

## OPINION

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**Subject:** Dissertation paper for acquiring the educational and scientific degree "PhD" in the field of higher education 7. Healthcare and sports, professional direction 7.1. Medicine, Ph.D. program "Angiology."

**Author:** Dr. Polyana Todorova Antova

**Form of doctoral studies:** Independent preparation

**Scientific unit:** Clinic of Angiology,

**Topic:** "Peripheral arterial disease of the lower extremities in women - risk profile, clinical presentation, outcome of the disease"

**Research supervisor:** Prof. Dr. Milena Staneva, Ph.D.

### 1. General presentation of the procedure and the doctoral student

When writing the dissertation, requirements for the procedure in terms of dissertation ability, choice of topic, internal defense, and selection of a Scientific Jury were observed. The dissertation paper was discussed and proposed for defense by an extended Scientific Collegium of Angiology Clinic at Acibadem City Clinic UMHAT Tokuda. At a meeting of the Scientific Council of "Acibadem City Clinic UMHAT Tokuda" EAD (Protocol 47/01.06.2023) and by order No. 15-05-99/09.10.2023 of the Executive Director and the Procurator of the hospital, I am appointed as an external member of The scientific jury in connection with the dissertation paper of Dr. Polyana Antova. I am determined to submit an Opinion.

No plagiarism was detected from the submitted reference Metadata StrikePlagiarism.com.

I declare that I have no conflict of interest with the author of the dissertation.

Dr. Polyana Todorova Antova was born in 1986 in Vratsa. He graduated medicine from the Medical University of Sofia in 2011. From 2012 until 2016, she was a specialist in Angiology at the Clinic of Cardiology and Angiology, then at the Clinic of Vascular Surgery and Angiology of the MCHAT Tokuda Hospital Sofia. Dr. Antova acquired a specialty in "Angiology" in June 2016 in Medical University of Sofia, and in the same year, she also acquired a certificate in "Ultrasound Vascular Diagnostics" from Medical University of Sofia. Since 2017,

works in the Angiology Clinic at "Acibadem City Clinic UMHAT Tokuda" EAD. There are specializations in Angiology at home and abroad.

She is a member of the Bulgarian Society of Angiology, the Bulgarian Association of Neurosonology and Cerebral Hemodynamics, the Bulgarian Association of Ultrasound in Medicine, the Scientific Council of "Acibadem City Clinic UMHAT Tokuda" EAD from September 2021 to June 2023.

## **2. Relevance of the topic**

Cardiovascular disease (CVD) is a leading cause of morbidity and mortality worldwide. One of the main clinical forms is peripheral arterial disease of the limbs (PAD). Some studies have shown that even after diagnosis of PAB patients, sex-related differences in treatment and disease outcome are present. The topic is relevant from a practical point of view.

## **3. Knowing the problem**

The doctoral student knows the state of the problem and creatively evaluates the literary material.

## **4. Research methodology**

The chosen research methodology allows for achieving the set goal and getting an adequate answer to the tasks solved in the dissertation work.

## **5. Characterization and evaluation of the dissertation work and contributions**

The dissertation is written in 146 pages, illustrated with 22 figures and 48 tables. It is appropriately structured and includes the following sections: Abbreviations and symbols used - 2 pages; Introduction – 2 pages; Literature review – 26 pages; Aim and tasks – 1 page; Material and methods – 7 pages; Own results – 62 pages; Discussion and Conclusion – 23 pages; Conclusions and recommendations – 3; Bibliography - 18 pages; The bibliographic reference contains 218 literary sources, of which five are in Cyrillic, and 213 are in English.

In the *introduction*, the problem is well formulated, and the purpose of the dissertation work is justified.

The *literature review* is well structured in accordance with the developed topic. It is competently written and shows a good knowledge of the problem under consideration in its various aspects. The importance of risk factors for the development of atherosclerosis, the clinical manifestations of peripheral arterial disease (PAD) of the extremities, as well as some gender-related features of the presentation are discussed. It is known that published studies on PAD include fewer women than men.

