AMERICAN ACADEMIC PUBLISHER

INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

ISSN NUMBER: 2692 - 5206 Volume 5. No 11. November ,2025

PREVALENCE, REGIONAL RISK FACTORS, DIAGNOSIS, AND OPTIMIZATION OF PREVENTION OF THYROID DISEASES AMONG THE POPULATION OF ANDIJAN REGION

Assistants of the Department of Medical Radiology

Otakhonov M.E.,

Khalilov I.H.

ABSTRACT: Background: Thyroid disorders are a major global public health concern, with increasing prevalence in both developed and developing countries. Andijan region of Uzbekistan has unique environmental and dietary conditions that may influence thyroid health.

Objective: This study aimed to assess the prevalence of thyroid diseases among the population of Andijan region, identify region-specific risk factors, evaluate current diagnostic practices, and propose strategies for optimizing prevention.

Methods: A cross-sectional study was conducted among 1,200 residents aged 15 years and older, selected through stratified random sampling. Data were collected using structured questionnaires, clinical examinations, biochemical tests (TSH, FT4, anti-TPO), urinary iodine concentration, and thyroid ultrasonography. Multivariate logistic regression was applied to identify significant risk factors.

Results: The overall prevalence of thyroid disorders was 18.7%, with higher rates in females (24.6%) than males (12.1%). Hypothyroidism (9.3%) and goiter (5.7%) were the most common conditions. Rural residents had slightly higher prevalence (20.3%) compared to urban residents (17.1%). Significant risk factors included female sex, age above 40 years, family history of thyroid disease, low dietary iodine, and environmental exposure.

Conclusion: Thyroid disorders are prevalent in Andijan region, particularly among females and older adults. Early diagnosis, routine screening, iodine supplementation, and public health education are essential to reduce disease burden and improve population health outcomes.

KEYWORDS: Thyroid disorders; Prevalence; Risk factors; Iodine deficiency; Andijan region; Hypothyroidism; Goiter; Thyroid screening

INTRODUCTION

Thyroid diseases represent a major global public health concern, with their prevalence steadily increasing in both developed and developing countries [1]. As one of the most important endocrine organs, the thyroid gland plays a critical role in regulating metabolism, growth, and the functioning of multiple organ systems. Disruption of thyroid activity—whether through hypothyroidism, hyperthyroidism, goiter, nodular disease, or autoimmune thyroid disorders—

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 5. No 11. November ,2025

can lead to significant clinical, social, and economic consequences [2]. Early identification and effective prevention of thyroid disorders are therefore essential for maintaining population health.

In Uzbekistan, thyroid diseases remain among the most frequently reported endocrine pathologies [3]. Regional differences in environmental exposures, nutritional habits, iodine intake, and healthcare access contribute to uneven distribution of thyroid disorders across the country. Andijan region, located in the Fergana Valley, is characterized by high population density, intensive agricultural activity, and specific ecological conditions that may predispose inhabitants to thyroid dysfunction [4]. Variability in iodine content of soil and water, dietary patterns, industrial pollutants, and socioeconomic factors have been identified as potential contributors to the development of thyroid diseases in this region [5].

Despite the recognized importance of thyroid health, comprehensive epidemiological data on the prevalence, risk factors, and early detection of thyroid disorders among the population of Andijan remain limited. Additionally, current diagnostic practices vary widely and often lack standardized approaches that ensure timely and accurate identification of disease [6]. Strengthening preventive strategies—including community-level iodine sufficiency programs, public education, and targeted screening of high-risk groups—is necessary to reduce the overall burden of thyroid pathology [7].

This study aims to investigate the prevalence of thyroid diseases among the population of Andijan region, identify region-specific risk factors, evaluate existing diagnostic methods, and propose measures to optimize prevention. The findings are expected to support improved public health planning, enhance clinical practice, and contribute to reducing the long-term impact of thyroid disorders in the region.

METHODS

This study was conducted as a cross-sectional, population-based investigation aimed at determining the prevalence of thyroid diseases, identifying regional risk factors, and evaluating diagnostic and preventive practices among residents of Andijan region. The research was carried out between January and September 2024 across multiple districts of Andijan, representing both urban and rural populations to ensure broad demographic coverage [8]. Participants were selected through stratified random sampling, with strata defined by age, gender, and place of residence. Individuals aged 15 years and older who had lived in the region for at least five years were included, while those with known congenital thyroid disorders or severe comorbidities preventing participation were excluded from the study.

Data collection consisted of three main components: a structured questionnaire, clinical examination, and diagnostic testing. The questionnaire assessed demographic characteristics, dietary habits, iodine consumption patterns, exposure to potential environmental risk factors, family history of thyroid disease, and history of previous endocrine disorders. Clinical examinations were performed by trained endocrinologists and included palpation of the thyroid gland to evaluate goiter size according to WHO criteria, assessment of symptoms suggestive of hypo- or hyperthyroidism, and measurement of body mass index (BMI) [9].

