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Thyroid Disorders in Pregnancy in Elbasani District

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Abstract

Background: Thyroid dysfunction is a common endocrine disorder in pregnancy, influencing maternal and fetal health.

Aim: This study aims to assess the prevalence of thyroid function categories (euthyroidism, hypothyroidism, and hyperthyroidism) among pregnant women and explore associations with parity, gestational period, sociodemographic factors, and thyroid-stimulating hormone (TSH) levels.

Study design: This is a cross-sectional study.

Methods: The study was conducted in 2024 at the Endocrinology Outpatient Service in Elbasan, Albania, including 121 pregnant women. Data collection involved clinical evaluations and laboratory measurements of TSH levels. Women were classified as euthyroid, hypothyroid, or hyperthyroid and stratified based on parity (primigravida vs. multigravida), gestational period (trimester), age, residence, socioeconomic status, and education level.

Results: Of the 121 participants, 70.2% were euthyroid, 19.8% had hypothyroidism, and 9.9% had hyperthyroidism. There was no significant association between thyroid function and parity ($p = 0.962$) or gestational period ($p = 0.999$). Additionally, age ($p = 0.999$), residence ($p = 0.958$), socioeconomic status ($p = 0.999$), and education level ($p = 0.998$) did not significantly impact thyroid function. TSH levels varied significantly between groups ($p < 0.001$), with euthyroid women having a mean TSH of

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1.76 ± 0.59 mIU/ml, hypothyroid women 8.68 ± 2.9 mIU/ml, and hyperthyroid women 0.04 ± 0.02 mIU/ml.

Conclusion: Thyroid dysfunction affects nearly one-third of pregnant women, independent of parity, gestational age, or sociodemographic factors. Given the potential maternal and fetal complications, routine thyroid screening during pregnancy is essential to ensure early detection and management.

Keywords: Thyroid dysfunction, Pregnancy, Hypothyroidism, Hyperthyroidism, Thyroid-stimulating hormone

INTRODUCTION

The thyroid gland, a small butterfly-shaped organ located in the anterior neck region, plays a vital role in regulating the body's metabolism, energy expenditure, thermogenesis, and growth. It achieves this through the synthesis and secretion of thyroid hormones—triiodothyronine (T3) and thyroxine (T4)—which are iodinated compounds essential for protein metabolism and cellular differentiation (1,2). These hormones are regulated via the hypothalamic-pituitary-thyroid (HPT) axis, with thyroid-stimulating hormone (TSH) from the anterior pituitary acting as a key modulator.

Thyroid hormones triiodothyronine (T3) and thyroxine (T4) contain iodine elements, which are important in controlling the body's metabolic rate and protein processing effect, which in turn influences the growth and development of the body. The main function of thyroid is to be responsible for iodine metabolism, including the synthesis of thyroid hormones, storage and secretion of hormones and feedback regulation of hormone control system. The pituitary gland in the brain produces thyroid stimulating hormone (TSH), which sends a signal to the thyroid to increase metabolism and production of its hormones. The thyroxine (T4) comes from the thyroid gland and the triiodothyronine (T3) is produced when tissues of the body process the T4. The body needs more production of T4 and T3 to increase body's metabolic rate. Anything that affects the pituitary gland or the thyroid gland can cause a variety of disorders. While the human body is learning to adapt to life's disorders and variations, the thyroid disorder patients and pregnant women with thyroid disorders need more stringent surveillance because of the effects of the disorders on the quality and well-being of both themselves and their offspring (3). Dysfunction of the thyroid gland can lead to two main categories of disorders: hyperthyroidism, marked by excessive hormone secretion, and hypothyroidism, characterized by insufficient production of thyroid hormones. Hyperthyroidism may result in symptoms such as weight loss, palpitations, heat intolerance, and irritability, while hypothyroidism often manifests as fatigue, cold intolerance, constipation, and cognitive slowing (4,5). Among these, autoimmune thyroid diseases like Hashimoto's thyroiditis and Graves' disease are the most prevalent causes worldwide (6).

