ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4

Journal of Coastal Life Medicine

A Study of Relationship Between Hypothyrodism with Central Obesity

Received: 23 August 2022, **Revised:** 19 September 2022, **Accepted:** 21 October 2022

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Keywords
Subclinical hypothyroidism (SHG), Metabolic syndrome, serum thyrotropin, dyslipidemia,

Abstract
Background: The precise estimation of the prevalence of important cardiovascular risk factors is of great interest. In order to evaluate the health and nutritional status of "adults and children in the United States", a series of studies known as the "National Health and Nutrition Examination Survey (NHANES)" was created.
Aim and Objective: To study the co-relation of hypothyrodism with central obesity.
Methodology: The present study was conducted in the "OPD of General Medicine, Santosh medical college and hospital, Ghaziabad, Uttar Pradesh". In their regular clinical practise, these data would have prognostic significance and consequences for clinicians and to establish strategies for improved treatment of their patients.
Result: On the basis of the IDF criteria for central obesity for the diagnosis, a total of 100 individuals with old and newly diagnosed metabolic syndrome were evaluated. More than half of patients were "females (56%)" and the "prevalence of hypothyroidism" was "higher among female patients (25%) than males (15.9%)".
Conclusion: The main conclusion of this study was that, in study participants with hypothyroidism, there is a substantial link between "thyroid homeostasis and obesity". In order to the best of our knowledge, only a few research have attempted to assess individuals with hypothyroidism utilising a sizable, "community-based sample" in order to discover a separate relationship between hypothyrodism and central obesity indices.

1. Introduction

A group of risk factors known as the "metabolic syndrome (MetS)", which includes "hypertension, atherogenic dyslipidemia, hyperglycemia, truncal obesity, and even prothrombotic and proinflammatory diseases", can increase the chance of developing "diabetes, cardiovascular disease, and death". According to an International Diabetes Foundation survey, about a fifth of the world's population has MetS (O'Neill et al, 2015) [1]. In clinical practise, it is common to see patients who have both "thyroid impairment and metabolic syndrome (MetS)". In various population surveys, it has been estimated that more than 20% of adults meet the requirements for MetS (Palmer and Toth, 2019) [2]. A fluctuation in weight gain and adiposity is caused by the regulation of metabolic rate by THs and some of their metabolites. The central control of appetite and sympathetic activity

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is another area where THs have an impact. Adiposity has an adverse impact on thyroid function, and leptin has significant modulatory effects in this regard. Additionally, "pro-inflammatory cytokines" linked to IR and obesity may affect thyroid function and possibly its structure (Guan et al, 2017; McAninch EA and Bianco, 2014) [3,4].

Obesity, which is defined as a "BMI 30 kg/m2", and abdominal obesity in particular, defined as a "waist circumference of >40 in (102 cm) for men or >35 in (88 cm) for women", are linked to an elevated "risk of cardiovascular disease (CVD) and all-cause mortality" [5-7]. It frequently exhibits a number of metabolic problems, including "insulin resistance and atherogenic dyslipidemia" ("high levels of low-density lipoprotein particles and triglycerides [TG] and low levels of high-density lipoprotein cholesterol [HDL-C]") [8,9]. "Atherosclerotic disease and acute cardiovascular events" are both more likely to occur in obese people due to their increased risk of "type 2 diabetes and metabolic syndrome" [10,11]. "Diabetes and insulin resistance" are linked to a wide range of pathophysiological outcomes, including a prooxidative state, an increased propensity to clot, endothelial dysfunction, and unfavourable cardiac remodelling [12,13].

When plasma free thyroxine (fT4) concentrations are normal and serum thyrotropin (TSH) levels are elevated, this condition is known as subclinical hypothyroidism (SCH). - The prevalence of SCH varies between 4.6% and 16.7% in the population worldwide and is correlated with sex and age [14]. A probable link between SCH and obesity has been examined in earlier research [15, 16].

Hypothyroidism is the disorder arising from the absence of the influence of thyroid hormones on body tissues. It is a common disorder. The average occurrence in the population is around1%to2%. (Gayetal,2000). [17] Serum TSH levels are greater than 10mU/L and are associated with low thyroid hormone levels. It is possible to identify florid hypothyroidism clinically.

