

Prevalence of Subclinical Hypothyroidism in Obese Adults Population

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ABSTRACT

Objective: Determination of frequency of occurrence of subclinical hypothyroidism (SCH) in a local population of obese adults

Study design: A cross-sectional study

Place and Duration: This study was conducted at Sindh Government Lyari General Hospital Karachi from March 2022 to March 2023

Methodology: The patients aged between 18 years to 55 years. All the participants had a body mass index (BMI) of more than 29 kg/m². As per the exclusion criteria, those patients having kidney failure, liver failure, or already diagnosed with thyroid dysfunction, were not added to the study. Patients taking cholesterol-lowering drugs were also not considered in the study. A blood sample of all the patients was collected for the measurement of serum thyroxine levels and serum thyroid stimulating hormone (TSH) levels.

Results: A total of 150 obese adults were considered in the study. The mean age of the participants was 35.7±8.1 years. Overall 69 (46%) patients were male while 81 (54%) patients were females. The mean BMI of the patients was 32.1±2.1 kg/m². The mean serum thyroxine level in the given population was 1.09±0.24 ng/dl and the mean serum TSH level was 3.12±1.09 mIU/L. A total of 24 (16%) patients were detected with subclinical hypothyroidism.

Conclusion: Subclinical hypothyroidism is vastly prevalent in the obese adult population, particularly in adults with a BMI of more than 29 kg/m². However, there is room for further studies to examine the correlation between obesity and SCH.

Keywords: Subclinical Hypothyroidism, Obesity, TSH, Thyroxine, Body mass index

INTRODUCTION

Obesity is a complex and chronic disease that leads to other morbid conditions such as diabetes, hypertension, and subclinical hypothyroidism. These complications can reduce the life span of an obese individual [1]. There are three prominent non-communicable diseases in Pakistan with the highest rate of mortality. These diseases are malignancies, chronic respiratory diseases, and cardiovascular ailments [2]. These non-communicable diseases have some common risk factors including alcohol intake, smoking, dyslipidemia, hypertension, diabetes mellitus, unhealthy lifestyle, sedentary lifestyle, and obesity [3]. By modifying these risk factors, common non-communicable diseases can also be prevented [4]. An increase in the overall prevalence of obesity at the global level has been reported by the world health organization (WHO) [5].

Various studies have suggested a relationship between obesity and a clinical change in thyroid function as a result of low-grade inflammation [6]. A recent study has shown that leptin, which is an adipocyte hormone, plays a vital role in the induction of thyroid autoimmunity in obese adults [7]. Several studies have been done to evaluate the changes in hormones due to obesity in an individual [8].

The frequency of SCH in the overall population of Pakistan is 5.4% which is more compared to overt hypothyroidism (4.1%). It is also more common in females than in the male population [9].

The present study aims at the determination of the prevalence of SCH in an obese population. It was seen during the research that not enough data and research has been done about the correlation between obesity and SCH in the local population. The present study will attempt to find out the prevalence of SCH in the obese population of the given ages.

METHODOLOGY

The present study is a cross-sectional study and includes a total of 150 patients. All the patients were between the ages of 18 years to 55 years. The BMI of all the patients was above 29 kg/m². As per the criteria of inclusion and exclusion, the study did not include patients on cholesterol-lowering drugs. Those patients that were already diagnosed with any kind of thyroid dysfunction, were also

not added in the study. Patients with hepatic and renal failure were excluded from the study.

The general and clinical history of all the patients was taken followed by a thorough clinical examination. A blood sample of all the patients was collected for the measurement of serum thyroxine levels and serum TSH levels. The samples were sent to the laboratory of the hospital. The demographic data collected from the patients included the names, gender, and age of the patients. The information was collected on proforma. To avoid any kind of bias in the results of the study, the exclusion criteria were strictly followed.

The data was collected and analyzed in the IBM SPSS version 26. Mean as well as standard deviation (SD) was calculated for quantitative variables such as age, thyroxine level, and TSH level. Percentage and frequencies were calculated for qualitative variables such as subclinical hypothyroidism and gender.

RESULTS

A total of 150 patients were included in the study, having a BMI of more than 29 kg/m². The study determined the prevalence of SCH in these patients and the results were keenly analyzed. The age distribution of the patients has been shown in Table 1. The mean age of the patients was 35.7±8.1 years. Most of the patients lay in the group of 31 years to 40 years of age and it included a total of 56 patients. A total of 17 of them had subclinical hypothyroidism. The gender and BMI distribution of the patients has been given in Table 2.

Table 1: Age distribution of the patients having subclinical hypothyroidism

Age (in years)	Subclinical hypothyroidism		P-value
	Present	Absent	
18-30	2	22	0.001
31-40	17	39	
41-50	3	38	
51-55	2	27	
Total	24	126	

Out of 150 participants, 69 (46%) patients were male while 81 (54%) patients were female. The mean BMI of the patients was 32.1±2.1 kg/m². All the patients were investigated for the serum TSH level and serum thyroxine level. The mean serum thyroxine

level in the given population was 1.09 ± 0.24 ng/dl and the mean serum TSH level was 3.12 ± 1.09 mIU/L. A total of 24 (16%) patients were detected with subclinical hypothyroidism.

Table 2: Gender and BMI distribution of patients

Variables	Subclinical Hypothyroidism		P-value
	Present	Absent	
Gender			
Male	10	59	0.146
Female	14	67	
BMI			
29-32	8	62	0.163
32.1-35.5	16	64	

DISCUSSION

The present study included 150 participants with a high BMI. Their thyroid profiles were analyzed to detect SCH. The study showed a 16% prevalence of the disease in the study population. According to the study of Sami et al, 15% prevalence of SCH in the given obese population [10]. The percentage of prevalence of their study is close to the percentage prevalence of our study.

Abbasi et al conducted a study to find out the correlation between thyroid disorders and the BMI of the patients. They included 200 patients in their study. A total of 38% of patients in their study had hypothyroidism. They analyzed and correlated the disease with the BMI of the patients. Their study showed a significant association between higher BMI and hypothyroidism [11]. Their results were similar to the results of the present study.

Song et al conducted a meta-analysis to review various studies for the analysis of the relationship of obesity with hypothyroidism. They included a total of 22 studies in their analysis and concluded that hypothyroidism was significantly related to obesity [12]. Their study is suggestive of similar outcomes as that of the present study.

Jin et al conducted a similar study which included obese patients. However, rather than taking BMI as a variable to correlate with hypothyroidism, they observed the lipid profiles of the patients. They analyzed the thyroid function tests of the patients and compared them with the lipid profiles. They concluded that subclinical hypothyroidism is commonly found in obese patients. There was a strong association of TSH with lipid profile [13].

Yan et al conducted a cross-sectional survey in which they included 2505 subjects. They included patients with a BMI of more than 28 kg/m^2 . All the patients were investigated for thyroid hormones and thyroglobulin antibodies. A total of 289 (11.54%) patients out of the total 2505 subjects were seen to have subclinical hypothyroidism. Hence, they concluded that obesity was strongly associated with subclinical hypothyroidism.

CONCLUSION

Subclinical hypothyroidism is seen quite commonly in the obese population, especially those with a BMI of more than 29 kg/m^2 .

This raises a concern about the autoimmunity of the thyroid in obese individuals. More research on this subject should be conducted to obtain more accurate results regarding the correlation between thyroid dysfunction and obesity.

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