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**NIVELET E STRESIT DHE CILËSIA E JETËS TË STUDENTËVE TË  
MJEKËSISË ME DISFUNKSION TË TIROIDESË NË KOSOVË**

**НИВОАТА НА СТРЕС И КВАЛИТЕТ НА ЖИВОТ КАЈ СТУДЕНТИТЕ  
ПО МЕДИЦИНА СО ТИРОИДНА ДИСФУНКЦИЈА ВО КОСОВО**

**STRESS LEVELS AND QUALITY OF LIFE AMONGST MEDICINE  
STUDENTS WITH THYROID DYSFUNCTION IN KOSOVO**

**Abstract**

Thyroid dysfunction, including hypothyroidism and hyperthyroidism, is a common endocrine disorder affecting the metabolism and overall health of individuals. This study aimed to assess stress levels and quality of life in university students with thyroid dysfunction. A descriptive research design was employed, utilizing an online distributed multi-faceted questionnaire. We collected data from 217 students at the Faculty of Medicine, University of Prishtina, "Hasan Prishtina." The questionnaire included information on general demographics, thyroid dysfunction diagnosis, thyroid-related symptoms, stress levels (assessed using the Perceived Stress Scale), and quality of life (measured by the Thyroid Disorder Quality of Life questionnaire). Descriptive analyzes, including frequency, cross-tabulation, and t-tests, were performed using SPSS statistical software.

Results showed that 13.4% of respondents had a prior diagnosis of thyroid dysfunction, with Hashimoto's Thyroiditis being the most common diagnosis. Students with thyroid dysfunction experienced significantly higher stress levels compared to those without a diagnosis. It categorized the quality

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of life for students with thyroid dysfunction as poor, likely due to the burden of the diagnosis itself and the impact of accompanying symptoms on daily life. These findings are consistent with previous research in the field.

The study's limitations include potential inaccuracies or misinterpretations in questionnaire responses and the relatively small sample size. However, the results consistently align with previous studies and provide valuable insights into the relationship between thyroid dysfunction, stress levels, and quality of life in university students.

**Keywords:** *Hypothyroidism, hyperthyroidism, thyroid dysfunction, stress, quality of life, med students*

## Introduction

The metabolism of almost all nucleated cells and most tissues is controlled by thyroid hormones. Over-activity or inactivity of this gland represents the most frequent problems of the endocrine system (1).

**Hypothyroidism** is the result of insufficient production/secretion of thyroid hormones or their inadequate action on target cells (2). Permanent loss or damage to the thyroid tissue, through processes such as autoimmune ones, referred to as Hashimoto's disease (in this disease lymphocytic infiltration of the thyroid gland leads to apoptosis of thyroid cells and hypothyroidism (3)), or damage from radiation, is known as primary hypothyroidism. Central or secondary hypothyroidism is due to insufficient stimulation of a normal thyroid gland, resulting from hypothalamic, pituitary disease, or TSH defects (4).

The classic presentation of a lethargic, dry-haired, thick-skinned, deep-voiced patient with weight gain, cold intolerance, bradycardia, and constipation makes the diagnosis easy. But in most cases, there are also less specific symptoms for the condition (1).

Diagnosis has to rely on laboratory tests because symptoms alone are not specific and sensitive to the condition. The markers are TSH and T<sub>4</sub>. In ***overt primary hypothyroidism***, there is a low serum FT<sub>4</sub> and elevated serum TSH levels, meanwhile, normal serum FT<sub>4</sub> and elevated serum TSH levels are found in ***subclinical*** primary hypothyroidism. Low serum FT<sub>4</sub> with normal or low serum TSH levels is diagnostic for ***central hypothyroidism*** (5).