2. Methods and Materials

The current investigation was carried out in the "General Medicine Outpatient Department at the Santosh Medical College and Hospital in Ghaziabad, Uttar Pradesh". The study we conducted involved 100 patients. Weight and waist size were reported in a semi-structured manner. Blood pressure was gauged in the right upper limb while the subject was seated. Blood is taken in one sitting after an eight-hour fast in order to examine thyroid hormone levels, fasting blood sugar levels, and lipid profiles. Only individuals with abnormal TSH levels had their levels of fT4 and fT3 tested in order to screen the population for the frequency of thyroid diseases. With reference ranges of "3.1-6.8 pmol/L, 12-22 pmol/L, and 0.27-4.2 mIU/L, respectively, for -e fT3, fT4, and TSH". Midstream urine samples were taken and kept cold overnight at 20°C. Using the ammonium persulfate technique, the "urinary iodine concentration (UIC)" was measured. An automated approach (BS180; Mindray, Ltd., Shenzhen, China) was used to quickly measure the levels of "fasting plasma glucose, high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), and serum total cholesterol (TC)".

3. Results

The current study was carried out at the "Santosh Medical College and Hospital in Ghaziabad, Uttar Pradesh, in the Department of General Medicine" with the goal of determining the prevalence of hypothyroidism in patients with metabolic syndrome and evaluating the relationship between hypothyroidism and central obesity. The study involved a total of 100 patients. The distribution of thyroid dysfunction in our sample is shown in Table 1 and Fig. 1(a). Of the patients, "7% had hypothyroidism". One in four individuals "(14%) had subclinical hypothyroidism". Hypothyroidism was a "21% common condition" [Fig.1(b)].

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Table-1: Distribution of thyroids function and prevalence of hypothyroidism

Thyroiddysfunction	**Frequency (%)** **(n=100)**
Euthyroid	79(79%)
Hypothyroid	7(7%)
Subclinicalhypothyroidism	14(14%)
Hypothyrodism	
Present	21(21%)
Absent	79(79%)