There are several types of thyroid disorders, and the most common are hypothyroidism, hyperthyroidism, and autoimmune diseases. A thyroid disorder is health condition that affects the metabolic process of the human body. If it is too active, it is called hyperthyroidism. But the disorder that is behind the increase of hormone production is more common and known as hyperthyroidism. In contrast, when the thyroid gland does not produce enough hormone to meet body's needs, it causes hypothyroidism. Both of these disorders have severe effects on the body and cause serious health problems. Autoimmune diseases are one of the most common types of thyroid disorders. The body produces proteins

that attack its own organs when it is affected by this type of disorder. The thyroid gland is the target organ of these attacks. The attacks may be shaped as shrinking or swelling of the thyroid gland, which causes the symptoms of tiring, nervousness or muscle disorders in the body. Although the health problems originated from the disorder seem simple, life-threatening situations may arise when diseases as a whole are considered (7). Pregnant women and individuals with coexisting autoimmune or chronic diseases are especially vulnerable and require continuous monitoring and early detection strategies.

While global data on thyroid disorders are substantial, there is a notable lack of localized epidemiological evidence in several low- and middle-income countries, including Albania. Historically, iodine deficiency disorders (IDD) were prevalent in Albania due to limited access to iodized salt, particularly in inland and mountainous areas. Following national and international initiatives, including universal salt iodization programs launched in the early 2000s, there has been a decline in IDD prevalence (8,9). However, thyroid dysfunctions continue to be underdiagnosed, and structured studies on their prevalence, risk factors, and clinical characteristics remain limited.

The city of Elbasan, located in central Albania, represents a region with mixed urban and rural populations, socio-economic disparities, and diverse environmental exposures. Healthcare infrastructure in the region has improved in recent years, yet challenges persist in terms of early detection, health literacy, and access to endocrine diagnostics. This underscores the need for targeted research that can inform public health interventions and clinical practices.

Therefore, the aim of this study is to assess the prevalence, demographic distribution, and clinical characteristics of thyroid disorders among pregnant patients in the Elbasan region. Specifically, the study seeks to explore diagnostic patterns, hormonal profiles within this population to support improved screening strategies, policy development, and awareness programs tailored to the local context.

MATERIAL AND METHODS

This cross-sectional study was conducted at the Endocrinology Outpatient Service in the Elbasan Regional Hospital during the calendar year 2024. A total of 121 pregnant women were included in the study. These participants were not selected randomly from the general population but represented all pregnant women who presented to the endocrinology service for thyroid evaluation or follow-up during the study period and who met the study's eligibility criteria.

Specifically, inclusion criteria were:

- being pregnant at any stage of gestation,
- aged 18 years or older,
- attending the endocrinology clinic for thyroid screening, follow-up, or symptomatic evaluation, and
- providing written informed consent.

Exclusion criteria included:

- known history of thyroidectomy,
- current antithyroid or thyroid hormone replacement therapy,
- presence of systemic illnesses (e.g., diabetes mellitus, renal failure, autoimmune diseases unrelated to thyroid), or
- lack of laboratory confirmation of TSH levels.

Informed consent was obtained from each participant after a thorough explanation of the study's objectives, procedures, potential risks, and benefits. The primary objective was to assess the prevalence and distribution of thyroid function categories—euthyroidism, hypothyroidism, and hyperthyroidism—among the study group. A secondary objective was to explore potential associations between thyroid function and sociodemographic or obstetric variables, including parity, gestational trimester, place of residence, age, education level, and socioeconomic status.

Data collection involved a combination of clinical interviews, chart reviews, and laboratory measurements of thyroid-stimulating hormone (TSH) levels. Based on these levels, participants were classified into functional thyroid categories according to established clinical guidelines (7). The study population was further stratified by parity (primigravida vs. multigravida), gestational age (first, second, or third trimester), residence (urban vs. rural), and education and income levels to evaluate potential risk factors associated with thyroid dysfunction in pregnancy.