**Hyperthyroidism** is defined as an increased synthesis and/or secretion of thyroid hormones by the thyroid gland. *Thyrotoxicosis* is the clinical condition where the excessive effect of thyroid hormones on tissues causes systemic clinical manifestations (6). In addition to overstimulation of the thyroid through TSH receptors and mutations of these receptors, other factors that cause hyperthyroidism include passive secretion of thyroid hormones

from damaged thyroid follicles; inflammation of the thyroid gland (thyroiditis), which may be autoimmune, post-viral, or induced by drugs, ectopic secretion of thyroid hormones, and self-administered thyroid hormone replacement (4).

This condition can manifest in constitutional symptoms of weight loss, fatigue, and heat intolerance. *Skin symptoms* such as warm, moist skin with thinning hair and pretibial myxedema in GD. *Musculoskeletal manifestations* include weakness, increased bone resorption, osteoporosis, and increased risk of fractures. Patients may develop lymphadenopathy, gynecomastia in men, or oligomenorrhea in women. *Gastrointestinal manifestations* include dysphagia, hyper-defecation, and increased appetite. From the *ophthalmological* point of view, there are lid retraction and infiltrative ophthalmopathy that can be seen in patients with Graves Disease (6,7).

Diagnosis is based on laboratory testing. Serum TSH is decreased in hyperthyroidism ( $<0.05\text{mUI/L}$ ), except in very rare cases of hypersecretion of TSH. Measurement of serum TSH has the highest sensitivity and specificity of any single blood test used in the evaluation of suspected hyperthyroidism and should be used as an initial screening test. Increased values of free T4 or T3 confirm the diagnosis; T4 is almost always elevated, but T3 is more sensitive, as there are cases of isolated 'T3 toxicosis' (1,8–10).

Studies suggest that there is a connection between stress and thyroid disorders especially those classified as autoimmune. Chronic stress causes T-Helper cell imbalance which is involved in the pathogenesis of Graves Disease and the immunomodulation caused by stress conditions can lead to Hashimoto's (11,12).

Despite it being a potential risk factor, stress is also one of the major symptoms of these conditions. In both cases of hyper and hypothyroidism experience higher levels of stress compared to their euthyroid counterpart (13–15). In hyperthyroidism, higher stress levels can be seen in cases of Graves Disease and especially those experiencing orbitopathy (16–18).

### **Methodology**

This was descriptive research based on an online distributed multi-faceted questionnaire.

**Samples.** We collected data from the Faculty of Medicine Students, University of Prishtina "Hasan Prishtina". Data includes general information on the students, the presence of already diagnosed thyroid dysfunction, hypo, and hyperthyroid symptoms, stress level, and quality of life. To assess the stress level, we used the "Perceived Stress Scale", and to assess the quality of life by focusing on energy, motivation, and physical activity we used the ThyDQoL questionnaire (Thyroid Disorder Quality of Life) (19, 20).

We distributed the questionnaire through the official faculty-issued student emails and we received 217 responses to the questionnaire. Exclusion criteria were set at 20% missing data, since none fit the criteria all we included all the data in the analysis. Data was analyzed using the SPSS 25 statistical software, and we presented them in tables in graphics. The data went through descriptive analysis using frequency, cross-tabulation, and t-testing.

## Results

*Table 1. Which Faculty of Medicine department is the participant studying in?*

Department	Frequency	Percentage %
Pharmacy	12	5.5
Physiotherapy	11	5.1
Nursing	17	7.8
General Medicine	144	<b>66.4</b>
Dentistry	33	15.2
<b>Total</b>	217	100.0

Of the 217 respondents, 66.4% belonged to General Medicine, followed by 15.2% Dentistry, 7.8% Nursing, 5.5% Pharmacy, and 5.1% Physiotherapy.

*Table 2. The study year the participant is part of*

Year	Frequency	Percentage %
1	19	8.8
2	19	8.8
3	35	16.1
4	18	8.3
5	15	6.9
6	59	<b>27.2</b>
Graduated	52	24.0
<b>Total</b>	217	100.0

Most of the respondents belonged to the sixth year of studies 27.2%, followed by graduate students 24.0%, and those in the third year 16.1%. First and second year 8.8% respectively, fourth year 8.3%, and fifth year 6.9%.