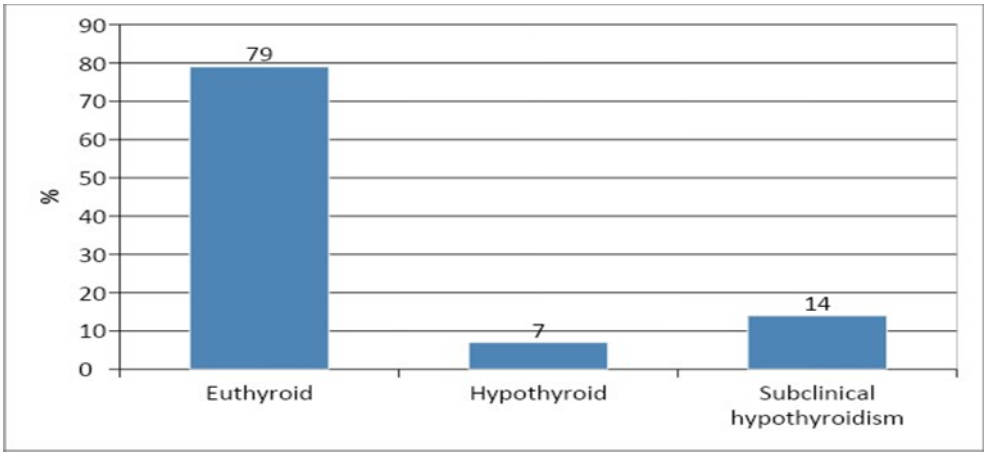

Figure 1(a): Distribution of thyroid dysfunction

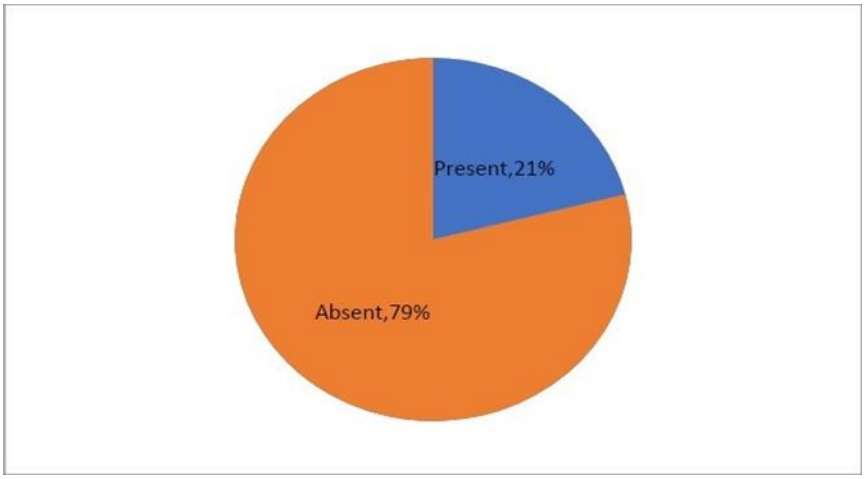

Figure 1(b): Distribution of prevalence of hypothyroidism

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Table-2: Distribution of patients according to age & gender and its association with hypothyroidism

	Hypothyroidism		Normal		p-value
	No.	%	No.	%	
Age(yrs)					
30-40	5	16.7	25	83.3	0.63
41-50	9	20.5	35	79.5	
>50	7	26.9	19	73.1	
Gender					
Male	7	15.9	37	84.1	0.26
Female	14	25.0	42	75.0	

"In Table-2 & Fig.2 (a) shows the distribution of patients according to age and gender and its association withprevalence of hypothyroidism. More than one third of patients were between 41-50 years of age (44%) followed by30-40(30%) and>50(26%) years and the prevalence of hypothyroidism was higher among patients of age >50 years (26.9%) than41-50(20.5%) and 30-40(16.7%) years. However, there was no significant (p>0.05) association of prevalence of hypothyroidism with age. Similarly, in Fig. 2(b) more than half of patients were females (56%) and the prevalence of hypothyroidism was higher among female patients (25%) than males (15.9%). However, there was no significant (p>0.05) association of prevalence of hypothyroidism with gender".

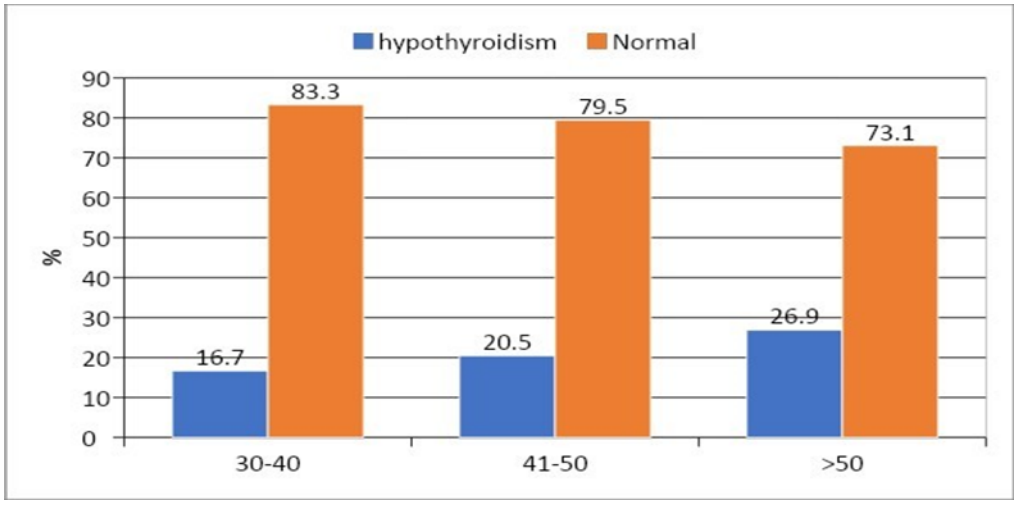

Figure 2(a): Distribution of patients according to age and its association with hypothyroidism

