Western studies have shown a prevalence of 4.3% to 8.5%.[4,5] Regional and hospital based studies in India have shown a prevalence ranging from 9% to26%.[6] The prevalence is higher in lower socioeconomic groups.[6] Studies from neighboring countries like Nepal have also reported a higher incidence.[7] Serum TSH levels are sensitive and specific for screening thyroid dysfunctions. It may be elevated in morbid patients and secondary hypothyroidism. Since TSH levels are subject to transient fluctuations, repeated estimations after 1 – 3 months are also recommended.[8] For the same reason screening of general population for subclinical hypothyroidism may not be reliable. Even when TSH levels fall within the normal, concentrations towards the upper limit (>2mU/l) may indicate an increased risk of future hyperthyroidism.[3] An Indian study among healthy volunteers had proposed an upper limit of 4.6µIU/ml for serum TSH estimation.[8]

Most patients with sub-clinical hypothyroidism present with vague and non-specific symptoms. Some studies state that clinical signs and symptoms cannot predict thyroid status.[10] Widespread iodine deficiency and the lack of screening programs make the situation complex in India. A significant proportion of patients with subclinical hypothyroidism may progress to overt hypothyroidism. Identifying subclinical hypothyroidism in a population with high prevalence of thyroid disorders may prove beneficial.[3] The concomitant presence of subclinical hypothyroidism and thyroid antibodies multiplies the risk of developing clinical

hypothyroidism in future.[3] Various studies have attempted to study the effect of subclinical hypothyroidism on metabolic and chronic illnesses. Controversies exist with regard to itsclinical significance, the variability of normal TSH levels with age, cardiovascular mortality and the effect of thyroid hormone replacement.[11] An association has also been suggested between elevated total serum cholesterol levels and subclinical hypothyroidism.**[12]**The mild hyperlipidemia present in patients with subclinical hypothyroidism may also increase the risk of atherosclerosis. A recent review suggested that TSH levels greater than 10mIU/l is associated with a higher risk of coronary heart disease and mortality.[13]Increased rate of residual myocardial ischemia is also seen in patients with clinical hypothyroidism.[14] In the neuromuscular system subclinical hypothyroidism may cause peripheral neuropathies [15,16] muscular weakness and low exercise tolerance.**[17]** Reviews have also stated a significant prevalence of subclinical hypothyroidism among patients with bipolar mood disorders.**[18]** A meta-analysis demonstrated that high TSH levels may also be related to cognitive impairment in young individuals.[19]

Screening of general population for subclinical hypothyroidism and treatment in asymptomatic healthy individuals is met with controversies.[**11,**20]Treatment of subclinical hypothyroidism may relieve clinical symptoms, improve lipid profiles**[21]** and lower the risk of atherosclerosis.[14] But the adequacy of the evidence is debated and case finding is suggested to be better than screening.[22] In spite of a predicted high prevalence, clinical studies evaluating the patient presentation of subclinical hypothyroidism among Indians are few. This study attempts to review the presentations of patients with subclinical hypothyroidism along with analysis of thyroid antibodies, dyslipidemia, coexsisting conditions with the treatment initiated.

Materials and Methods

This was a retrospective study of outpatient data (outpatient book) from department of general medicine, at Nizam's institute of medical sciences, Hyderabad, which is a tertiary care postgraduate institute having subclincal hypothyroidism. Medical records of patients attending the general medicine outpatient clinic for a period of three years were analyzed. Adult patients with raised thyroid stimulating hormone (TSH) levels and normal T3 and T4 levels were included in the study. Patients with previous history of thyroid illness, pregnant women and patients with morbid illnesses were excluded. The upper limit of serum TSH used was 4.2µIU/ml (Table 1).

Table: 1 Normal value for thyroid function test

Assay	Abbreviation	Lower Limit	Upper Limit
Serum Thyroid Stimulating Hormone	TSH	0.2 µIU/ml	4.2 µIU/ml
Serum Thyroxine	T4	5	14
Serum Triiodothyronine	T3	1.3	3.1

The patient's clinical presentation recorded was analyzed. Presenting complaints and the clinical signs elicited or observed were categorized. Body mass index was calculated from the recorded height and weight. Details about the past history, family history, previous illness, any reports were ever available were also noted, the treatment given and the follow up period of the patient were also traced.A systematic approach was practiced for treatment initiation. All patients with a TSH level above 10µIU/ml were started on low dose levothyroxine (25 or 50 µg daily). For patients with TSH level between 10µIU/ml and 4.2µIU/ml multi-level indications were considered and treatment or observation was tailored according to individual patient. All patients on treatment were advised follow up at monthly intervals. Titration of the levothyroxine was done until TSH levels reached within normal range.