*Table 3. The gender of all participants*

<b>Gender</b>	<b>Frequency</b>	<b>Percentage %</b>
Female	159	<b>73.3</b>
Male	58	26.7
<b>Total</b>	217	100.0

Out of 217 respondents, 73.3% were female, 26.7% male.

*Table 4. Gender of participants with an existing Thyroid Disease*

<b>Gender</b>	<b>Frequency</b>	<b>Percentage %</b>
Female	27	<b>93.1</b>
Male	2	6.9
<b>Total</b>	29	100.0

Of the 29 cases that were previously diagnosed, 93.1% were female, and 6.9% were male.

*Table 5. Relation between thyroid diagnosis and respective treatment*

			<b>Do you use treatment for this diagnosis?</b>		Total	
			Unspecified	No	Yes	
<b>Have you been previously diagnosed with a thyroid disorder?</b>	Yes	Frequency	2	11	<b>16</b>	29
		%	6.9%	37.95	55.2%	100%

Of the 217 respondents, 29 had a prior diagnosis of thyroid dysfunction, of which 55.2% used therapy for the diagnosis in question, 37.9% did not use therapy, and 6.9% did not state whether they used therapy or not.

*Table 6. The time when the diagnosis was made.*

<b>Time of Diagnosis</b>	<b>Frequency</b>	<b>Percentage %</b>
During Studies	21	<b>72.4</b>
Before Studies	7	24.1
Unspecified	1	3.5
<b>Total</b>	29	100.0

Of 29 cases previously diagnosed with thyroid dysfunction, 72.4% were diagnosed during the studies, 24.1% before the studies, and 3.5% did not specify the time of diagnosis.

CENTRUM 20

*Table 7. Specified thyroid disease diagnosis of these participants*

<b>Diagnoses</b>	<b>Frequency</b>	<b>Percentage %</b>
Increase of T4 hormone	1	3.4
Hashimoto's Thyroiditis	11	<b>37.9</b>
Thyroid Gland Nodules	2	6.9
Thyroid Gland Cysts	2	6.9
Gestational Hyperthyroidism	1	3.4
Unspecified Hypothyroidism	2	6.9
Unspecified Hyperthyroidism	2	6.9
Goiter	1	3.4
Unspecified Thyroiditis	1	3.4
Graves Disease	1	3.4
Papillary Carcinoma of the Thyroid	1	3.4
Heterogeneous Thyroid Gland	1	3.4
Unspecified Diagnosis	3	10.3
<b>Total</b>	<b>29</b>	<b>100.0</b>

Of the 29 respondents with a prior diagnosis of thyroid dysfunction, in the open question to specify the diagnosis, 37.9% of them were diagnosed with Hashimoto's Thyroiditis, which is the most frequent diagnosis, and 10.3% chose not to specify the diagnosis. 6.9% respectively were: diagnosed with Thyroid Gland Nodules, Thyroid Gland Cysts, unspecified Hypo, and Hyperthyroidism. While 3.4% respectively, the diagnoses were: Increased T4 hormone, Hyperthyroidism in pregnancy, thyroid goiter, thyroiditis, Graves' Disease, Papillary Carcinoma, and heterogeneous gland.

*Table 8. A legend for the abbreviations is used later in Tables 9 and 10.*

In the last month, how often have you been upset because of something that happened unexpectedly?	In the past month, how often have you felt that you were unable to control the important things in your life?	In the last month, how often have you felt nervous and stressed?	Have you previously been diagnosed with thyroid disease?
P.1	P.2	P.3	P.0

These abbreviations are used to make it easier to tabulate the data in the following two tables

*Table 9. Shortened PSS for all participants, including mean answer and score*

<b>Questions</b>	<b>Answers</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Scoring</b>
P.1	217	0	4	2.54	0-3 low level
P.2	217	0	4	2.27	4-7 moderate levels
P.3	217	0	4	2.92	8-12 high level
<b>Total</b>	<b>217</b>			<b>7.73</b>	<b>Moderate to High</b>

Out of 217 respondents, in the question “In the last month, how often have you been upset because of something that happened unexpectedly?” with points from 0-4, the average value was 2.54.

