International Journal of Advances in Medicine
Agrawal V et al. Int J Adv Med. 2019 Aug;6(4):1079-1083
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: http://dx.doi.org/10.18203/2349-3933.ijam20192588

Original Research Article

A clinico-epidemiological analysis of subclinical hypothyroidism in a tertiary care health center

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Received: 20 May 2019
Accepted: 29 May 2019

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ABSTRACT

Background: Subclinical hypothyroidism (SCH) is defined by increase in serum thyroid stimulating hormone (TSH) and free thyroxine (FT4) and free triiodothyronine (FT3) levels within normal range, coupled with absence of typical clinical symptoms. The present study was undertaken to analyse the SCH associated comorbidities, especially lipid disturbances, thyroid autoantibodies, etc.
Methods: The present study was retrospective observational study, which was carried out at a tertiary health care center.
Results: Out of the 100 patients, majority were in the age group 21 to 30 years (31 patients), followed by 26 patients in age group >51 years and least in age group 41 to 50 years. Prevalence showed female predilection, with female: male ratio of 1.9:1. Most common symptom reported was general fatigue, which was encountered in 40 patients, followed by weight gain, menstrual abnormalities, and constipation. 10 patients were asymptomatic. Serum TSH range in the patients was 5 to 21.1 µIU/l, while mean TSH was 10.9 µIU/l. 20 patients were found to have serum TSH>10.
Conclusions: 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, T3, T4, Thyroxine, TSH

INTRODUCTION

Subclinical hypothyroidism (SCH) is defined by increase in serum thyroid stimulating hormone (TSH) and free thyroxine (FT4) and free triiodothyronine (FT3) levels within normal range, coupled with absence of typical clinical symptoms.[1] It shows much higher predilection for female sex, advancing age, and increased daily iodine intake.[2-4] The prevalence in India, as gathered from various clinical and epidemiological studies ranges from 6 to 15%.[5]

A major chunk of patients with SCH are at greater risk of suffering from frank hypothyroidism. Thus, it is quite logical to anticipate that regular and mass screening of patients to detect SCH will help the overall prevalence of overt hypothyroidism.[6]

SCH is documented to be associated with various comorbidities like elevated LDL cholesterol and triglyceride levels, increased prevalence of coronary heart disease and related mortality, increased residual myocardial ischemia, increased peripheral neuropathies,

muscular weakness, reduced exercise capacity.[6-11] SCH is also found to be common in certain neuropsychiatric disorders like bipolar mood disorders, impaired cognitive functions in young.[12] Moreover, it has been found that treatment of SCH reduces the bad cholesterol levels and attenuates the likelihood of atherosclerosis.[13]

Although there are handful of epidemiological studies throwing light on prevalence of SCH, paucity on data regarding its clinical profile and whereabouts still prevails. The present study was undertaken to analyse the SCH associated comorbidities, especially lipid disturbances, thyroid autoantibodies, etc.

METHODS

The present study was retrospective observational study, which was carried out at Medical Records Section, department of Medicine, Krishna Institute of Medical Sciences, Karad, Maharashtra. The study period was of 6 months, from July 2018 to February 2019. Medical records of the patients who were diagnosed with SCH during the past two years were analysed.

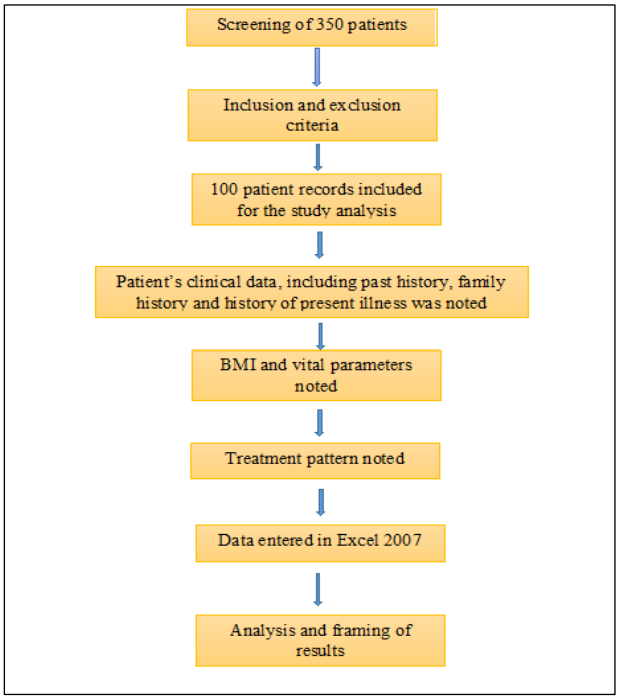

Figure 1: Flow/ methodology adopted for the current study.

The selection criteria for the study participants was as under:

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.

The general flow/ methodology adopted for the current study is depicted in figure 1. All the relevant data was analysed in Microsoft Excel 2007. Ethics committee approval was taken prior to the start of the study.

RESULTS

Out of the 100 patients, majority were in the age group 21 to 30 years (31 patients), followed by 26 patients in age group >51 years and least in age group 41 to 50 years. Prevalence showed female predilection, with female: male ratio of 1.9:1 (Table 1).

Table 1: Demographic details of study patients.

Items	Subcategory	n
Age	<20	1
	21 to 30	31
	31 to 40	22
	41 to 50	20
	>51 yrs	26
Sex	Male	34
	Female	66

Table 2: Clinical features and serum TSH values in study patients.