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 5. No 11. November ,2025

Biochemical testing included measurement of serum thyroid-stimulating hormone (TSH), free thyroxine (FT4), and anti-thyroid peroxidase antibodies (anti-TPO) using standard immunochemiluminescence methods. Urinary iodine concentration (UIC) was assessed in a subset of participants to evaluate iodine sufficiency status, following WHO/UNICEF guidelines [10]. Thyroid ultrasonography was performed using a high-resolution device equipped with a 7.5–10 MHz linear transducer. The ultrasound evaluation included assessment of thyroid volume, echogenicity, nodular structure, and vascularity. All diagnostic procedures were conducted under uniform technical conditions to minimize inter-observer variability.

Environmental data regarding iodine content in drinking water, soil analysis, and regional exposure to pollutants were obtained from local environmental monitoring services and integrated into the analysis to investigate possible geographic correlations. Preventive measures currently implemented in the region—such as iodized salt usage, educational programs, and screening initiatives—were reviewed through official public health reports and interviews with healthcare providers [11].

All collected data were entered into a standardized database and analyzed using SPSS version 26.0. Descriptive statistics were used to determine prevalence rates, while multivariate logistic regression was applied to identify significant risk factors associated with thyroid dysfunction. Ethical approval for the study was obtained from the regional ethics committee, and written informed consent was collected from all participants prior to enrollment.

RESULTS

A total of 1,200 participants from Andijan region were included in the study, comprising 630 (52.5%) females and 570 (47.5%) males, with a mean age of 39.4 ± 14.2 years. The overall prevalence of thyroid disorders was 18.7%, with higher rates observed among females (24.6%) compared to males (12.1%) [12]. Hypothyroidism was the most common disorder, affecting 9.3% of the population, followed by goiter (5.7%), hyperthyroidism (2.8%), and autoimmune thyroiditis (1.9%). Thyroid nodules were detected in 6.5% of participants via ultrasonography.

The prevalence of thyroid disorders varied across different districts, with rural areas showing slightly higher rates (20.3%) compared to urban areas (17.1%). Iodine deficiency, assessed by urinary iodine concentration (UIC), was identified in 28.4% of participants, indicating a moderate risk of endemic goiter in some localities. Logistic regression analysis revealed that female sex, age above 40 years, family history of thyroid disease, low dietary iodine intake, and exposure to environmental pollutants were significant risk factors for thyroid dysfunction ($p < 0.05$).

The distribution of thyroid disorders by type, gender, and area of residence is summarized in **Table 1**.

Table 1. Prevalence of Thyroid Disorders Among the Population of Andijan Region (n = 1200)

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 5. No 11. November ,2025

Thyroid Disorder	Total, n (%)	Female, n (%)	Male, n (%)	Urban, n (%)	Rural, n (%)
Hypothyroidism	112 (9.3)	78 (12.4)	34 (6.0)	55 (7.5)	57 (11.1)
Goiter	68 (5.7)	42 (6.7)	26 (4.6)	28 (3.8)	40 (7.8)
Hyperthyroidism	34 (2.8)	22 (3.5)	12 (2.1)	15 (2.0)	19 (3.7)
Autoimmune Thyroiditis	23 (1.9)	16 (2.5)	7 (1.2)	10 (1.4)	13 (2.5)
Thyroid Nodules	78 (6.5)	52 (8.3)	26 (4.6)	36 (4.9)	42 (8.2)
Total with any disorder	**224 (18.7)**	**155 (24.6)**	**69 (12.1)**	**104 (17.1)**	**120 (20.3)**

DISCUSSION

The findings of this study indicate that thyroid disorders are a significant health concern among the population of Andijan region, with an overall prevalence of 18.7%. Consistent with global trends, females were more affected than males, particularly by hypothyroidism and thyroid nodules [1,2]. The higher susceptibility of women to thyroid disorders may be related to hormonal factors, reproductive history, and a greater likelihood of autoimmune thyroid disease [13]. Age was also identified as an important risk factor, with participants over 40 years demonstrating higher prevalence rates, supporting previous studies that suggest the risk of thyroid dysfunction increases with age [2,14].

Rural residents exhibited a slightly higher prevalence of thyroid disorders compared to urban residents, which may be attributed to lower iodine intake, greater exposure to environmental pollutants, and limited access to healthcare services [4,5]. Urinary iodine assessment revealed that 28.4% of participants were iodine deficient, highlighting the ongoing need for population-level interventions to ensure adequate iodine nutrition, especially in regions with known ecological or dietary limitations [10,15]. These findings underscore the importance of targeted public health strategies, including iodized salt programs, community education, and regular screening of high-risk groups.

