

To

To the Chairman of the Scientific Jury

Appointed to the Minutes of P-109-268/05.08.2024

Please find attached: **REVIEW**

Regarding: Doctoral thesis on **CT ASSESSMENT OF ABDOMINAL ADIPOSE TISSUE, BONE DENSITY AND SARCOPENIA** by Dimitrina Nikolova Markova, MD, for awarding the educational and scientific degree “Philosophy Doctor”

Medical University "Prof. Dr. Paraskev Stoyanov" – Varna

Department of Imaging Diagnostics and Interventional Radiology

Faculty of Medicine

7.1. Medicine – professional field

7. Healthcare and sports – higher education area

PhD study format – full-time

Research Supervisor: **Assoc. Prof. Chavdar Bachvarov, MD, PhD**

Reviewer: Prof. Nachko Iliev Totsev, MD, PhD – Head of the Department of Imaging Diagnostics and Treatment at MU-Pleven

St. Marina University Hospital – Pleven, West Industrial Zone

88 Bulgarian Aviation Str.

e-mail: nitotsev@gmail.com

I received all the necessary documentation – paperwork and digital content, in time. There are no conflicts of interest on my part, and I have not detected any plagiarism.

The review is written following the requirements of the Academic Staff Development in the Republic of Bulgaria Act.

1. Brief biographical data and career profile

Dimitrina Markova, MD, was born on July 11th, 1981. In 2000, she graduated from the Tech School of Veterinary Medicine, Lovech. In 2003 she graduated from the Medical College – Pleven, with a degree in Rehabilitation. From 2005 to 2011 she studied at the Medical University – Pleven, majoring in Medicine. In 2011 she graduated with honours and a Master's in medicine from the Medical University – Pleven. From November 2011 to May 2015, she worked as a resident physician at the Department of Diagnostic Imaging and the Emergency Room at Dr. Bratan Shukerov Hospital – Smolyan. From 27/05/2015 to 17/09/2018 she worked as a physician at the Clinic of Imaging Diagnostics, St Marina University Hospital – Varna. Since September 2018 till now, she has been an assistant physician at the Clinic of Imaging Diagnostics, St Marina University Hospital – Varna. In 2018 she acquired her CCST in Imaging diagnostics. Since 17.09.2018 she has been an assistant professor at the Department of Imaging Diagnostics, Interventional Radiology and Radiotherapy. On November 2nd, 2020 she was enrolled as a full-time doctoral student in the same department. Her research interests are in the areas of breast imaging, abdominal imaging, imaging of the female pelvis and paediatric imaging.

Upon the successful conclusion of the designated personal training and research schedule, the doctoral student was discharged with the right to defence by the Rector's Order № R-109-268/05.08.2024.

2. General description of the thesis and submitted materials

Dr. Markova has effectively communicated her thesis in clear language and concise style. The separate sections are well-sequenced and interconnected. The thesis contains 208 pages, divided into the following sections: Introduction – 2 pages, Literature Review – 72 pages, Aim, Tasks and Hypothesis – 1 page, Materials and Methods – 9 pages, Results and Discussion – 64 pages, Findings – 2 pages, Conclusion – 2 pages, Contributions – 1 page, Participations in projects, thesis-related publications and participations in scientific forums – 1 page, and Bibliography – 41 pages. The thesis is well illustrated with 4 tables and 82 figures. There are 511 references, with one in Cyrillic and 510 in Latin.

In collaboration with the project **“Clinical Significance of Abdominal Visceral Adipose Tissue in Patients with Respiratory Disorders during Sleep”**, headed by Prof. Diana

Petkova, MD, PhD, 96 patients were examined by low-dose abdominal CT. The patients were examined at the Clinic of Imaging Diagnostics at St. Marina University Hospital – Varna. They were divided into four groups:

- 1) Patients with colorectal carcinoma – 22 patients;
- 2) Patients with lung cancer – 18 patients;
- 3) Patients with chronic pancreatitis – 20 patients;
- 4) Control group – 36 patients.

The first three groups of patients were selected retrospectively and examined using Siemens Spirit, Somatom Definition, and Somatom Force CT scanners. The control group was examined prospectively using a Siemens Somatom Force CT scanner.

The statistical software package IBM SPSS for Windows, v.20.0 was used for data processing.

3. Aim of the thesis and relevance of the subject

The thesis subject is relevant and mirrors the advancements in the world of medical practice in the field of imaging diagnostics focusing on individual approaches in patient treatment and personalised medicine.

The thesis aims to evaluate the indices of abdominal adipose tissue, bone density and sarcopenia using low-dose abdominal CT and to analyse the correlation between them in patients with colorectal carcinoma, lung cancer and patients with chronic pancreatitis.