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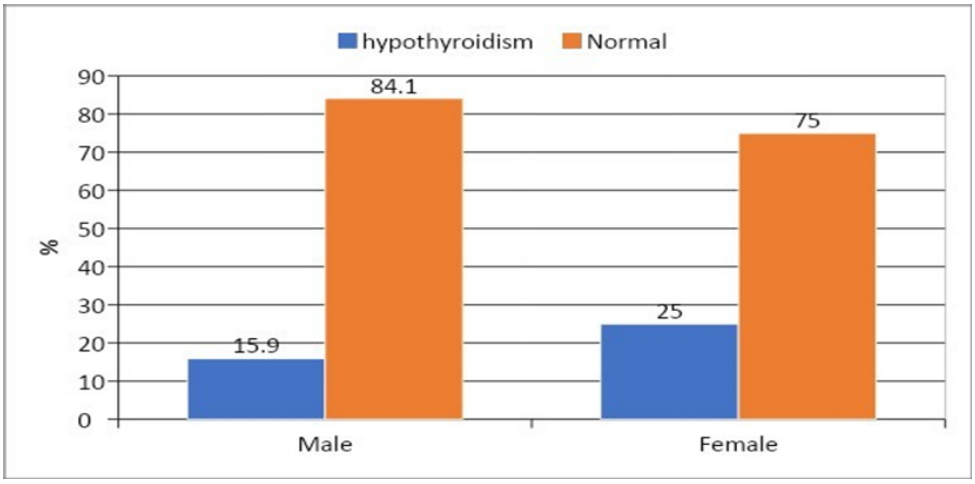

Figure 2(b): Distribution of patients according to gender and its association with hypothyroidism

Table-3: Comparison of anthropometric parameters with hypothyroidism

Anthropometric parameters	Hypothyroidism	Normal	p-value[1]
Height in cms	157.00±8.35	158.33±8.40	0.52
Weight in kgs	70.43±13.79	68.52±9.67	0.46
BMI in kg/mtr^2	28.52±4.67	27.32±3.27	0.17

[1]Unpaired t-test

Table-3 shows the comparison of anthropometric parameters between with and without hypothyroidism. There was no significant (p>0.05) difference in anthropometric parameters between with and without hypothyroidism.

Table-4: Distribution of patients according to central obesity and its association with hypothyroidism

Central obesity	No.(n=100)		Hypothyroidism		Normal		p-value[1]
	No.	%	No.	%	No.	%	
Lowrisk	41	41.0	3	7.3	38	92.7	0.007
Highrisk	51	51.0	14	27.5	37	72.5	
Increasedhighrisk	8	8.0	4	50.0	4	50.0	

Table-4 & Fig.3 shows the distribution of patients according to central obesity and its association with prevalence of hypothyroidism. “High risk of central obesity was among about half of patients (51) and the prevalence of hypothyroidism was higher among increased high risk central obesity (50%) than high risk (27.5%) and low risk (7.3%)”. There was significant (“p=0.007”) “association of prevalence of hypothyroidism with central obesity”.

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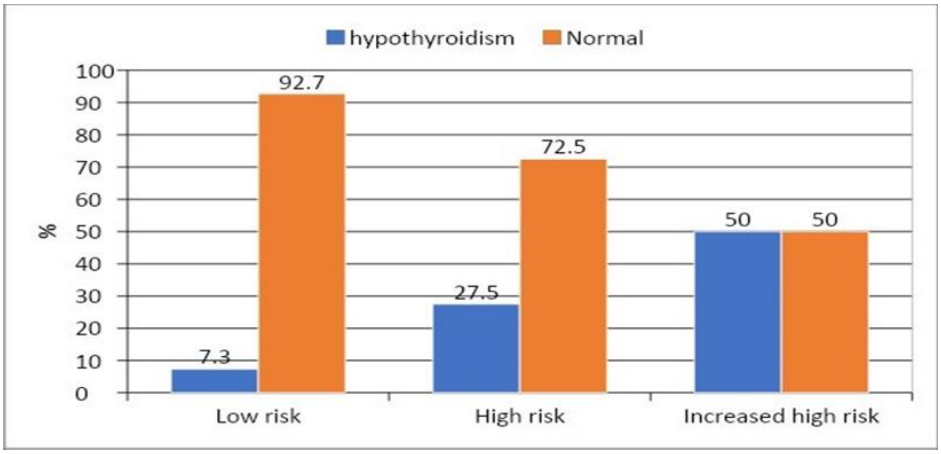

