Original Article

The Frequency of Thyroid Dysfunction in Patients with a Diagnosis of Depressive Disorder

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Abstract

Objective: Thyroid dysfunctions are among the most common endocrine disorders in society. An increase or decrease in thyroid hormone levels may present with neurological and/or psychiatric symptoms. In this study, we aimed both to determine the prevalence of this disorder in our region by determining the frequency of thyroid dysfunction in patients diagnosed with major depressive disorder in our outpatient clinic and to raise awareness during the evaluation process of patients. **Material and Method:** Thyroid-stimulating hormone (TSH) levels of 1035 patients diagnosed with major depressive disorder in our hospital between January 2020 and January 2022 were retrospectively scanned from the hospital information management system and those outside the reference ranges (0.38–5.33 mIU/L) were determined. **Results:** It was observed that TSH was not within the reference ranges in approximately 7% of the patients diagnosed with depressive disorder. 1035 patients were included in the study. When the blood results of 1035 patients included in the study were examined retrospectively, 32 of them had TSH values below 0.38 mIU/L. TSH value was found to be above 5.33 mIU/L in 44 of them. **Conclusion:** Obtained data have shown that thyroid dysfunctions can be encountered frequently in patients presenting with depressive complaints. It is thought that the evaluation of patients with depressive complaints in terms of thyroid dysfunction, and the treatment of the underlying thyroid dysfunction will contribute to the regression of psychiatric symptoms.

Keywords: *Depression, hyperthyroidism, hypothyroidism, thyroid, TSH*

Introduction

The thyroid gland is the body's largest endocrine organ. The synthesis of triiodothyronine (T3) and thyroxine (T4) hormones is regulated by thyroid-stimulating hormone (TSH) secreted from the anterior pituitary. T4 is transformed into a more potent thyroid hormone, T3 by the deiodinase enzyme. While approximately 20% of T3 is produced in the thyroid gland, 80% is produced by peripheral conversion.[1,2]

T3 binds to thyroid hormone receptors in the cell nuclei of target tissues with ten times greater affinity and partially higher activity than T4.[3] Thyroid hormone has different effects on the metabolism of many molecules in cells.[3] The net result of these effects is an increase in basal metabolic rate.[3] One of the most important functions of thyroid hormones is the maturation of the central nervous system and the maintenance of cognitive functions through biochemical reactions.[3]

The relationship between thyroid hormones and mental balance has been known since the 19th century.[4] This relationship between thyroid and psychiatric diseases, especially mood disorders, has led to the opinion that thyroid hormones may be important in the regulation of affect and in the pathophysiology of psychiatric diseases. In hypothyroidism where nonspecific symptoms are seen at the beginning, depending on the insufficient secretion of thyroid hormones, psychiatric symptoms such as

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depression, slowing of thought flow, forgetfulness, weakening of concentration ability, and increase in sleep duration may occur in the future. In severe clinical cases, even psychotic symptoms may accompany these symptoms.[4-6] As in hypothyroidism, depression is the most common psychiatric disorder in hyperthyroidism with high levels of T3 and T4 hormones.[7] However, depressive disorder secondary to hypothyroidism and hyperthyroidism presents with different clinical manifestations. While a depression dominated by languishing syndrome and anhedonia is observed in hypothyroidism, in hyperthyroidism, restlessness with a feeling of distress, irritability, insomnia, and agitated depression with excessive activity are noted.[8,9]

Although valuable clinical results have been obtained from many studies conducted in recent years, the secret role of hypothalamic-pituitary-thyroid axis in the etiology of major depressive disorder has not been clearly revealed.[9,10] According to the opinions of some clinicians, in patients who applied to psychiatry outpatient clinics; thyroid dysfunctions are more common compared to the healthy population.[11,12] It is thought that patients with thyroid dysfunction diagnosed with major depressive disorder may reduce or even eliminate their depressive complaints with the treatment of the underlying disease. In this way, it will be possible to prevent patients from using drugs unnecessarily and to refrain from complications related to thyroid dysfunction.[13]

The aim of the study is to determine the frequency of thyroid dysfunction in patients diagnosed with depressive disorder in the region we live in. This rate will be used as a reference in future studies to be compared with other data in Turkey and the world. By determining the frequency of thyroid dysfunction in patients with depressive complaints, it is aimed to draw the attention of clinicians to thyroid disorders and to consider other clinical conditions in the differential diagnosis of patients who apply to psychiatry outpatient clinics.

Material and Method

Sociodemographic data and results of requested TSH tests of 1035 adult patients diagnosed with major depressive disorder according to DSM-V criteria and applied to Balıkesir University Faculty of Medicine Mental Health and Diseases outpatient clinic between January 2020 and January 2022 were retrospectively retrieved from their medical files. Data about their TSH levels were collected through the hospital information management system program. The number of TSH levels outside the reference range was proportioned to the total number of patients.

A total of 1035 patients' TSH levels were determined in the biochemistry laboratory of our hospital using a commercial kit (Beckman Coulter, USA) and a chemiluminescent method in the autoanalyzer (DXI800). Reference values were accepted as 0.38 mIU/L–5.33 mIU/L.

