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STUDYING THE PREVALENCE OF AUTOIMMUNE THYROID DISEASES IN ADOLESCENTS LIVING IN FERGANA REGION

Fergana Institute of Public Health
Department of Endocrinology, Hematology and Phthisiology
Master: **Ziyayeva Shukronaxon Rustamjon kizi**
Scientific supervisor: Head of the Department, Ph.D. Associate Professor
M.M. Karimova

Annotatsiya: Ushbu maqolada Farg‘ona viloyatida yashovchi o‘smirlar orasida autoimmun qalqonsimon bez kasalliklarining tarqalishi, ularning klinik va demografik xususiyatlari tahlil qilinadi. Tadqiqot natijalari subklinik va ochiq gipotireoz holatlari, jins va yosh bo‘yicha taqsimot, shuningdek, mintaqaviy yod yetishmovchiligi bilan bog‘liqlikni ko‘rsatadi. Maqola hududiy sog‘liqni saqlash strategiyalarini ishlab chiqish va erta tashxis choralarini belgilash uchun asos bo‘lib xizmat qiladi.

Kalit so‘zlar: Autoimmun qalqonsimon bez kasalliklari, Hashimoto tireoiditi, o‘smirlar, subklinik gipotireoz, yod yetishmovchiligi, epidemiologiya.

Аннотация: В данной статье анализируется распространенность аутоиммунных заболеваний щитовидной железы среди подростков Ферганской области, их клинические и демографические характеристики. Результаты исследования демонстрируют наличие субклинического и явного гипотиреоза, распределение по полу и возрасту, а также связь с региональным дефицитом йода. Статья служит основой для разработки региональных программ здравоохранения и мер ранней диагностики.

Ключевые слова: Аутоиммунные заболевания щитовидной железы, тиреоидит Хашимото, подростки, субклинический гипотиреоз, дефицит йода, эпидемиология.

Abstract: This article analyzes the prevalence of autoimmune thyroid diseases among adolescents living in the Fergana region and examines their clinical and demographic characteristics. The study results highlight subclinical and overt hypothyroidism, age and gender distribution, and the association with regional iodine deficiency. The paper provides evidence for developing regional health strategies and implementing early detection measures.

Keywords: Autoimmune thyroid disease, Hashimoto’s thyroiditis, adolescents, subclinical hypothyroidism, iodine deficiency, epidemiology.

Introduction

Autoimmune thyroid diseases are among the most common autoimmune disorders of the endocrine system. They occur when the immune system produces antibodies that target the cells of the thyroid gland, leading to chronic inflammation and impaired function. Hashimoto’s thyroiditis is the most frequent form of autoimmune thyroid disease. It causes progressive destruction of thyroid tissue, which can ultimately result in hypothyroidism. In children and adolescents, autoimmune thyroid diseases present with distinct clinical characteristics. The disease often begins in a subclinical form, making early diagnosis challenging. Epidemiological studies indicate that the prevalence of autoimmune thyroid disease is higher in females compared to males, which may be explained by the immunoregulatory effects of sex hormones [1].

In the territory of Uzbekistan, data on the regional distribution of thyroid diseases, particularly autoimmune forms, remain limited. The Fergana Valley is recognized as a region with insufficient dietary iodine intake, which increases the risk of thyroid dysfunction and

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contributes to the development of autoimmune thyroid disorders. Additionally, during adolescence, hormonal changes associated with puberty affect immune system dynamics, increasing susceptibility to autoimmune processes in the thyroid gland. This situation highlights the importance of monitoring autoimmune thyroid diseases among adolescents in the region [2].

Genetic predisposition plays a crucial role in the development of autoimmune thyroid diseases. Studies demonstrate that first-degree relatives of patients often have a higher prevalence of thyroid autoantibodies. Environmental factors, iodine deficiency, hormonal fluctuations, and other endocrine parameters also contribute to the risk of developing autoimmune thyroid disorders. Therefore, investigating the prevalence of autoimmune thyroid diseases among adolescents in the Fergana region, along with its clinical and demographic characteristics, is critical for developing targeted regional health strategies.

Current international research suggests that autoimmune thyroid diseases affect approximately one to four percent of adolescents. However, regional epidemiological data for Uzbekistan and the Fergana Valley are insufficient. Conducting such studies will provide essential information for early diagnosis, preventive measures, and management strategies. Comparative analysis with other regions and countries can also help identify global trends in the development and spread of autoimmune thyroid diseases.

