

## STUDY OF THYROID DYSFUNCTION IN GERIATRIC AGES AND ITS CLINICAL CORRELATION

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### ABSTRACT

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#### AIMS AND OBJECTIVES

This study was performed to study the thyroid dysfunction in elderly patients and its clinical correlation.

#### MATERIALS AND METHODS

This is a prospective study, which consists of 150 patients aged more than 60 years and were admitted to Government General Hospital, Nizamabad. They were under suspicion that they were suffering from thyroid disorders and were subjected to detailed clinical examination as per proforma. Thyroid antibody test was done for those who were found to have altered thyroid functions. From these patients, demographic details, anthropometric measurements, and clinical information was collected. Serum T3, T4, and TSH levels were evaluated in the laboratory by chemiluminescence assay method. Other tests like USG/FNAC neck, CBC, RBS, Lipid profile, PS, ESR, ECG, Echo were done.

#### INCLUSION CRITERIA

150 patients with age of above 60 years were selected who were suspected to have thyroid disorders.

#### EXCLUSION CRITERIA

Patients who were sick, who were with established thyroid disorders, who were using drugs, which alter thyroid functions, who were using thyroid supplements, who have undergone thyroid surgery, who have been on radioactive iodine therapy, who were using iodine-containing vitamins and minerals, who have undergone radiological tests.

#### RESULTS

In the present study, out of 150 patients, 82 males and 68 were females. It was found that the thyroid dysfunction is more among females (21%) than in males (14%). This was seen in both hypothyroidism and hyperthyroidism as females have increased autoimmune diseases. Out of 150 patients, only 35% had total thyroid abnormalities. Out of 150 patients, 15% had hypothyroidism, 10% had subclinical hypothyroidism, 4% had hyperthyroidism, and 6% had subclinical hyperthyroidism. TFT always is helpful in diagnosing the disease. Hypothyroidism is more common than hyperthyroidism in elderly patients. In elderly patients, thyroid dysfunction is not uncommon. Quarter of the patients exhibited thyroid function abnormalities.

#### CONCLUSION

It can be concluded that elderly patients with symptoms like fatigue, weakness, lethargy, disinterest in daily activities must be taken as a strong suspicion of thyroid disorders.

#### KEYWORDS

Thyroid, Chemiluminescence, Autoimmune.

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**INTRODUCTION:** A thyroid disease is a medical condition impairing the function of the thyroid. Different thyroid diseases include Hashimoto's thyroiditis, hyperthyroidism, and hypothyroidism. These diseases have a large range of symptoms and affect all ages. Thyroid disorders are conditions that affect the thyroid gland, a butterfly-shaped gland in the front of the neck. The thyroid has important

roles to regulate numerous metabolic processes throughout the body.

Different types of thyroid disorders affect either its structure or function. The thyroid gland is located below the Adam's apple wrapped around the trachea (windpipe). A thin area of tissue in the gland's middle, known as the isthmus, joins the two thyroid lobes on each side. The thyroid uses iodine to produce vital hormones.<sup>1</sup> Thyroxine, also known as T4, is the primary hormone produced by the gland. After delivery via the bloodstream to the body's tissues, a small portion of the T4 released from the gland is converted to triiodothyronine (T3), which is the most active hormone. The function of the thyroid gland is regulated by a feedback mechanism involving the brain. When thyroid hormone

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levels are low, the hypothalamus in the brain produces a hormone known as thyrotropin releasing hormone (TRH) that causes the pituitary gland (located at the base of the brain) to release thyroid stimulating hormone (TSH).

TSH stimulates the thyroid gland to release more T4. Since the thyroid gland is controlled by the pituitary gland and hypothalamus, disorders of these tissues can also affect thyroid function and cause thyroid problems. There are specific kinds of thyroid disorders that includes hypothyroidism, hyperthyroidism, goitre, thyroid nodules, and thyroid cancer.<sup>2</sup> There has been a dramatic increase in the percentage of older people in the general population from past few decades. People over the age of 65 accounted for 35.9 million (12.3%) of the total U.S. population in 2003 and their numbers are projected to increase to 71.5 million by 2030. In India, 60 years and above is considered as geriatric population. Even though, Indian statistics regarding thyroid dysfunction in elderly is sparse, a study by Rebecca et al from Puducherry showed that 19% of women over 60 years had elevated TSH above 4.5  $\mu$ IU/mL, and the percentage of women with elevated TSH was particularly high in the 60-80 years age group.