Results

A total of 71 patients between the ages of 18 to 77 (Mean = 43) were diagnosed with subclinical hypothyroidism during a period of three years.

The maximum number of subjects was between 31 to 40 years (18, 25%). (Fig.1) The number of women (52, 73%) detected with subclinical hypothyroidism was more than double the number of men (19, 27%). Serum TSH values ranged from a lowest of 4.5 µIU/mlto a highest of 18.9 µIU/mlamong the patients (Fig. 2). Mean serum TSH was 8.4 µIU/ml. Eighteen (25%) patients had TSH levels above 10 µIU/ml and were considered as having severe subclinical hypothyroidism. Three of the patients with serum TSH>10µIU/ml were asymptomatic.

Table 2: Indications for initiation of low dose levothyroxine

Serum TSH levels	Category	Considerations for treatment	Treatment
≥ 10µIU/ml	A	All Patients	Low dose levothyroxine
4.2µIU/ml - 10µIU/ml	B	Positive Thyroid Peroxidase Antibodies	
	C	Enlarged Thyroid Gland	
	D	Documented Serum TSH ≥ 7 For Past 6 months	
	E	Presence of symptoms and physical signs related to hypothyroidism	
	F	Concomitant Autoimmune Illness, Obesity Or Dyslipidemia.	
	G	No Indication For Treatment	Observation

Sub clinical hypothyroidism was an incidental finding in 18(25%) asymptomatic patients who were being evaluated for general health checkup. Among the symptomatic patients (53, 75%), generalized body pains were the most common presenting complaint (27, 38%) (Table: 3) for which medical evaluation was sought. Though weight gain (19, 27%) was also a common complaint, weight gain in spite of loss of appetite was present in 3 patients (4%). Constant tiredness (14, 19%) with muscular weakness, cutaneous paresthesia(11, 15%) and constipation (11, 15%) were other common complaints. Skin and hair problems included dryness of skin (5, 7%) and hair loss (10, 14%). Menstrual disturbances were present in 9 women out of which one woman received treatment for dysfunctional uterine bleeding. Dyspnea, hoarseness of voice, poor memory and excessive sleepiness were present in fewer patients. All patients had more than one symptom. (Table 3)

A family history of hypothyroidism was present in six patients(8%). Though a majority (38%) of the patients had a BMI within the normal range, obesity was also recorded in 25% patients (Table 4). The clinical sign noted was the presence of an enlarged thyroid in 10(14%) patients which was confirmed as multinodular goiter by ultrasound in one patient. One patient without an evident enlarged thyroid in physical examination was detected to have a solitary nodule on high resolution thyroid ultrasound. Other signs present included dry coarse skin (4, 5%), pedaledema(4, 5%)and a delayed muscle relaxation after elicitation of deeptendon reflexes(3, 4%)(Table 5).Other symptoms and signs like intolerance to cold or characteristic facies were absent.Investigations revealed dyslipidemia in 21(25%) patients. Among them, 5 patients had fatty liver. Vitamin-D deficiency (5, 7%) and megaloblastic anemia (6, 8%) were also recorded. 33 patients were tested for thyroid peroxidase antibodies which was positive in 23(32%) patients. Autoimmune diseases like systemic lupus erythematosus (2), rheumatoid arthritis (1), idiopathic thrombocytopenic purpura (2) and pure red cell aplasia (1) were concomitantly present in few patients. Diabetes Mellitus was present in 14(20%) patients. 63(75%) patients were initiated on low dose levothyroxine (25µg and 50µg) (Table 6)and advised regular follow up. All patients with TSH> 10µIU/ml received an initial levothyroxine 25 µgm. Among the 23 patients with anti -thyroid peroxidase antibody (Anti-TPO), eight patients had concomitant serum TSH >10 µIU/ml. fourteen out of these 23 patients with anti-thyroid antibodies received treatment in spite of serum TSH level below 10µIU/ml. One patient with anti-TPO did not receive any thyroid

supplementation and had serum TSH level below 10µIU/ml. All patients(10) with evident goiter received thyroid supplementation. Five out of them had serum TSH level above 10µIU/ml and two had concomitant anti-TPO antibodies. Three were treated solely due to the presence of goiter.All patients(53) with symptoms received treatment. 15/53 of these patients had serum TSH>10µIU/ml. 11/53 had anti-TPO antibodies. 1/53 patient had goiter and 2/53 had consistent elevation of serum TSH > 7µIU/ml for 6 months. 3/53 had indications in category F. 21/53 were treated for the sole indication of symptoms alone. Treatment initiation was associated with symptom resolution and normalization of TSH.Relatively fewer patients were treated due to sole indication of dyslipidemia, SLE and obesity.