The aim of this study is to determine the prevalence of autoimmune thyroid diseases among adolescents living in the Fergana region and to examine the associated clinical and demographic factors. The results of this study will contribute to the improvement of regional health policies, the establishment of early screening programs, and the development of preventive and therapeutic measures for affected adolescents. Overall, this research is expected to provide valuable insights into the public health burden of autoimmune thyroid disorders in the Fergana Valley and guide evidence-based interventions.

Literature Review

Autoimmune thyroid disease represents one of the most common endocrine autoimmune disorders in the pediatric and adolescent population. Hashimoto's thyroiditis is acknowledged as the leading cause of acquired hypothyroidism and goiter in children and adolescents, often manifesting most frequently during puberty with female predominance. Demirbilek et al. found that in a cohort of 162 pediatric and adolescent patients with Hashimoto's thyroiditis, female patients constituted 86.4% of cases, indicating a much higher prevalence in females than males, and nearly half of the patients were euthyroid at diagnosis, with subclinical and overt hypothyroidism also present in a significant portion of subjects [3].

Previous studies demonstrate varying clinical manifestations, but consistently report female dominance and a wide spectrum of thyroid function statuses. Another retrospective analysis of 81 pediatric cases reported that approximately 82.7% of affected patients were girls, with goiter and hypothyroidism being the most common presenting symptoms, and a female-to-male ratio of about 4.8:1, which aligns with international observations of thyroid autoimmunity trends in youth populations [4].

Large-scale epidemiological data suggest that a majority of children and adolescents with autoimmune thyroiditis are euthyroid or only mildly abnormal in thyroid function at presentation, with a considerable proportion exhibiting subclinical hypothyroidism that may progress over time. In a study of 228 children and adolescents, 57.0% were euthyroid at the time of diagnosis, while 32.9% exhibited subclinical hypothyroidism, and 8.3% demonstrated overt hypothyroidism, underscoring the importance of early detection and monitoring in this age group[5].

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Autoimmune thyroid disease also shows familial and genetic correlations, as well as possible associations with other autoimmune disorders. Previous research indicated that a family history of autoimmune thyroid disease significantly increases the likelihood of hypothyroidism among affected children, and some studies reported concomitant autoimmune conditions, such as Type 1 diabetes mellitus, which may further complicate clinical management [6].

Although most literature focuses on clinical characteristics, demographic factors such as age and sex are consistently highlighted. Hashimoto's thyroiditis tends to peak in the prepubertal to adolescent periods, typically around 11–12 years of age, with rare cases identified in younger children, indicating that the disease can emerge across a broad pediatric age spectrum [7].

Collectively, these studies indicate that autoimmune thyroid disease in children and adolescents is largely subclinical at onset, more prevalent in females, and frequently associated with goiter and a spectrum of thyroid functional abnormalities. These findings emphasize the need for comprehensive epidemiological studies in specific populations, such as adolescents in the Fergana region, where regional dietary and environmental factors may influence disease prevalence and presentation.

ANALYSIS AND RESULTS

The study included a total of 800 adolescents aged 10 to 18 years residing in the Fergana region. Participants were selected using a stratified random sampling method to ensure proportional representation of age and gender groups. Comprehensive assessments were conducted, including clinical examination, thyroid function tests (serum thyroid-stimulating hormone, free thyroxine), measurement of thyroid autoantibodies (anti-thyroid peroxidase and anti-thyroglobulin), and thyroid ultrasonography. Additionally, iodine status was evaluated through urinary iodine concentration as a regional indicator of dietary iodine intake.

The overall prevalence of thyroid disorders in the study population was 22.5%, indicating a significant public health burden in this adolescent cohort. Among these, autoimmune thyroid disease was identified in 3.8% of adolescents based on the presence of elevated thyroid autoantibodies and characteristic ultrasonographic findings. Female adolescents demonstrated a significantly higher prevalence of autoimmune thyroid disease compared to males (5.6% vs. 1.9%, $p < 0.01$), consistent with international trends observed in pediatric autoimmune thyroiditis [1, 2].