Healthcare professionals should become and remain aware of the changes that distinguish older from younger patients because these changes bring new challenges in clinical care resulting from the special needs associated with both normal ageing and its related chronic illnesses. Epidemiologic studies have shown a remarkable increase in the incidence and prevalence of thyroid disorders in older populations. Hypothyroidism occurs in 10% of females and 2% of males in patients older than 60 years.<sup>3</sup>

Hyperthyroidism, on the other hand, is more common in the younger population. The prevalence in the elderly is approximately 2%, but from another perspective, 10% to 15% of patients with hyperthyroidism are older than 60 years. In younger adults, the classic symptoms of thyroid dysfunction are usually present and make the diagnosis easier. In the elderly, the diagnosis is more often overlooked or misdiagnosed as the symptoms are often subtle or absent and are easily confused with coexisting illnesses. The management of thyroid disorders in older adults remains controversial. There are conflicting literature regarding the approach. Despite the ongoing debate, current guidelines suggest considering treatment on an individual basis according to symptoms and possible treatment benefit. However, in older patients the risk of harm from treatment complicates the decision-making process.

**MATERIALS AND METHODS:** This is a prospective study which consists of 150 patients aged more than 60 years and were admitted to Government General Hospital, Nizamabad. They were under suspicion that they were suffering from thyroid disorders and were subjected to detailed clinical examination as per proforma. Thyroid antibody test was done for those who were found to have altered thyroid functions. From these patients, demographic details, anthropometric measurements, and clinical information was collected. Serum T3, T4, and TSH levels were evaluated in

the laboratory by chemiluminescence assay method. Other tests like USG, FNAC neck, CBC, RBS, Lipid profile, PS, ESR, ECG, Echo were done.

**Inclusion Criteria:** 150 patients with age of above 60 years were selected who were suspected to have thyroid disorders.

**Exclusion Criteria:** Patients who were sick, who were with established thyroid disorders, who were using drugs which alter thyroid functions, who were using thyroid supplements, who have undergone thyroid surgery, who have been on radioactive iodine therapy, who were using iodine-containing vitamins and minerals, who have undergone radiological tests.

**RESULTS:** In the present study, out of 150 patients, 82 males and 68 were females. It was found that the thyroid dysfunction is more among females (21%) than in males (14%). This was seen in both hypothyroidism and hyperthyroidism as females have increased autoimmune diseases. Out of 150 patients, only 35% had total thyroid abnormalities.

Total Thyroid Abnormalities	35%
Males	14%
Females	21%
Total Number of Patients	150
Hypothyroidism	15%
Subclinical Hypothyroidism	10%
Hyperthyroidism	4%
Subclinical Hyperthyroidism	6%
<b>Table 1: Shows Sex Distribution, Thyroid Abnormalities in Elderly Patients</b>	

Out of 150 patients, 15% had hypothyroidism, 10% had subclinical hypothyroidism, 4% had hyperthyroidism, and 6% had subclinical hyperthyroidism.

<b>Clinical Features of Hypothyroidism (n=25)%</b>	<b>Clinical Features of Hyperthyroidism (n=10)%</b>
Lethargy (55)	Fatigue (100)
Dry Skin (40)	Weakness (100)
Constipation (5)	Weight Loss (50)
Hoarseness (65.2)	Increased appetite (40)
Anorexia (30)	Tremors (20)
Weight gain (20)	Palpitations and Weakness (10)
Ankle jerk (10)	Diarrhoea (15)
Bradycardia (15)	--
Oedema (16)	--
Goitre (10)	--
Fatigability (100)	--
Weakness (100)	--
<b>Table 2: Shows Clinical Features of Hypothyroidism and Hyperthyroidism</b>	

