

## REVIEW

by Associate Professor Dr. Tsvetoslav Antonov Georgiev, PhD,  
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*Regarding:* Doctoral dissertation for the award of the educational and scientific degree  
"Doctor" on the topic: "Body composition, biochemical indicators, grip strength, and walking  
speed in women with hyperthyroidism" within the doctoral program "Endocrinology,"  
professional field 7.1 "Medicine," higher education area: 7. "Healthcare and Sports"

**Author of the dissertation:** Dr. Gergana Tosheva Marinova

**Scientific supervisor:** Associate Professor Dr. Mira Valentinova Siderova, PhD

By order No. R-109-100/28.01.2025 of the Rector of the Medical University "Prof. Dr.  
Paraskev Stoyanov" – Varna, based on a decision of the Faculty Council of the Faculty of  
Medicine, I have been appointed as an internal member of the scientific jury evaluating the  
dissertation of Dr. Gergana Tosheva Marinova on the topic "Body composition, biochemical  
indicators, grip strength, and walking speed in women with hyperthyroidism."

### 1. Relevance and Significance of the Topic

Hyperthyroidism is a widespread endocrine disorder that affects metabolism, muscle function, and body composition. Despite significant clinical interest in the disease, the relationship between hyperthyroidism and changes in body composition, muscle strength, and physical activity has not been sufficiently studied. It is also unclear which diseases may lead to the development of so-called "secondary" sarcopenia. Through her dissertation, Dr. Gergana Tosheva Marinova successfully fills this "gap" in applied science and endocrinology by investigating important aspects of hyperthyroidism concerning the potential risks of developing secondary sarcopenia.

The analysis of the impact of hormonal imbalance on body composition and the assessment of changes in muscle mass, strength, and functional capacity in patients with hyperthyroidism are crucial for the treatment of patients with thyroid dysfunction and their comorbidities. By utilizing modern analytical methods, including dual-energy X-ray absorptiometry (DXA) and bioelectrical impedance, her dissertation provides new insights into the potential mechanisms associated with muscle mass and strength loss.

## **2. Scope and Structure of the Dissertation**

The dissertation consists of 150 pages, including 38 tables and 53 figures. The bibliography comprises 325 sources, of which 312 are in Latin script and 13 in Cyrillic. The dissertation is logically structured and contains all necessary components – introduction, literature review, objectives and tasks, materials and methods, results, discussion, conclusions, and contributions.

Dr. Gergana Tosheva Marinova aims to evaluate the relationship between hyperthyroidism in women and body composition, grip strength, and walking speed. The objective of the dissertation is precisely and clearly defined. The research within the dissertation aligns with this objective. Accordingly, eight specific research tasks have been formulated, each directly corresponding to the stated objective.

## **3. Main Scientific Results and Contributions**

The doctoral candidate conducted a precise cross-sectional study involving 90 participants, divided into groups according to their thyroid status. The results have significant clinical value and can contribute to improved treatment and monitoring of patients with thyroid hyperfunction. Despite the large number of findings, I believe the key results can be summarized as follows:

- Women with hyperthyroidism have significantly lower body mass, muscle tissue, and bone mass compared to healthy controls.
- A significant relationship has been established between hyperthyroidism and reduced muscle strength, as measured by the grip strength test.
- Patients with hyperthyroidism exhibit slower walking speeds, which is a risk factor for disability.
- The study highlights the risk of secondary sarcopenia among women with hyperthyroidism, identifying its prevalence and the threshold age beyond which the risk increases.

To be comprehensive and impartial in evaluating this dissertation, I would offer a critical remark to the doctoral candidate. The dissertation contains an excessively large number of conclusions (twenty-one), which are excellent findings but not necessarily concise judgments that summarize specific data while introducing new knowledge. Some of the conclusions also extend beyond the scope of the defined research tasks. I would recommend



that in future scientific work, Dr. Tosheva synthesizes her results into a smaller number of specific and focused conclusions.

#### **4. Quality of the Methodology**

Dr. Gergana Tosheva Marinova's dissertation is an in-depth and well-structured scientific study with clear and practically applicable results, achieved through a well-designed methodology and precise execution. The topic is relevant, the methodology is appropriate, and the conclusions drawn are scientifically substantiated.

The dissertation presents a set of methods that provide a detailed and objective analysis of the relationship between hyperthyroidism, body composition, and physical indicators. The conducted cross-sectional "case-control" study includes a broad range of anthropometric, biochemical, and hormonal assessments, as well as functional tests such as grip strength measurement and walking speed. The precise application of modern methodologies, including bioelectrical impedance analysis and standard laboratory tests, demonstrates the high scientific value of the study.

The combination of physiological, laboratory, and instrumental methods is excellently selected and justified, while the interpretation of data is detailed and objective. There are no significant remarks regarding the employed methods—they are adequate, well-grounded, and aligned with contemporary scientific standards in endocrinology. The statistical analysis enhances the quality of the research by enabling Dr. Gergana Tosheva Marinova to derive objective and well-founded conclusions from the collected data. This contributes to the significance of the dissertation and its applicability in real-world settings. I consider the statistical methods used to be appropriate for addressing the objectives and tasks of the dissertation.

#### **5. Publications and Scientific Activity**

The doctoral candidate has published four full-text scientific articles related to the dissertation topic, confirming the study's significance and scientific value. Notably, Dr. Tosheva combines different research approaches by publishing both original scientific articles and review materials, enriching the understanding of the studied problems. Additionally, Dr. Tosheva has presented one paper at a national congress and three at international congresses.

#### **6. Conclusion**

In conclusion, I can summarize that Dr. Gergana Tosheva Marinova has carefully selected her study subjects, conducted a thorough investigation and analysis of the results, and

successfully discussed them within the context of existing global literature on this issue. The innovative research conducted, the obtained results, and the evident relevance of the topic provide sufficient grounds for me to give a high evaluation of the presented dissertation on "Body composition, biochemical indicators, grip strength, and walking speed in women with hyperthyroidism."

I confidently vote in favor of awarding the educational and scientific degree "Doctor" to Dr. Gergana Tosheva Marinova and recommend that the esteemed members of the scientific jury also cast a positive vote.

24.02.2025

Signature: ..

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/Assoc. Prof. Dr. Tsvetoslav Georgiev, PhD/