Results

We observed that the TSH values were within reference ranges in 92.66% of the patients. TSH values were <0.38 mIU/L in 3.09% (n = 32) and >5.33 mIU/L in 4.25% (n = 44) of the patients, and thyroid dysfunction was detected in 7.34% of all patients [Table 1]. Reference ranges of TSH values did not differ according to gender and age.

Discussion

In this study, it was observed that the TSH values were within the normal reference ranges in 92.66% of the patients who applied to the psychiatry outpatient clinic within 2 years. According to the data of TR Ministry of Health Adult Metabolic Diseases (Thyroid, Osteoporosis, Gout) and Celiac Disease Control Program 2019–2023 (Ankara–2019), serum TSH values were detected to be within the normal range (0.4 and 2.5 mU/L) in 95% of healthy adults. This rate is similar to the rate of TSH values which were within the normal range in 92.66% of the patients with depressive disorder in our study. In other studies, it has been reported that 5–15% of the patients diagnosed with major depressive disorder have subclinical hypothyroidism, 5–10% of them have thyroid dysfunctions, and this rate coincides with the rate of thyroid dysfunction (7.34%) seen in our patient population.[14,15]

Dysregulation of immune functions in major depressive disorder most likely causes autoimmune thyroiditis and related development of thyroid dysfunction.[16] Although this relationship has not been clearly demonstrated, major depressive disorder, moderate elevation in TSH and T4 levels suggested that it may be associated with several thyroid dysfunctions, including a blunt TSH response to TRH and altered circadian release of thyroid hormones.

However, disruptions in the regulation of thyroid functions have been observed in response to stress in many diseases.

Table 1: TSH values in 1035 patients who received the diagnosis of major depressive disorder

TSH	*n*	%
<0.38 mIU/L	32	3.09
0.38 mIU/L < TSH < 5.33 mIU/L	959	92.66
>5.33 mIU/L	44	4.25

Even TSH values at the upper limits of the reference values were associated with more frequent depressive episodes, more severe symptoms, and weaker responses to treatment in people with major depression.[17-19]

In light of these data, similar results were obtained in studies on the effects of levothyroxine replacement therapy on depression and anxiety symptoms. The response to antidepressant treatment in patients with subclinical hypothyroidism followed up with a diagnosis of depressive disorder was found to be weaker compared to euthyroid patients. Anxiety, depression, and somatic complaints were observed more frequently in these patients, and these symptoms were seen to regress with thyroid hormone replacement.[20,21] In the study conducted by Gülseren *et al.*[22] in 2006, levothyroxine treatment was applied to patients with subclinical hypothyroidism and regression was found in Hamilton Anxiety (HAMA), Hamilton Depression (HAMD), and Short Form Health Survey (SF-36) scores in terms of depression and anxiety.

Thyroid hormones play a role in maintaining both the functional integrity of the brain and also many physiological functions. Overt thyroid diseases, subclinical hyperthyroidism, or subclinical hypothyroidism do not appear to be the cause of most cases of depression. In addition, it is thought that the treatments to relieve thyroid dysfunction alone will not be sufficient in the treatment of depression. However, thyroid dysfunction seen in patients with depressive disorder should not be underestimated. Therefore, a target TSH level below 4.5–5 μIU/mL, which is the upper reference value for healthy adults appears to have a diagnostic insufficiency, especially for patients with depressive disorder under treatment. In resistant depression, it is recommended that the TSH levels be below 2.5 μIU/mL or even below 2 μIU/mL in order for the patient to get adequate results from the treatment.[23]

In the Clinical Practice Guidelines published by the American Association of Clinical Endocrinologists, it is emphasized that thyroid dysfunction should be considered in the differential and co-diagnosis of every patient diagnosed with major depressive disorder.[24] For the diagnosis of thyroid dysfunction, serum TSH tests have been reported to be the most reliable test in all subtypes of hypothyroidism and hyperthyroidism in the guidelines of the American Thyroid Association and the American Society of Clinical Endocrinologists.

In conclusion, thyroid dysfunction should be considered in the differential and co-diagnosis of the patients who apply to outpatient clinics with depressive complaints. In cases where thyroid dysfunction is suspected, it would be more beneficial to request the results of TSH tests from the patients. We think that taking into account the higher costs to be incurred after a detailed history and clinical examination, to measure T3 and T4 levels in cases where TSH values are outside the reference ranges,[11] and to arrange the psychiatric diagnosis and treatment considering these results will be more beneficial, and cost-effective. In this way, it will be possible both to prevent patients from using drugs unnecessarily and also to refrain from complications related to thyroid dysfunction.[13]

First of all, the fact that TSH blood levels of all patients with depressive complaints who applied to our outpatient clinic were not measured is one of the main limitations of our study. In other words, it was seen that there were patients who had depressive complaints and were not asked for TSH blood test. Apart from this, another important limitation is the inability to obtain information about whether the patients included in the study had a previous diagnosis of thyroid dysfunction and whether they received treatment.

It is recommended that this study be performed in a larger patient population. At the same time, choosing the patients included in the study from people living in different regions may provide more objective results. It is appropriate to conduct new studies in addition to this study in order to predict whether a routine TSH measurement is necessary in order to exclude thyroid dysfunction in patients admitted to psychiatry outpatient clinics. It is aimed that this study will shed light on future studies in this field.

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Conflicts of interest

There are no conflicts of interest.

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