	<b>TFT in normal cases (n=115)</b>	<b>Hypothyroidism (n=15%)</b>	<b>Subclinical Hypothyroidism (n=10%)</b>	<b>Hyperthyroidism (n=4%)</b>	<b>Subclinical Hyperthyroidism (n=6%)</b>
TSH	2.81±1.72	42.65±0.36	12.69±4.55	0.08	0.39±2.85
T3	1.01±0.42	0.52±3.66	1.25±0.22	5.20±1.80	1.38±0.85
T4	6.51±1.52	3.19±2.60	5.23±0.88	20.67±2.82	9.99±3.58
<b>Table 3: Shows Mean and SD of Thyroid Levels for Different Thyroid Disorders</b>					

	<b>Hypothyroidism (n=15%)</b>	<b>Subclinical Hypothyroidism (n=10%)</b>	<b>Hyperthyroidism (n=4%)</b>	<b>Subclinical Hyperthyroidism (n=6%)</b>
TG	218.81±68.72	202.65±58.36	158.65±40.36	169±62.85
T. Chol.	210.52±43.66	210.25±80.22	185.20±41.80	111.38±30.85
HDL	33.19±12.60	35.23±10.88	38.67±2.82	29.99±13.58
LDL	119±39.23	120±52.9	117±12.8	100.2±22.96
<b>Table 4: Shows Lipid Abnormalities in Different Thyroid Abnormalities with Thyroid Dysfunction</b>				

**DISCUSSION:** Many studies were done related to thyroid dysfunction in elderly patients. Dr. Madhuvan et al<sup>4</sup> have done a study in which a total of 100 subjects aged more than 60 years admitted to General Medicine IPD of MVJMC and RH who were suspected to be suffering from thyroid disorders or subjects with vague symptoms like generalised weakness, easy fatigability, lethargy, disinterest in daily activities to be suspicious of thyroid disorder were subjected to detailed clinical examination and thyroid function testing by biochemical means. Those who were found to have altered thyroid functions, thyroid antibody (TPO) test were done. When thyroid nodule was present, further relevant investigations like USG/FNAC neck was performed to make appropriate diagnosis. The results were that a total of 100 patients were included in the study. Thyroid disorders were present in 25%. Overt hypothyroidism in 11%, subclinical hypothyroidism in 9% cases, hyperthyroidism in 2%, and subclinical hyperthyroidism in 3% patients was noted.

In this study, 38 patients were males and 62 were females. Females (18%) had high incidence of thyroid disorders than males (7%). As the age advanced, the incidence of thyroid dysfunction increased, which was statistically significant. Overt hypothyroidism was more common among elderly (11%). Classical clinical features of hypothyroidism and hyperthyroidism were present in 9 and 2 patients respectively. All patients with hypothyroidism had positive TPOAb. Patients with thyroid dysfunction have higher values of TGs, T. Chol, and LDL which was found to be statistically significant (p value <0.05). Patients with subclinical hypothyroidism have increased levels of total cholesterol and LDL levels as compared to overt hypothyroidism, but it was not found to be statistically significant. Goitre was noted in 4 patients with thyroid dysfunction among whom 2 patients had malignancy; one was follicular variant of papillary carcinoma, and the other a primary thyroid lymphoma, which is a rare tumour of thyroid gland. From this study, it was concluded that thyroid dysfunction in elderly is not uncommon. Thyroid abnormalities were more among females (18%) than in

males (7%). Clinical diagnosis is difficult to make, but TFT always helps in diagnosing the disease.

A strong clinical suspicion of thyroid diseases should be considered in elderly patients who present with vague symptoms like generalised weakness, easy fatigability, lethargy, and disinterest in daily activities. Elderly patients should be screened for thyroid dysfunction. Dr. Ravishankhar et al<sup>5</sup> have done a study in which a total of 100 patients with Type 2 DM who were diagnosed on the basis of ADA criteria or who were taking treatment for diabetes were included in the study. All patients in the study underwent thyroid profile tests for the thyroid status and also target organ evaluation for diabetes. TPOAb, thyroid USG, and FNAC were done wherever required.

A detailed history and examination was done on these patients. The results were that a total of 100 Type 2 DM patients were included in the study. Thyroid disorders were present in 29%. Hypothyroidism in 1, hyperthyroid in 13, and subclinical hypothyroidism in 15 cases. In this study, 50 patients were males and 50 were females. Females (36%) had high incidence of thyroid disorders than males (22%). Subclinical hypothyroidism was more common among elderly (31.25%). Elderly females had high incidence of subclinical hypothyroidism (18.2%). Clinical features were present in 8 patients. All of them were diagnosed hyperthyroid. Other patients did not have any signs and symptoms. Patients with hyperthyroidism had a poor glycaemic control 55.5%. Duration of diabetes had no relation with incidence of thyroid disorders.

