Frequency of Subclinical Hypothyroidism in Old-age Population

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ABSTRACT

This study was conducted to determine the frequency of subclinical hypothyroidism (SCH) in the old age population (>60 years). A cross-sectional study was conducted from July 2019 to January 2020 at Jinnah Postgraduate Medical Centre, Karachi, Pakistan. Healthy subjects (having no active complaint) of either sex aged 60-80 years were included. Those already on thyroid replacement, preexisting thyroid diseases, prior radiation therapy, or having chronic kidney disease were excluded. A total of 133 participants, 79 males and 54 females, were selected with a mean age of 69.5 ± 6.4 years. There were 29 diabetics, 30 hypertensives, and 10 smokers. A total of 17 (12.8%) were found to have SCH. On stratification, gender, diabetes mellitus, and hypertension had a significant association with the presence of SCH. SCH is a modifiable risk factor, more in females, diabetics, hypertensives, and the old age population. These results highlight the need for screening for SCH in primary care settings, especially in old age.

Key Words: *Subclinical hypothyroidism, Old age, Gender, Diabetes, Hypertension*.

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Subclinical hypothyroidism (SCH) is a disorder of the thyroid gland, characterised by elevated thyroid-stimulating hormone (TSH), with normal levels of free T_3 (FT_3) and free T_4 (FT_4). Due to the varying clinical presentation, the only way to diagnose it is through biochemical testing.[1] Etiology is usually similar to that of simple hypothyroidism, most common being Hashimoto's thyroiditis; whereas, other causes include subacute thyroiditis, postpartum thyroiditis, previous hyperthyroidism, autoimmune diseases, thyroid injury/inflammation (due to radiation, surgery, or medication), and thyroid infiltration. Before making a definitive diagnosis of SCH, other causes of a raised TSH must be excluded, like recovery from non-thyroidal illness, thyroid hormone resistance, radiation, prior thyroid diseases like a cold or hot nodule, or chronic kidney disease.[1]

Signs and symptoms of SCH are non-specific and non-diagnostic. However, in old age, patients may present with clinical features of depression and cognitive dysfunction, fatigue, constipation, dyslipidemia (elevated low-density lipoprotein), and cardiac dysfunction (bradycardia).[1] It is also associated with an increased risk of coronary heart disease (CHD).[2]

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The decision to treat the patients with SCH remains controversial, with some physicians in favour, irrespective of symptoms, while the majority agreeing to treat only if they are symptomatic, TSH level is >10mIU/L, anti-TPO antibodies positive, with or without any evidence of CHD.[3]

The local data related to SCH is insufficient. The objective of this study is to determine the prevalence of SCH in patients > 60 years and evaluate its relationship with factors like age, gender, smoking status, and comorbidities (diabetes and hypertension). This will highlight the importance of screening for thyroid diseases, especially in the elderly, to start early management.

This is an observational, cross-sectional study, carried out at the Medicine Department, Jinnah Postgraduate Medical Centre, Karachi, Pakistan. The study duration was from July 15, 2019 to January 15, 2020. After receiving the patients in the Outpatient Department, informed consents were taken.

A non-probability consecutive sampling technique was used for data collection in healthy subjects (having no active complaint) of either sex aged 60-80 years. Their reason for consultation was not a thyroid-related illness, but a regular health checkup. Patients already on thyroid replacement, preexisting thyroid diseases, prior radiation therapy, or those having chronic kidney disease were excluded.

The thyroid function assessment was done by measurement of FT3, FT4, and TSH, using a chemiluminescence immunoassay (CLIA) kit. SCH was defined as a condition in which the TSH level is greater than 4.5 mIU/L in the presence of a normal level of

peripheral free T3 and T4. The patients were treated as per hospital protocol. All the data were collected through a predesigned proforma.

The statistical analysis was performed using SPSS version 22 (IBM Corp., Armonk, NY, US). Mean and standard deviations were calculated for age; while frequency and percentages were calculated for gender, smoking, diabetes mellitus (DM), hypertension (HTN), and subclinical hypothyroidism. Effect modifiers and confounders were controlled by stratification, according to age, gender, smoking, DM, and HTN. Post-stratification, the Chi-Square test or Fisher's Exact test was applied. A p-value ≤ 0.05 was considered significant.