Item	Sub-category	n
Symptom	Asymptomatic	10
	General fatigue	40
	Weight gain	22
	Constipation	11
	Loss of appetite	14
	Menstrual abnormalities	17
	Cold intolerance	8
Signs	Dry skin	21
	Delayed tendon reflexes	8
	Pedal edema	7
	Goiter	6
Serum TSH	Range	5.0 to 21.1
	Mean	10.9 µIU/l
	>10	20 patients

Most common symptom reported was general fatigue, which was encountered in 40 patients, followed by weight gain, menstrual abnormalities, and constipation. 10 patients were asymptomatic. Most common clinical sign reported in these patients was dry skin, which was found in 21 patients, followed by delayed tendon reflexes, pedal edema, and goiter. Serum TSH range in the patients was 5 to 21.1 µIU/l, while mean TSH was

10.9 µIU/l. 20 patients were found to have serum TSH>10 (Table 2).

On analysing treatment pattern in these patients, it was found that no treatment was given to 8 patients. Out of the 92 patients, who received treatment majority had presence of TSH of 5-10 µIU/l along with clinical symptoms/signs comprising of 49 patients, while 20 patients had TSH>10 with/without presence of clinical symptoms/signs, and 13 patients had positive anti TPO antibodies (Table 3).

Table 3: Treatment pattern in study patients.

Treatment pattern	Subcategory	n
No treatment		8
Treatment given	Total	92
	positive TPO Ab	13
	TSH>10±clinical feature	20
	TSH of 5 to 10 with clinical features	49
	Other comorbidities	10

Low dose of thyroxin i.e. 25 to 50 µg was given in majority of the patients (n=82), 75 µg in 7 patients, and 100 µg in 3 patients. All the patient on treatment improved clinically (Table 4).

Table 4: Dose of thyroxin prescribed in study participants.

Dose of thyroxine	n
25 to 50 µg	82
75	7
100	3

DISCUSSION

The present study sheds light on the major area of thyroid disorder i.e. epidemiology in Indian patients, especially subclinical hypothyroidism, since chances of it getting missed at diagnosis is very high. The major for these finding might be relative mild or absence of clinical symptoms in subclinical hypothyroidism. Such studies have been tried in other parts of the world.[5,6,14]

Precisely, the absence or minimally present mild symptoms makes the diagnosis of subclinical hypothyroidism challenging, which is not the case with frank hypothyroidism. 10% of the patients in the present study had no symptoms, while 40% has vague generalized fatigue which generally associated with number of diseases and can be attributed to hectic lifestyle.[15] Thus, clinical signs are important in diagnosis of subclinical hypothyroidism, although they may not be present in majority of the patients.[6]

The prevalence of subclinical hypothyroidism in the present study was 8.9%, which was almost similar as compared to other study reports. These studies reported prevalence of subclinical hypothyroidism in the range of 8 to 9%.[5,6,16] Majority of the patient in the present study were in extremes i.e. 21-30 and >51 years. This finding was in contrast to that of study done by Shetty et al, which reported maximum affected age group as 31-40 years.[5] Nevertheless, demographic distribution of subclinical hypothyroidism will help to screen these age group subjects more vigorously. This is important, as screening that focuses on vulnerable population is likely to detect disease more frequently and timely intervention will reduce the chances of overt disease.[17]

Prevalence in females was double as compared to males in the present study, which is in corroboration to findings of other studies.[5,17,18] Subclinical hypothyroidism has numerous complications on female fertility, maternal and fetal outcomes in pregnancy. It has been cited in many studies that incidence of subclinical hypothyroidism escalates with advancing age.[19] But, it should also be noted that patients of subclinical hypothyroidism are rising in the young adults.[20] Most probable reason for such an incidence can be lack of physical activity coupled with increased intake of junk food.

The higher extreme of normal range of TSH in the present study was 5 µIU/ml, which is slightly higher than that of other study.[6] Moreover, mean TSH in the present study was also more as compared to the same study.[6] This might be attributed to lack of awareness of the disease in the area and inadequate dietary iodine intake.[20] Anti-TPO antibodies were positive in 13% of the patients, which is less as compared to other studies which reported it to be more than 20%.[5] These patients have a definite autoimmune component as a causative factor of thyroid dysfunction. The thyroid gland may or may not be altered in size.

The major issue with detecting subclinical hypothyroidism is the lack of typical symptoms, presence of vague/ non-specific symptoms.[5] In a review article by Raza et al on subclinical hypothyroidism, it was clearly pointed out that subclinical hypothyroidism mostly presents itself with non-specific symptoms like generalized weakness, lethargy, vague body aches, etc. There is comparatively very less incidence of signs and symptoms like reduced heart rate, psychological disturbances, signs and symptoms of peripheral neuropathies, etc.[18] These neurological deficits have been shown to improve after thyroid replacement therapy.[21]

On assessing the treatment patterns, majority of the patients in the present study had serum TSH 5 to 10 with presence of clinical symptoms. Thus, major stimulus for initiating thyroxine therapy was presence of clinical symptoms+TSH of 5 to 10 µIU/ml, followed by TSH >10 and positive anti-TPO antibodies. It was pointed in one study that, presence of persistently raised TSH along with positive anti-TPO antibodies increased the likelihood of overt hypothyroidism to multiple folds.[18] All patients

were symptomatically improved, as per clinical records, which is in conjunction with other study findings.[5,22,23]

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. More frequent screening of vulnerable population should be routinely practiced.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Agrawal V, Patil V, Kshirsagar A. A clinico-epidemiological analysis of subclinical hypothyroidism in a tertiary care health center. Int J Adv Med 2019;6:1079-83.