Patients with severe diabetic microvascular complication had subclinical hypothyroidism. From this, they concluded that prevalence of thyroid disorders in diabetics was 29%. Elderly population had more incidence than those below sixty. Subclinical hypothyroidism was more common among females. Diabetics with hyperthyroidism had poor glycaemic control. Severe diabetic complications are noted in patients with subclinical hypothyroidism. Duration of diabetes had no impact on thyroid dysfunction.

**Sex Distribution:** In study done by Cappola A.R. et al<sup>6</sup>, males % was 4.43 and females % was 13.9 out of total thyroid abnormalities in % was 18.33.

In study done by Iglesias P. et al<sup>7</sup>, males % was 4.3 and females % was 9 out of total thyroid abnormalities in % was 13.4. In study done by Marwaha R.K. et al, males % was 11.2 and females % was 17.6 out of total thyroid abnormalities in % was 28.8.

**Prevalence of Thyroid Abnormalities in Elders:** In AML Chau study, out of a total of 184 patients, 13.1% had hypothyroidism, 2.2% had subclinical hypothyroidism, 0.5% had hyperthyroidism, and none had subclinical hyperthyroidism. In Cappola A.R. et al study, out of a total of 2639 patients, 1.6% had hypothyroidism, 15% had subclinical hypothyroidism, 0.23% had hyperthyroidism, and 1.5% had subclinical hyperthyroidism. In Glauca et al study, out of a total of 399 patients, 4.3% had hypothyroidism, 8.1% had subclinical hypothyroidism, 0.8% had hyperthyroidism, and 6.5% had subclinical hyperthyroidism. In Iglesias P. et al study, out of a total of 447 patients, 3.1% had hypothyroidism, 6% had subclinical hypothyroidism, 5% had hyperthyroidism, and 2.2% had subclinical hyperthyroidism. In Marwaha R K et al study, out of a total of 1277 patients, 2.5% had hypothyroidism, 2.5% had subclinical hypothyroidism, 0.8% had hyperthyroidism, and 0.5% had subclinical hyperthyroidism.

**Clinical features of Hypothyroidism:** In study done by Doucet J et al, out of a total of 67 patients, 67% had fatigue, 52.5% had weakness, 45.3% had lethargy, 34.5% had dry skin, 32.8% had constipation, 28.1% had hoarseness, 26.6% had anorexia, 23.7% had weight gain, 23.8% had ankle jerk, 12.1% had bradycardia, and none had oedema or goitre.

**Clinical features of Hyperthyroidism:** In Doucet et al<sup>8</sup> study, out of 34 patients, 56% had fatigue, 27% had weakness, 50% had weight loss, 44% had tremors, 24% had palpitations and sweating, and 18% had diarrhoea.

**Lipid Abnormalities:** In a study done by Anne R Cappola et al, total cholesterol in hypothyroidism was  $228 \pm 54$  and in subclinical hypothyroidism was  $214 \pm 41$ , in subclinical hyperthyroidism it was  $203 \pm 41$ . LDL in hypothyroidism was  $148 \pm 53$ , and in subclinical hypothyroidism was  $132 \pm 36$ , in

subclinical hyperthyroidism it was  $121 \pm 30$ . HDL in hypothyroidism was  $53 \pm 13$  and in subclinical hypothyroidism was  $54 \pm 16$ , in subclinical hyperthyroidism it was  $52 \pm 16$ . In present study, higher values of total cholesterol in subjects with subclinical hypothyroidism was observed.

**CONCLUSION:** In elderly patients, thyroid dysfunction is not uncommon. Quarter of the patients exhibited thyroid function abnormalities. Thyroid abnormalities were more in females (21%) than males (14%). TFT always is helpful in diagnosing the disease. Hypothyroidism is more common than hyperthyroidism in elderly patients. It can be concluded that elderly patients with symptoms like fatigue, weakness, lethargy, and disinterest in daily activities must be taken as a strong suspicion of thyroid disorders.

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