In the question “In the past month, how often have you felt that you were unable to control the important things in your life?” the average value was 2.27.

In the question “In the last month, how often have you felt nervous and stressed?” the average value was 2.92. With an average of the three values = 7.73.

*Table 10. T-testing for stress levels between participants with thyroid disease diagnosis and those without*

	<b>P.0</b>	<b>F</b>	<b>Mean</b>	<b>SD</b>	<b>t-test</b>	<b>P value</b>
<b>P.1</b>	No	188	2.49	1.047	-1.789	.075
	Yes	29	2.86	1.026		
<b>P.2</b>	No	188	2.21	1.234	-1.978	.049
	Yes	29	2.69	1.137		
<b>P.3</b>	No	188	2.84	.990	-2.993	.003
	Yes	29	3.41	.733		

In the first question between the groups with and without a prior diagnosis, the t-statistic value = -1.789, while the p-value = 0.075

In the second question, between these two groups, the value of the t-statistic = -1.978, with a value of p = 0.049

In the third question, between these two groups, the value of the t-statistic = -2.993, with a value of p = 0.003

*Table 11. Shortened quality of life questionnaire of participants with an existing diagnosis*

	Frequency	Minimum	Maximum	Mean	SD
1. Do you feel extreme fatigue during physical activity?	29	2	4	2.79	.861
2. My motivation for everyday work.	29	0	4	2.31	.891
3. Feeling tired, without energy.	29	0	4	1.52	1.090
4. I enjoy the things I do in my spare time.	29	0	4	1.62	.942
Total	29			8.24	

From 29 cases with an existing diagnosis, in the first question, with an evaluation from 0-4, where the minimum value chosen was 2 and the maximum 4, the average value was 2.79.

In the second question, with an evaluation from 0-4, where the minimum value chosen was 0 and the maximum value was 4, the average value was 2.31.

In the third question, with a rating from 0-4, where the minimum value chosen was 0 and the maximum value was 4, the average value was 1.52

In the fourth question, with an assessment from 0-4, where the minimum value chosen was 0 and the maximum value was 4, the average value was 1.62

*Table 12. Quality of Life rating scales, as a total of these 4 questions rated 0-4*

Points	Scoring
0-3	Good
4-7	Moderate
8-11	Poor
12-16	Very Poor

The mean Quality of Life score for the participants was 8.24, which falls in the “poor” category.

### Discussion

General data was used to establish the specific demographic used in this research project. In Table 5, we see that from 217 respondents, 29 cases (13.4%) had a prior diagnosis of thyroid dysfunction, of these, 55.2% used therapy, 37.9% did not use therapy, and 6.9% did not specify whether they used therapy. The reason this percentage did not use therapy may be that of the specified diagnoses, a change in thyroid function may not accompany some of them (21).

Of the cases with a prior diagnosis of thyroid dysfunction, 72.4% of them were diagnosed during their studies (Table 5). It's important to note that there is a period of symptoms before diagnosis and it takes up to 4 weeks for them to subside after treatment.(1). This affects the quality of life and the academic performance of these students. Studies show that a sedentary lifestyle with reduced physical activity and higher stress levels increases the risk of thyroid dysfunction (22).