Statistical analyses

The data were analyzed using the SPSS (Statistical Package for Social Sciences) software, version 25.0.

Descriptive statistics were presented for continuous variables, which are summarized as mean (M) and standard deviation (SD). The Kolmogorov-Smirnov test was used to assess the normality of continuous variables.

Categorical variables were presented as absolute frequencies and relative percentages. The chi-square test was used to compare proportions between categorical variables.

For the comparison of TSH mean values, ANOVA (Analysis of Variance) was performed.

Statistical significance was set at $p \leq 0.05$, and all statistical tests were two-tailed.

RESULTS

Out of the total 121 pregnant women, 66 (54.5%) are experiencing their first pregnancy (primigravida), while 55 (45.5%) have had at least one previous pregnancy (multigravida) (figure 1).

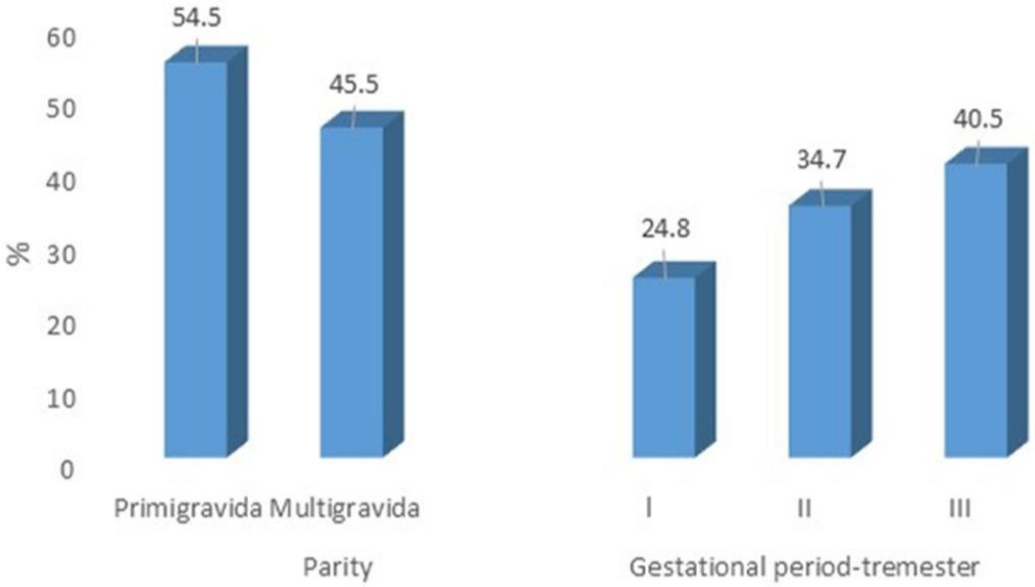

Figure 1. Distribution of Pregnant Women by Parity and Gestational Period (in %)

Regarding the gestational period, the distribution of pregnant women is fairly balanced across the three trimesters. A quarter of the women 30 (24.8%) are in their first trimester, while a slightly higher proportion, 42 (34.7%), are in their second trimester. The largest group, making up 40.5% (49 cases) consists of women in their third trimester.

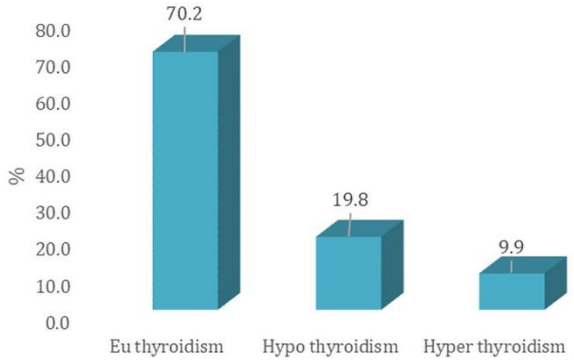

Figure 2. Prevalence of Thyroid Function Categories Among Pregnant Women

Prevalence of thyroid function categories among pregnant women is shown in figure 2. This distribution highlights the prevalence of thyroid function among the study population, revealing that the majority of pregnant women 85 (70.2%) maintain normal thyroid function, while approximately 30% experience some form of thyroid dysfunction, with 24 (19.8%) affected by hypothyroidism and 12 (9.9%) by hyperthyroidism.