*The aim* of the dissertation work is well formulated in accordance with the topic of the dissertation and the presented literature review. The present work aims to determine the risk profile, features of the course, and outcome of the disease in patients with peripheral arterial disease of the limbs, with a view to determining the influence of the female gender and developing a personalized algorithm for diagnosis, treatment, and follow-up in the female gender. The set tasks, 7 in total, are completely sufficient and are fully implemented in the dissertation work.

In the "*Materials and methods*" section. 200 patients with PAD - 100 women and 100 men - studied for the period 2017-2022 are described in detail. The subjects were aged from 38 to 92 years, with an average age of 68 years  $\pm$ 10. The methods describe in detail the risk factors, methods of research, therapy, and follow-up in patients with PAD, comparing the features of the course in men and women. The statistical processing of the data used appropriate methods and specialized statistical package SPSS (Statistical Package for the Social Sciences) version 16.0, which guarantees the reliability of the obtained results.

*Results and discussion:* The results presented are convincing and clear, and the data obtained are analyzed and compared, where possible, with other publications on the topic. The importance of risk factors, methods of diagnosis, treatment, and follow-up in both sexes are described. Numerous qualitative and quantitative indicators related to the type of treatment and the clinical course are presented in detail when comparing men and women.

*Conclusions and contributions:* Based on the obtained results, Dr. Antova logically draws conclusions specific to women with PAD, which correspond to the tasks set. The more important ones are:

1. Women with PAD are older than men with PAD and are less likely to have a history of the disease when it is reported.
2. Women with PAD more often have accompanying arthropathy, neuropathy, and carotid pathology. They more often take analgesics and less often anticoagulants compared to men.
3. Women with PAD are more often in a more advanced stage of the disease at its initial diagnosis and have not experienced previous vascular interventions. In them, revascularization treatment was performed less frequently.
4. Women appear less frequently for follow-up examinations than men.

Based on the conclusions, recommendations were developed for women with PAD for prevention and diagnosis, which is the biggest contribution of this work. The contributions are six original - 1 of a theoretical and 5 of an applied nature.

**6. The abstract** reflects what was written in the dissertation paper. In accordance with the academic requirements, it presents the contributions, and a list of publications related to the dissertation work is attached.

**7. Assessment of the publications and personal contribution of the doctoral student**  
The PhD student has submitted two publications in national journals and two scientific communications at national scientific forums, one of which has been published in a journal with IF. In 1 publication, Dr. Antova is the first author and independent author in 1 publication and two communications. This scientific activity is sufficient to show that the doctoral student is consistent in his scientific activity and exceeds the national minimum requirements for the educational and scientific degree of "PhD".

## CONCLUSION

The dissertation contains scientific-theoretical and scientific-applied results that represent an original contribution to science, expanding our knowledge in the field of multifocal atherosclerosis and Angiology. It is written in a strictly scientific style. It meets all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for the Implementation of LDASRB, and the Regulations of "Acibadem City Clinic UMHAT Tokuda" EAD. The presented materials and dissertation results fully comply with the specific requirements adopted in connection with the Regulations of "Acibadem City Clinic UMHAT Tokuda" EAD for the application of LDASRB.

Dr. Polya Todorova Antova is a specialist in Angiology with over 10 years of work experience. The doctoral student shows qualities and skills for independent conduct of scientific research.

Due to the above, I give my *positive assessment* and strongly recommend to the members of the Scientific Jury to positively assess the dissertation paper "Peripheral arterial disease of the lower extremities in women - risk profile, clinical presentation, outcome of the disease" and to award dr Polya Todorova Antova the scientific and educational degree "PhD" in the field of Higher Education 7. Health care and sports, professional direction 7.1. Medicine, Doctoral Program "Angiology"

31.10.2023

City of Sofia

Prepared the opinion:

Prof. Dr. Dobrin Vassilev, PhD