Table 3: Distribution of symptoms and presenting complaints

Symptoms	Number of patients
Generalized body pains	27
Weight gain	19
Tiredness	14
Constipation	11
Paresthesias	11
Hair loss	10
Loss of Appetite	10
Menstrual disturbances	9
Dryness of skin	5
Hypersomnia	5
Poor memory	2
Dyspnea	1
Hoarseness	1
None (asymptomatic)	18

Table 4: BMI distribution among patients with Subclinical Hypothyroidism

BMI Category	BMI range	No. of patients N=71
Underweight	≤ 18.5	10
Normal Weight	18.5 -24.9	27
Over weight	25.00 - 29.99	16
Obese	≥ 30	18

Table 5: Physical Examination findings

Signs on physical examination	No. of Patients
Goiter	10
Dry coarse skin	4
Pedal edema	4
Delayed muscle relaxation after DTR	3
Carpal Tunnel Syndrome	1

Table 6: Distribution of patients across treatment categories

Category	No. of patients initiated on treatment n = 63, N= 71	Percentage N=71
A	18	25%
B	14	20%
C	3	4%
D	2	3%
E	21	29%
F	5(Dyslipidemia-2) (Obesity -2) (SLE-1)	7%

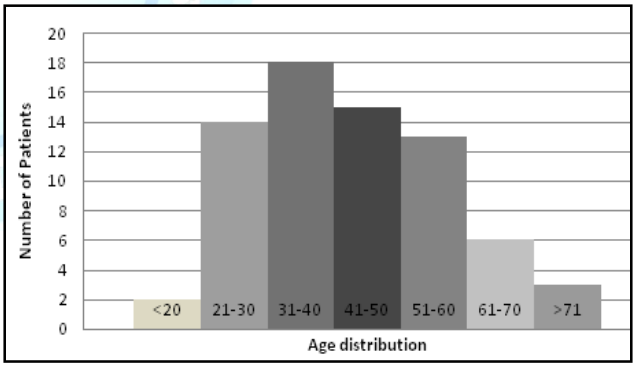

Fig.1 Age wise distribution of subclinical hypothyroidism

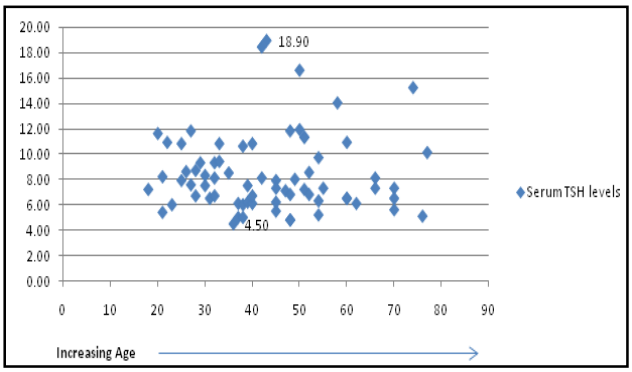

Fig.2 Serum TSH levels

7 patients required upward titration of levothyroxine. One patient required a maintenance dose of 100 µgm to achieve normal serum TSH and symptom resolution. 3 patients achieved normal serum TSH at a final dose of 75 µgm and 3 patients required 50 µgm. The remaining 11 achieved normal TSH with 25 µgm of levothyroxine on follow up. Eightpatients (11%) falling in the category G did not receive thyroid supplementation and were advised regular follow up. On follow, consistent elevation of serum TSH > 4.2µIU/ml was found in 2 patients under observation.

Discussion

Epidemiology of thyroid disorders among Indian population is poorly understood and this study provides valuable insights into the clinical picture of patients with subclinical hypothyroidism. Few studies have attempted to do the same.[10] Compared to overt hypothyroidism, subclinical hypothyroidism may prove challenging to diagnose. 25% of the subjects in the present study had no signs suggestive of a thyroid disorder.This supports the view that subclinical hypothyroidism cannot be identified through clinical signs alone.[10]The demographic differences and age distribution of the study subjects have provided a distinct picture of the spectrum of subclinical hypothyroidism among patients attending multispecialty, tertiary care hospital that caters to a diverse population from all socio-economic levels. Senthilkumaran S et al. reported a prevalence of 9% among rural women of south India.[23] Several other studies also have reported a high prevalence of subclinical hypothyroidism among Indians. [24] Among patients from coastal Andhra Pradesh, Shekhar et al. 2011 had observed a prevalence of 8.29% for subclinical hypothyroidism[13] and our prevelance was 7.86**.** Similar to most studies a higher number of women subjects were detected with subclinical hypothyroidism.[**23**] The higher number of women with subclinical hypothyroidism may have implications on fertility and future pregnancies.