The analysis of TSH levels across different thyroid function categories reveals distinct differences in mean values and variability (figure 3.) Among women with euthyroidism, the mean TSH level is 1.76 ± 0.59 mIU/ml, indicating a relatively stable distribution of values around the mean. For those with hypothyroidism, the mean TSH level is significantly higher at 8.68 ± 2.9 mIU/ml, suggesting a wider variation in

TSH levels within this group ($p<0.001$). In contrast, women diagnosed with hyperthyroidism exhibit extremely low TSH levels, with a mean of 0.04 ± 0.02 mIU/ml, highlighting minimal fluctuation in TSH levels in this category.

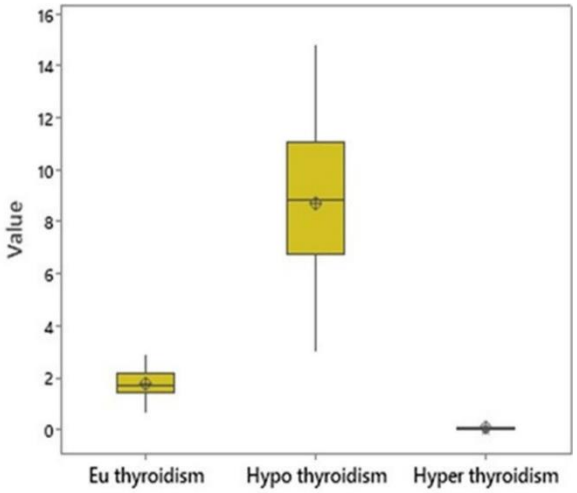

Figure 3. Distribution of TSH Levels Across Thyroid Function Categories

The table 1 presents data on thyroid function among pregnant women, categorized by parity) and gestational period.

Among primigravida women, 46 (69.7%) have normal thyroid function (euthyroidism), while 13 (19.7%) have hypothyroidism, and 7 (10.6%) have hyperthyroidism. Similarly, among multigravida women, 39 (70.9%) have euthyroidism, 11 (20%) have hypothyroidism, and 5 (9.1%) have hyperthyroidism. The chi-square test yields a p-value of 0.962, suggesting that there is no significant association between parity and thyroid function.

Regarding gestational period, the distribution of thyroid function across the trimesters remains consistent. In the first trimester, 21 (70%) of women have euthyroidism, 6 (20%) have hypothyroidism, and 3 (10%) have hyperthyroidism. During the second trimester, 30 (71.5%) have euthyroidism, 8 (19%) have hypothyroidism, and 4 (9.5%) have hyperthyroidism. By the third trimester, 34 (69.4%) of women have euthyroidism, 10 (20.4%) have hypothyroidism, and 5 (10.2%)

Table 1. Distribution of Thyroid Function Categories by Parity and Gestational Period

Variables	Eu thyroidism	Hypo thyroidism	Hyper thyroidism	Chi square p value
	N (%)	N (%)	N (%)	
Parity				
Primigravida	46 (69.7)	13 (19.7)	7 (10.6)	0.962
Multigravida	39 (70.9)	11 (20.0)	5 (9.1)	
Gestational period				
1st trimester	21 (70.0)	6 (20.0)	3 (10.0)	
2nd trimester	30 (71.5)	8 (19.0)	4 (9.5)	0.999
3rd trimester	34 (69.4)	10 (20.4)	5 (10.2)	

have hyperthyroidism. The chi-square test result for gestational period shows a p-value of 0.999, indicating that there is no significant relationship between thyroid function and the trimester of pregnancy.