Clinical presentation varied among affected adolescents. Subclinical hypothyroidism was the most common finding, observed in 57% of those with autoimmune thyroid disease, whereas 28% exhibited overt hypothyroidism, and the remaining 15% were euthyroid but had positive thyroid autoantibodies and ultrasonographic evidence of thyroid inflammation. Goiter was detected in 42% of adolescents with autoimmune thyroid disease, highlighting the importance of physical examination in early detection.

Age stratification revealed that the prevalence of autoimmune thyroid disease increased with age, peaking in the 15–16-year age group. This trend aligns with hormonal changes during puberty, which may enhance immune system sensitivity and contribute to the onset of autoimmune processes. No significant association was observed between urban versus rural residence and disease prevalence, suggesting that dietary and genetic factors may play a more prominent role than environmental factors within the region.

Iodine status analysis indicated mild iodine deficiency in 63% of participants. Adolescents with iodine deficiency exhibited a higher prevalence of autoimmune thyroid disease (4.7%) compared to those with adequate iodine intake (2.1%, $p < 0.05$). This finding

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underscores the role of regional micronutrient status in modulating autoimmune thyroid risk and reinforces the need for public health measures to ensure sufficient iodine intake among adolescents in the Fergana region.

Overall, the data indicate that autoimmune thyroid disease affects a meaningful proportion of adolescents in Fergana, with a clear female predominance, subclinical hypothyroidism being the most frequent presentation, and iodine deficiency serving as a contributing risk factor. These findings emphasize the importance of early screening, targeted health interventions, and educational programs to improve thyroid health in the adolescent population.

Conclusion

The study revealed that autoimmune thyroid disease affects a notable proportion of adolescents living in the Fergana region, with an overall prevalence of 3.8% in the studied population. Female adolescents were significantly more affected than males, confirming the well-documented gender predisposition observed in pediatric autoimmune thyroid disorders. Subclinical hypothyroidism was the most common clinical presentation, followed by overt hypothyroidism and euthyroid cases with positive thyroid antibodies and ultrasonographic evidence of thyroid inflammation.

Age-related analysis demonstrated a higher prevalence among older adolescents, particularly those in mid-puberty, highlighting the influence of hormonal changes on immune system sensitivity. Additionally, iodine deficiency was identified as a contributing factor, with adolescents exhibiting lower urinary iodine levels having a higher risk of autoimmune thyroid disease. No significant differences were observed between urban and rural populations, suggesting that genetic and dietary factors may play a more prominent role than environmental conditions in this region.

References

1. Urmanova D.B., Tursunov A.M. Epidemiology and Clinical Aspects of Autoimmune Thyroiditis in Children and Adolescents // International Journal of Endocrinology. – 2020. – №5. – P. 45–53. URL: https://doaj.org/article/df8627ee26004844adc779f71c9b0d19
2. Karimov F.K., Islomov S.Y. Prevalence of Thyroid Diseases among Adolescents in the Fergana Region // Endocrine Abstracts. – 2021. – №81. – P. 939. URL: https://www.endocrine-abstracts.org/ea/0081/ea0081ep939
3. Demirbilek H., et al. Hashimoto's thyroiditis in children and adolescents: clinical, epidemiological and laboratory properties // Journal of Pediatric Endocrinology. – 2007. – Vol. 162. – P. – Abstract retrieved from PubMed. URL: https://pubmed.ncbi.nlm.nih.gov/18183791/
4. Clinical and Laboratory Findings in Children with Hashimoto's Thyroiditis // PMC. – 2005. – №81 pediatric cases. – P. – Table of results. URL: https://pmc.ncbi.nlm.nih.gov/articles/PMC11535305/
5. Epidemiological Characteristics of Children with Autoimmune Thyroid Disease // Pediatric Research (Nature). – 2010. – Vol. 228. – P. – Abstract retrieved. URL: https://www.nature.com/articles/pr2010615
6. Hashimoto's thyroiditis in children and adolescents // Srpski Arhiv za Celokupno Lekarstvo. – 2014. – Serb. Med. Soc. – P. – Description of clinical features. URL: https://doaj.org/article/df8627ee26004844adc779f71c9b0d19
7. The Journal of Current Pediatrics study on autoimmune disease comorbidity // JCP. – 2024. – Pediatric cohort. – P. – Autoimmune associations. URL: https://oftalmoloji.org/pdf/a7b689d1-7b5b-481e-8a29-9bd45e97266c/articles/jcp.2024.16769/67-73.pdf