Figure 3: "Distribution of patients according to central obesity and its association with hypothyroidism"

Table-4: Comparison of mean blood pressure with hypothyroidism

Blood pressure	Hypothyroidism	Normal	p-value[1]
SBP	142.67±13.33	138.51±13.99	0.22
DBP	88.73±6.97	87.81±7.87	0.60

Table- 4 & Fig.4 shows the comparison of blood pressure with hypothyroidism. There was no significant (p>0.05) difference in blood pressure between hypothyroidism patients than normal.

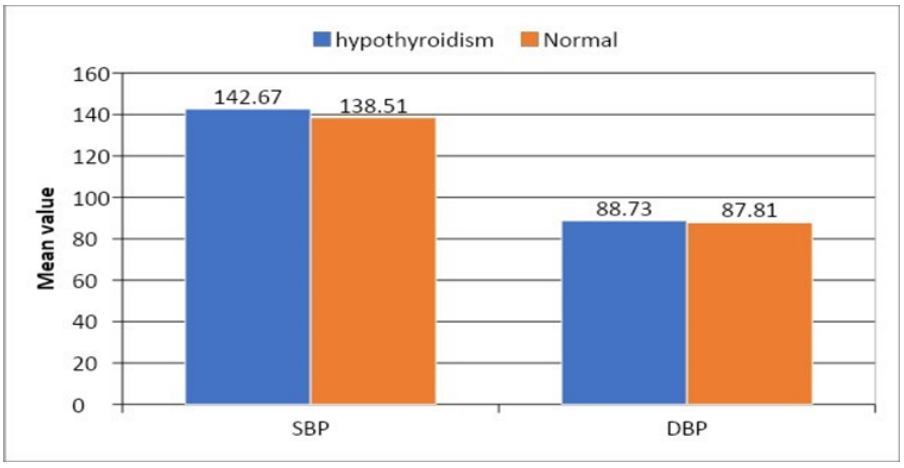

Figure 4: Comparison of mean blood pressure with hypothyroidism

4. Discussion

"This study showed that more than one third of patients were between 41-50 years of age (44%) followed by 30-40 (30%) and >50 (26%) years. In this study, the prevalence of hypothyroidism was higher among patients of age >50 years (26.9%) than 41-50 (20.5%) and30-40 (16.7%) years". However, there was no significant (p>0.05) association of prevalence of hypothyroidism with

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age. Deshmukh et al (2018) [18]. In the higher age group (<45 years of age), both men and women had a higher prevalence of thyroid dysfunction (men: 63 percent's. 37 percent; women: 59 percent vs. 41 percent). The outcome of the latest research that we have carried out states that here was a tendency ofincrease in TD with ageing for both sexes, in accordance with other studies. (Meng et al, 2015; Tehrani et al, 2011) [20,21]. Aljabri et al (2019) [19] reported that the prevalence of hypothyroidism was non-significantly greater across all age groups but significantly higher in all decades (p0.0001). Females younger than 60 years of age had a non-significantly higher prevalence of hypothyroidism.

5. Conclusion

In conclusion, results from a community-based and representative cohort showed that SPINA-GT and TSHI were negatively linked with BMI in persons with "SCH regardless of age, sex, smoking, iodine status, and glucolipid metabolism".

The prevalence of "hypothyroidism" was higher among patients with increased high risk central obesity (50%) than among those with "high risk (27.5%) and low risk (7.3%)", which accounted for almost half of patients (51%) with high risk of central obesity. The prevalence of hypothyroidism and central obesity were significantly correlated (p=0.007). Of the patients, 42% had hypertension.

Further study is necessary to determine whether intensive treatment, such as ongoing thyroid homeostasis testing or thyroid hormone replacement therapy for those with SCH, can enhance metabolism and adiposity status.

Limitation: Several restrictions applied to this investigation. First, the study's cross-sectional design leaves unclear whether obesity in patients with SCH is a result of significantly low thyroid homeostasis indices or whether obesity is the source of such low levels.

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