The table 2 presents the distribution of thyroid function by based on age group, residence, socioeconomic status, and education level.

The chi-square test results indicate that there is no statistically significant association between thyroid function and age (p=0.999), place of residence (p=0.958), socioeconomic status (p=0.999), or education level (p=0.998) in this sample.

Table 2. Distribution of Thyroid Function by Sociodemographic characteristics

Variables	Eu thyroidism N (%)	Hypo thyroidism N (%)	Hyper thyroidism N (%)	Chi square p value
Agegroup				
≤20	13 (68.4)	4 (21.1)	2 (10.5)	
21–25	30 (71.5)	8 (19.0)	4 (9.5)	0.999
26–30	25 (69.4)	7 (19.5)	4 (11.1)	
>30	17 (70.8)	5 (20.9)	2 (8.3)	
Residence				
Rural	34 (69.4)	10 (20.4)	5 (10.2)	0.958
Urban	51 (70.8)	14 (19.5)	7 (9.7)	
Socio economic status				
Upper	8 (72.7)	2 (18.2)	1 (9.1)	0.999
Middle	42 (70.0)	12 (20.0)	6 (10.0)	
Low	35 (70.0)	10 (20.0)	5 (10.0)	
Education				
9-years	18 (72.0)	5 (20.0)	2 (8.0)	0.998
High school	42 (70.0)	12 (20.0)	6 (10.0)	
University	25 (69.4)	7 (19.5)	4 (11.1)	

DISCUSSION

The findings of this study reveal that thyroid dysfunction affects approximately 30% of pregnant women in Elbasan, with 19.8% presenting with hypothyroidism and 9.9% with hyperthyroidism, while the remaining 70.2% had normal thyroid function (euthyroid state). These proportions are significantly higher than those typically reported in global epidemiological literature. For instance, studies have documented the prevalence of hypothyroidism during pregnancy to range between 2% and 15%, depending on iodine sufficiency, population characteristics, and screening strategies (3,10). Similarly, hyperthyroidism is usually less common, with international prevalence estimates ranging from 0.2% to 2.5%, especially in iodine-sufficient regions (11).

When compared to these international values, the 19.8% prevalence of hypothyroidism found in Elbasan exceeds the upper global estimate by over 30%, while the 9.9% prevalence of hyperthyroidism is nearly four times higher than the highest figure reported in iodine-replete populations. These striking deviations raise important public health concerns and suggest the need for context-specific investigation into potential causal factors.

From a regional perspective, few studies have comprehensively assessed the burden of thyroid disorders among pregnant women in the Balkan countries, but existing data also point to a considerable variability. In North Macedonia, a study by Stojanoska et al. (2019) (12) reported hypothyroidism rates of around 10.6% among pregnant women. In Kosovo, recent unpublished health surveillance reports estimate a combined thyroid dysfunction prevalence of 13%–17% (13). A study in southern Serbia noted subclinical hypothyroidism in 8.3% of pregnant women (14). While these rates are somewhat elevated compared to global norms, they remain substantially lower than the prevalence observed in our cohort from Elbasan, underscoring a potentially local pattern of increased thyroid dysregulation (12).

Several factors could contribute to these findings. First, iodine deficiency remains a plausible explanation, as Albania, despite national salt iodization programs, has reported suboptimal iodine intake in vulnerable populations, especially in rural and peri-urban areas (15). Iodine is essential for thyroid hormone synthesis, and its deficiency is a well-established risk factor for both maternal and fetal thyroid dysfunction (16). Second, regional genetic susceptibilities or autoimmune thyroid disorders, such as Hashimoto’s thyroiditis or Graves' disease, may be more prevalent but underdiagnosed in this population. Third, limited or delayed access to quality antenatal care, particularly in early pregnancy when thyroid screening is most relevant, might contribute to missed subclinical conditions that evolve into overt dysfunction later in gestation.