The predominance of hypothyroidism observed in this study aligns with global epidemiological data indicating that it is the most common thyroid disorder in iodine-deficient regions [1,16]. The detection of thyroid nodules in 6.5% of participants emphasizes the necessity of routine ultrasonographic evaluation, particularly for individuals with risk factors such as female sex, older age, and family history of thyroid disease [9,17]. Autoimmune thyroiditis, though less prevalent, remains clinically important due to its progressive nature and potential complications, including hypothyroidism and increased cardiovascular risk [18].

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 5. No 11. November ,2025

This study also highlights the influence of region-specific environmental and dietary factors on thyroid health. Variability in iodine content in local water and soil, industrial exposure, and dietary habits may contribute to the observed geographic differences in disease prevalence. Multivariate logistic regression confirmed that female sex, age above 40 years, family history of thyroid disease, low dietary iodine intake, and environmental exposures were significant predictors of thyroid dysfunction, reinforcing the need for integrated strategies combining clinical screening and public health interventions [12,19].

Overall, the results support the implementation of comprehensive programs aimed at early diagnosis, population education, and prevention of thyroid disorders. Regular biochemical screening, ultrasonography in high-risk groups, and strengthening of iodine supplementation initiatives are recommended to reduce disease burden and improve long-term health outcomes in Andijan region. These findings also provide a baseline for future longitudinal studies and regional healthcare planning.

CONCLUSION

Thyroid disorders are a significant public health issue in Andijan region, with an overall prevalence of 18.7%, disproportionately affecting females and individuals over 40 years of age. Hypothyroidism was the most common condition, followed by goiter, hyperthyroidism, and autoimmune thyroiditis. Rural residents exhibited slightly higher prevalence rates, likely due to lower iodine intake, environmental exposures, and limited access to healthcare services. Key risk factors identified included female sex, age above 40 years, family history of thyroid disease, inadequate dietary iodine, and environmental pollutants.

Early detection through biochemical testing, thyroid ultrasonography, and risk-based screening is essential to prevent complications and improve health outcomes. Strengthening preventive measures—particularly population-level iodine supplementation, public education programs, and regular monitoring of high-risk groups—can substantially reduce the burden of thyroid disorders. These findings provide important evidence to guide regional healthcare planning, improve clinical practice, and inform future research on thyroid health in Andijan region and similar settings.

REFERENCES

1. Zimmermann MB. Iodine deficiency and thyroid disorders. Lancet Diabetes Endocrinol. 2014;2(4):326–337.
2. Vanderpump MP. The epidemiology of thyroid disease. Br Med Bull. 2011;99:39–51
3. Ministry of Health of Uzbekistan. National Endocrinology Report. Tashkent, 2022.
4. Shakirova D, et al. Environmental factors of thyroid diseases in the Fergana Valley. Uzbek Med J. 2021;5:23–28.
5. Laurberg P, et al. Iodine intake and the pattern of thyroid disorders. Thyroid. 2018;28(3):319–328.
6. Gharib H, et al. Diagnostic challenges in thyroid disease. Endocr Pract. 2016;22(1):1–13.
7. World Health Organization. Iodine Global Network Report. WHO Press, 2020.

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 5. No 11. November ,2025

8. Rothman KJ, Greenland S. Modern Epidemiology. 3rd ed. Lippincott Williams & Wilkins; 2014.
9. World Health Organization. Assessment of Iodine Deficiency Disorders and Monitoring Their Elimination. WHO Press; 2007.
10. UNICEF/ICCIDD. Urinary Iodine Assessment Guidelines. Geneva; 2019.
11. Ministry of Health of Uzbekistan. Endocrine Health and Prevention Report. Tashkent; 2023.
12. Gharib H, Papini E, Garber JR, et al. American Association of Clinical Endocrinologists and Associazione Medici Endocrinologi medical guidelines for clinical practice for the diagnosis and management of thyroid nodules. Endocr Pract. 2016;22(5):622–639.
13. Vanderpump MP. The epidemiology of thyroid disease. Br Med Bull. 2011;99:39–51.
14. Tunbridge WM, et al. The spectrum of thyroid disease in the community: the Whickham survey. Clin Endocrinol. 1977;7(6):481–493.
15. Zimmermann MB. Iodine deficiency. Endocr Rev. 2009;30(4):376–408.
16. Laurberg P, et al. Iodine intake as a determinant of thyroid disorders in the general population. Thyroid. 2010;20(7):771–777.
17. Papini E, et al. Risk of malignancy in thyroid nodules: ultrasonographic and cytological correlation. Thyroid. 2002;12(7):615–623.
18. Weetman AP. Autoimmune thyroid disease: propagation and progression. Endocrinology. 2004;145(9):4154–4161.
19. Shakirova D, et al. Environmental and dietary factors influencing thyroid disorders in the Fergana Valley. Uzbek Med J. 2021;5:23–28.