Increasing prevalence of subclinical hypothyroidism with age has been reported by Indian and western studies.[23] But an increasing prevalence with age was not noticed and the maximum prevalence was recorded in the fourth decade.Similar high prevalence in fourth and fifth decade was also reported by another Indian study among normal population.[**9**]Mean TSH value recorded by our study was 8.4µIU/ml. The upper limit of normal TSH as 4.2 µIU/ml is justified as average TSH level in euthyroid Indians has been reported as 2.2 µIU/ml. [9]

Chronic autoimmune thyroid diseases can present with subclinical hypothyroidism. 23% of patients were confirmed positive for Anti-TPO. This constituted 69% of those tested. The actual prevalence of anti-thyroid antibodiesmay be higher than the results of other studies among Indians.[25]Thyroid enlargement or atrophy can occur due to autoimmune process.[9]Majority of the study subjects did not have thyroid enlargement.The Colorado thyroid disease prevalence study had demonstrated the significance and variety of symptoms present in patients with subclinical hypothyroidism.[**4**] Similar to the Colorado study, non-specific symptoms like body pains, lethargy and weight gain were predominant among the present study population. Discriminatory clinical signs specific for hypothyroidism like goiter, edema, hoarseness of voice, paresthesias and delayed relaxation after tendon reflexes were also present. But bradycardia, cold intolerance, decreased sweating, mood swings, depression and peculiar facial features were absent. Menstrual disturbances were also reported but the presence of infertility was not assessed. Psychiatric evaluation was not performed. The prevalence was higher among patients with symptoms suggestive of hypothyroidism.

Dyslipidemia was present in 25% of the subjects with subclinical hypothyroidism which may be lower than other reports.[13]Though fatty liver was present, none of the subjects had any evidence of cardiac disease or other sequelae of atherosclerosis.Nerve conduction studies had demonstrated presence of peripheral neuropathies in individuals with subclinical hypothyroidism.[15] Painful neuropathies and neuromuscular abnormitieswere reported to be relieved with hormone replacement

therapies.[16,26] The most frequent presenting complaint in this study was body pains. Symptoms were also a major impetus to initiate treatment with low dose levothyroxine. The second most common indication for treatment was the presence of anti-thyroid antibodies. The Whickham survey demonstrated the increased risk [odds ratio 8(women) and 44(men)] of progression to clinical hypothyroidism in patients with raised serum TSH alone and a multiplication of the risk when anti-thyroid antibodies were concurrently present. Thyroid supplementation based on elevated TSH levels alone or in the presence of thyroid antibodies may be justified in these patients. Indian studies have reported a higher prevalence than Whickham survey.[3] European guidelines categorizes subclinical hypothyroidism into mild (serum TSH 4.2µIU/ml - 10µIU/ml) and severe (>10µIU/ml) depending on the serum TSH levels.[27] Applying the same guidelines, 25% of the patients in this study had severe subclinical hypothyroidism. These guidelines also recommend treatment of subclinical hypothyroidism to achieve a serum TSH level ≤2.5µIU/ml. 4 patients required a dose greater than 50µgm to achieve normal serum TSH levels on follow up. Other studies have shown an improvement of symptoms with L-thyroxine.[11,28] Normalization of serum TSH levels and relief of symptoms were achieved in all patients on thyroid hormone supplementation. Estimation of serum TSH levels is proven to be sensitive for detection of thyroid disorders.[11] This study provides evidence that subclinical hypothyroidism can present with vague symptoms. A significant number of patients lacked symptoms or thyroid enlargement. Large scale population based studies in India are lacking. Few patients in our study required higher doses of thyroid hormone replacement to achieve normal serum TSH levels. Delayed diagnosis and treatment of hypothyroidism is common in India in spite of relatively high prevalence. [6] As progression of subclinical hypothyroidism to overt hypothyroidism occurs in a substantial number of subjects,[3] adequate thyroid supplementation in the presence of high serum TSH levels, anti-thyroid antibodies, enlarged thyroid gland and symptoms is justified.

The natural progression of chronic illnesses in Indian population may be different from western studies. The widespread presence of iodine deficiency may contribute to an increase in the prevalence of thyroid dysfunctions. Quality of life is affected in these patients due to the significant influence of thyroid hormones on metabolic, cardiovascular and neurological function. This study was a purely hospital based study at a tertiary level referral center. As the primary aim was to elucidate the clinical presentation among patients with subclinical hypothyroidism and due to the retrospective nature of the study a denominator was not obtained.

Patients with subclinical hypothyroidism cannot be identified based on clinical symptoms alone. Clinical symptoms and laboratory assessment of thyroid function must be performed concurrently to determine the presence of thyroid dysfunction. All patients with subclinical hypothyroidism must be evaluated for dyslipidemia and thyroid antibodies. Treatment must be tailored according to the clinical picture of individual patient. Nation-wide studies of subclinical hypothyroidism and treatment guidelines are the need of the hour.

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