Moreover, differences in diagnostic thresholds or laboratory practices may also partly explain the variation, as reference intervals for TSH and free

T4 during pregnancy are known to vary significantly by region, ethnicity, and trimester, and are often not adapted for local populations (17). It is also possible that more comprehensive screening protocols in Elbasan have led to greater case detection, especially of subclinical forms that might otherwise go unrecognized in less rigorous settings (18).

In light of these findings, further research is urgently needed to assess iodine status among pregnant women in Elbasan, to evaluate the prevalence and impact of autoimmune thyroiditis, and to standardize screening protocols using locally validated reference ranges. Such steps are crucial not only for early diagnosis and management of thyroid dysfunction in pregnancy, but also for improving maternal and neonatal outcomes in the region.

The study found no significant association between parity (primigravida vs. multigravida) and thyroid dysfunction ($p = 0.962$). This finding contrasts with research suggesting that multigravida women may have a higher risk of developing thyroid disorders due to cumulative metabolic changes and immune system adaptations over multiple pregnancies (19). However, other studies support the lack of a strong relationship between parity and thyroid function, indicating that individual factors such as autoimmunity and iodine status may play a more dominant role than pregnancy history (20).

Similarly, no significant difference was found in thyroid function across different gestational periods ($p = 0.999$), suggesting that thyroid hormone disturbances do not follow a specific trend throughout pregnancy in this population. This finding is in line with research indicating that while TSH levels naturally fluctuate during pregnancy due to hormonal adaptations, the prevalence of thyroid dysfunction remains relatively stable across trimesters (21). However, some studies report a higher incidence of thyroid dysfunction in early pregnancy, likely due to increased metabolic demands and placental hormone interactions (22). The lack of trimester-based variations in this study may be attributed to adequate prenatal screening and management of thyroid disorders (23).

This study also found no significant relationship between thyroid function and demographic factors, including age ($p = 0.999$), place of residence ($p = 0.958$), socioeconomic status ($p = 0.999$), and education level ($p = 0.998$). These findings contrast with some previous studies that have suggested a higher prevalence of thyroid disorders in populations with lower socioeconomic status and limited healthcare access, due to factors such as poor nutrition, iodine deficiency, and lack of early diagnosis (24). However, other research supports the idea that thyroid dysfunction is largely influenced by genetic and autoimmune factors rather than sociodemographic characteristics (25). The results of this study suggest that all pregnant women, regardless of background, should be routinely screened for thyroid disorders to ensure timely detection and management.

The analysis of TSH levels across thyroid function categories confirmed expected patterns: Euthyroid women had a mean TSH of 1.76 ± 0.59 mIU/ml, reflecting a stable distribution. Hypothyroid women had significantly higher TSH levels (8.68 ± 2.9 mIU/ml, $p<0.001$), with greater variation due to differing severity levels. Hyperthyroid women had markedly suppressed TSH levels (0.04 ± 0.02 mIU/ml, $p<0.001$), consistent with thyroid overactivity. These findings are consistent with international guidelines, which define subclinical and overt thyroid dysfunction based on abnormal TSH and free T4 levels (26). Given the known risks of untreated thyroid dysfunction in pregnancy, including preterm birth, gestational hypertension, and impaired fetal neurodevelopment (27,28,29,30), the results underscore the importance of routine TSH screening in prenatal care.

CONCLUSION

This study highlights the prevalence of thyroid dysfunction among pregnant women, showing that thyroid disorders occur independently of pregnancy stage, parity, and demographic factors. The findings emphasize the importance of routine TSH screening in pregnancy to ensure early detection and management of thyroid dysfunction. Further research should explore potential genetic and environmental contributors to thyroid disorders in pregnancy to better inform clinical practice and public health strategies.

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