A total of 133 healthy subjects were selected for this study, having a mean age of 69.5 ± 6.4 years. Among cases, 79 (59.4%) were males and 54 (40.6%) were females. When the age groups were made into classes, 70 (52.6%) were in the age group of 60-70 years, while 63 (47.4%) were in that of 71-80 years.

There were 29 (21.8%) diabetics, 30 (22.6%) hypertensives, and 10 (7.5%) smokers. A total of 17 (12.8%) patients were found to have SCH.

By stratification of SCH, it was found that gender, DM, and HTN had a significant association with the presence of subclinical hypothyroidism (p=0.030, p<0.001, and p=0.001 respectively, Table I).

Table I: Stratification of subclinical hypothyroidism, according to gender, age, smoking, and comorbidities (133).

	Subclinical hypothyroidism		Total	p-value
	Yes (n=17)	No (n=116)		
Age (years):				
60-70 years	6 (8.6%)	64 (91.4%)	70	0.125
71-80 years	11 (17.5%)	52 (82.5%)	63	
Gender:				
Male	6 (7.6%)	73 (92.4%)	79	0.030
Female	11 (20.4%)	43 (79.6%)	54	
Diabetes:				
Yes	11 (37.9%)	18 (62.1%)	29	<0.001
No	6 (5.8%)	98 (94.2%)	104	
Hypertension:				
Yes	10 (33.3%)	20 (66.7%)	30	0.001
No	7 (6.8%)	96 (93.2%)	103	
Smoking:				
Yes	3 (30.0%)	7 (70.0%)	10	0.118
No	14 (11.4%)	109 (88.6%)	123	

The frequency of SCH in our hospital-based study population was found to be 12.8%.

On gender-based analysis, the proportion of females affected by SCH was higher (20.4% vs 7.6%). This is similar to every major study done on hypothyroidism prevalence.[4] However, this is very low compared to other studies like Surks *et al.*, where it was concluded that with increased age, there is an increased level of TSH found in the normal population with SCH, approaching 14.5%.[5] This shows how variable the prevalence rates of SCH are in different countries. Evidence shows that in European countries, SCH is more prevalent in iodine sufficient areas. Moreover, in a study done in Colorado, subjects taking thyroid medication had a 17.6% prevalence of SCH, compared to those without the medication (9%).[4,6] On the other hand, iodine deficiency has been a public health problem in the Eastern Mediterranean countries, like Afghanistan, Algeria, Iraq, Iran, Morocco, Saudi Arabia, Sudan, Yemen, and Pakistan.[4] This may be the reason behind the low rates of SCH in these countries. Our results may have overestimated the actual prevalence since they are from older adults.

Diabetics are more likely to have SCH, when compared with the normal population with a higher ratio of diabetic complications. Similarly, hypertensives are more likely to have SCH.[4] When SCH status, according to the comorbid, were assessed in our study, HTN and DM were found to be significantly associated with SCH as well (p=0.001, and p<0.001).

These results are limited by the fact being from a single healthcare setup and not the general population; and the same sampling error is the reason for having a high number of hypertensives and diabetics. Moreover, a regular follow-up is required to rule out any TSH measuring lab error or determining the actual cause of raised TSH.

Studies with a larger sample size assessing people of all ages and populations of both urban and rural settings are needed to have a generalised estimated prevalence in all age groups.

Subclinical hypothyroidism is a modifiable risk factor, more in females, diabetics, hypertensives, and the old age population. These results highlight the need for screening for SCH in primary care settings, especially in old age adults.

ETHICAL APPROVAL:

The study was approved by the Institutional Review Board of Jinnah Postgraduate Medical Centre, Karachi, Pakistan.

PATIENTS' CONSENT:

Informed consents were obtained from the patients to publish the data concerning this case.

CONFLICT OF INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

KUS, KUS, MQ: Conception and design, interpretation, drafting, critical revision, final approval.
UY: Data acquisition and analysis, interpretation, drafting, critical revision, final approval.
SMAN: Interpretation, drafting, critical revision, final approval.
BS: Analysis and interpretation, drafting, critical revision, final approval.

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