Of the 29 respondents who had a prior diagnosis of thyroid dysfunction (Table 6), 11 (37.9%) were diagnosed with Hashimoto’s Thyroiditis, 2 (6.9%) unspecified hypothyroidism, 1 (3.4%) heterogeneous thyroid gland. These diagnoses specified as hypothyroidism represented 48.3% of the diagnoses. 1 case (3.4%) was diagnosed with increased T4, 1 (3.4%) with hyperthyroidism during pregnancy, 1 (3.4%) with Graves’ disease, and 2 cases (6.9%) with unspecified hyperthyroidism. These diagnoses classified as hyperthyroid were 17.24% of the total. The following cases present diagnoses of thyroid dysfunction, which cannot be grouped either as hypo or hyperthyroid conditions as the participants did not specify them. 2 cases (6.9) of thyroid nodules. 2 (6.9%) thyroid cysts, 1 (3.4%) goiter, 1 (3.4%) unspecified thyroiditis and 3 cases



(10.3%) did not specify the diagnosis at all. The data suggests that hypothyroid conditions, with Hashimoto's Thyroid being the most common, are more frequent. This is similar to what previous studies have found. (23,24).

The focus of this research was measuring stress levels and the quality of life of this susceptible demographic. Stress plays an important role in the pathogenesis of thyroid disorders and is one of the most important symptoms in the presence of a similar diagnosis (11–16). Here, we measured stress levels using PSS (perceived stress scale).

- In the question “In the last month, how often have you been upset because of something that happened unexpectedly?” from 0-4 points, the average value of all respondents was 2.54. We evaluated separately the data of the same question, where, in students with a prior diagnosis of thyroid dysfunction, the average value was 2.86 compared to those without a prior diagnosis, 2.49. The t-statistic value was -1.789 and the p-value = 0.078, where, according to the significance value 0.05, it shows that there is no significant difference between the two groups.

- In the following question “In the last month, how often have you felt that you cannot control the important things in your life?” with the same conditions, the average value of 217 respondents was 2.27. In students with a prior diagnosis, this value was 2.69, while that of those without a diagnosis was 2.21. The value of the t-statistic in this case was -1.978 with a value of  $p = 0.049$ , which indicates a significant difference in values between the two groups.

- In the question “In the last month, how often have you felt nervous and stressed?” the average value of all respondents was 2.92. Among those with a prior diagnosis, this value was 3.41, while that of students without a diagnosis was 2.84. In these data, the value of the t-statistic was -2.993 with a value of  $p=0.003$ , this indicates a significant difference between these two groups.

Our research shows that students with a prior thyroid dysfunction diagnosis experience higher stress levels than those without. The total value of the three questions was 8.96 for cases with a prior diagnosis and 7.54 for cases without a diagnosis. According to the scoring system, both groups had a high stress level, but it was considerably higher in the first group.

We measured the quality of life for students with thyroid disease using ThyDQol (Thyroid disorder quality of life questionnaire). From the collected data, the total value of the 4 questions was 8.24. Based on the evaluation table (Table 12), the quality of life of these students is categorized as “poor”. The factors that can influence this low quality are the interaction of the burden of the diagnosis itself as well as the impact of accompanying symptoms on daily life, and this information agrees with previously conducted research (16,20,25).

**Limitations.** The data of this research should be considered bearing in mind some limitations. The main limitation is the collection of data through the questionnaire, which can be accompanied by: false answers, wrong understanding of the questions, or misinterpretation. Although this limitation is

present, the extensive use of questionnaires in preliminary descriptive research lends legitimacy to the data. The other limitation is the small sample, in this case, 217 respondents, however, the conclusions of the analyzed data are always in agreement with previous studies and bring innovation in this field showing a significant difference between the compared groups.

### **Conclusions**

We conclude that in this demographic the dominating diagnosis is hypothyroidism, with Hashimoto's as the leading cause.

Based on the questionnaire, these students have a high stress level. Analyzed data of two groups 1. Students without a prior diagnosis of thyroid dysfunction and 2. For students with a prior diagnosis, a significant difference in the level of stress was observed where the presence of a thyroid disorder is accompanied by a significantly higher level of stress.

The life quality of students who have an existing thyroid disorder was categorized as poor, affected mainly by the accompanying symptoms.

Further research in this field needs to study if treatment or the lack of it, affects both stress and quality of life. It would also be important to study if incorporating mental health care in this demographic would lessen these markers.

### **Reviewers:**

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