The aim was clearly defined, and the main tasks were well formulated and met the stated goal.

The study's results are described comprehensively and correctly and are quite sufficient to meet the stated objectives.

The statistical methods used are correct and adequate to the data with good and understandable analysis and reliability. The doctoral student shows proficiency in comparative analysis and assessment.

The discussion defines the author's conclusions from the results which are compared with the literature data. The thesis reflects Dr. Markova's meticulous preparation for the task.

The conclusions from one's research are carefully and precisely defined.

The results and discussion are presented on 57 pages using tables, figures (graphs and photographs) and statistical analysis.

4. Thesis structure

The thesis is methodically divided into several sections, the first of which is the literature review. It includes detailed information on obesity, osteoporosis and sarcopenia, and discusses in depth the role of imaging diagnostics and the implementation of contemporary approaches for more precise patient diagnosis.

The thesis summary is structured as required in 74 pages; it is well illustrated and fully reflects the main results achieved in the thesis. Its structure follows that of the thesis – of course, without the literature review. It provides a precise and authentic overview of the author's scientific research, findings, and contributions. Both, the thesis summary and the thesis share the same technical and literary characteristics. The statistical analysis is well-described and logically structured.

Dr. Markova has drawn 6 conclusions from her research. She has responsibly and critically analysed the imaging methods used in the study sample and the correlations to abdominal adipose tissue. The results of the study are consistent with public data in the literature.

5. Thesis contributions

There are 8 contributions, which are divided into three groups: theoretical – 1, applied – 5 and original – 2:

For the first time in Bulgaria, a CT study was performed to assess abdominal adipose tissue, bone density and sarcopenia in patients with cancer and chronic pancreatitis.

For the first time in Bulgaria, the correlation between the CT assessment measurements of abdominal adipose tissue, bone density and sarcopenia was described.

I acknowledge the 8 contributions as formulated.

6. Thesis-related scientific publications

There are 3 publications related to the subject of Dr. Markova's thesis, including one participation in a project and participation in two scientific forums.

PARTICIPATION IN PROJECTS RELATED TO THE THESIS

“Clinical Significance of Abdominal Visceral Adipose Tissue in Patients with Respiratory Disorders during Sleep”, headed by Prof. Diana Petkova Gospodinova-Vulkova, MD, PhD,

THESIS-RELATED PUBLICATIONS

1. Georgi Valchev, Dimitrina Markova, Daniela Kaloyanova, Summer El Shemeri, Sofia Chausheva, Mariana Yordanova. ***Visualization and post-processing of medical images – MPR, MIP, VRT, segmentation. Nature and application.*** Varna Medical Forum, Vol. 10, 2021, Annex 1; 64–72.
2. Dimitrina Markova, Georgi Valchev, Tanya Dobрева-Kuncheva. ***Application of diagnostic imaging methods in the study of the impact of sleep apnea on abdominal adipose tissue. Literature review*** – Health & Science, 2023, Year XII, Issue 3–4 (045–046), pp. 259–261.
3. Dimitrina Markova, Georgi Valchev. ***Imaging methods for the diagnosis of sarcopenia.*** Varna Medical Forum, vol. 12, 2023, issue 1, pp. 12–20

PARTICIPATION IN SCIENTIFIC FORUMS

1. IX Scientific Session of the Medical College Varna, 26/03/2021, Varna
2. Jubilee Scientific Conference “Traditions and Future in Medical Education” with international participation, 21/03/2023, Sofia

7. Conclusion

It is clear from the information provided that Dr. Markova has a strong understanding of the latest advancements, not just in theory, but also as an established specialist in Imaging Diagnostics, which enables her to make a focused practical application of the results obtained. Dr. Markova has an analytical approach to evaluating the literature. She has mastered and can successfully and independently use statistical methods in the application of research methodologies. She demonstrates an excellent professional background and command of the material, which enables her to draw meaningful conclusions for scientific and clinical practice. She has sufficient publications and research activity related to her thesis.

The thesis fully complies with the requirements of the Act and the Regulations for its implementation for awarding the educational and scientific degree “Philosophy Doctor”.

I am confident in my choice to vote in favour and to suggest to the esteemed members of the Scientific Jury, appointed by the Rector of MU-Varna, to cast a POSITIVE VOTE for awarding the educational and scientific degree “Philosophy Doctor” to Dimitrina Nikolova Markova, MD, for the presented thesis on CT ASSESSMENT OF ABDOMINAL ADIPOSE TISSUE, BONE DENSITY AND SARCOPENIA.

13/09/2024

Pleven

Prepared the review:

Заличено на основание чл. 5,
§1, б. „В“ от Регламент (ЕС)
2016/679

(Prof. Nachko Totsev, DM, PhD)