RECENSION

*From **ACAD. LACHEZAR TRAYKOV, PHD***

Academic of Bulgarian academy of sciences

Rector of Medical University - Sofia

Head of Department of neurology, MU - Sofia

Neurology clinic, UMHAT "Alexandrovska"

Member of Science jury (Protocol №НС-02-21/28.04.2021) and Order № РД-26-1166/05.05.2021 from the Executive Director of UMHATEM "N.I.Pirogov"

Concerning: Competition for associate professor in the area of higher education 7. Healthcare and sport in professional direction. 7.1 Medicine and scientific specialty "Neurology", announced in CN, num.19 from 05.03.2021.

The recension of the materials presented in the competition, is based on the requirements of the Law for the development of the academic staff in the Republic of Bulgaria, the Regulations for its application, as well as the Regulations for the conditions for acquiring scientific degrees and holding academic positions and Quality development criteria. of the academic staff of UMHATEM "N. I. Pirogov".

The recension was prepared on the basis of a Decision from a Meeting of the Scientific Jury and Protocol №1 / 10.05.2021. No procedural violations were found.

In account to my participation as a member of the scientific jury, I declare that:

- There is no Conflict of interests;

- I have not found any violations in the course of the competition so far and I have no remarks on the materials provided to me for recension.

Documents for participation in the competition were submitted by only one candidate – Dr. Mariya Ivanova Dimitrova, MD, PhD.

1. Biography of the candidate

Dr. Mariya Dimitrova graduated in Medicine at the Medical University - Sofia in 2007 (diploma № 020430 / 14.11.2007). She has started work as a physician in 2008, when she was enrolled in a specialization in neurological diseases after a competition. In 2013 she acquired a specialty in neurological diseases (diploma № 013989 / 1.06.2013), and in 2014 a certificate for highly specialized activity in "Neurosonology" (№3370). For the period 2013-2018 she successively held the positions of ordinator and assistant at the Clinic of Neurological Diseases of the Military Medical Academy. In 2018 she defended her dissertation on "Neuropsychological disorders in obstructive sleep apnea" with supervisor Prof. Krassimir Genov and scientific consultant - Acad. Lachezar Traykov (diploma № 129 / 30.04.2018). In 2018 she completed a master's degree in Public Health and Health Management - Medical University-Sofia (diploma № 32490 / 3.05.2018). Since 2018 she has been the head of the Department of Neurological Diseases of UMHATEM "N.I.Pirogov".

Certified to evaluate patients with multiple sclerosis with EDSS, to assess neurological deficit in patients with stroke with the NIHSS scale, and to assess anxiety and depression by C-SSRS. Has passed the following trainings:

- ✓ Spring School for Young Neurologists, Stare Splavy, 2012
- ✓ ALS diagnosis and care, Prague, 2012
- ✓ Cognitive impairments in neurological diseases, 2014
- ✓ Preceptorship on MRI in multiple sclerosis, Milano, Italy, 2015
- ✓ Regional Teaching Course of the European Academy of Neurology, 2017
- ✓ World Federation of Neurology continuing medical education program, 2017
- ✓ Fabry Summer School, 2018
- ✓ "Dementia" academy, 2019
- ✓ Stroke Treatment Logistics Simulation Training Course, Brno, 2019

Dr. Mariya Dimitrova is a member of scientific and medical societies and organizations in the field of neurology, neurosonology and somnology:

- ✓ Bulgarian society of neurology
- ✓ Bulgarian society of neurosonology and cerebral hemodynamics
- ✓ Bulgarian society of somnology
- ✓ European society of neurosonology and cerebral hemodynamics

- ✓ Bulgarian medical association

She participates annually in the National Congress of Neurological Diseases, the National Congress of Neurosonology and Cerebral Hemodynamics, the European Academy of Neurology, as well as in a number of other national and international forums.

Dr. Dimitrova is a sub-researcher in nine clinical trials for the treatment of patients with multiple sclerosis and a principal investigator in two clinical trials for the treatment of stroke.

2. Education-teaching activity of the candidate

From the presented documents it is evident that Dr. Dimitrova was an assistant at the Clinic of Neurological Diseases - MMA from 2016 until her leave. Participated in lecture courses for nurses, paramedics, postgraduate training of GPs and neurologists.

Since 2018, Dr. Mariya Dimitrova is Head of the Department of Neurological Diseases at UMHATEM "N.I.Pirogov". The following teaching activity is presented:

- ✓ Auditory employment in the lecture course "Emergencies in Neurology" of medical students in the training cycle "Emergency Medicine" (40 hours for 2018, 60 hours for 2019, 55 hours for 2020, 55 hours for 2021), as well as in a module to the PULSS program "Protocols in emergency neurological conditions" for 2020 and 2021.
- ✓ Extraauditory activities include training of seven residents in neurological diseases, conducting curricular exams.
- ✓ The teaching-methodical activity is based on developing lectures, editing materials for the journal "Emergency Medicine", scientific activity as a participant in research projects, conducting colleague meetings.

3. Scientific-research activity of the candidate

Dr. Mariya Dimitrova is the author and co-author of 79 scientific papers, including a dissertation (with compendium), an independent monograph. In 34 of the scientific papers the candidate is the first author.

Type of scientific activity	Total number	First author	Other position
Total number of publications	79	34	
Dissertation	1		
Monographs	1	Independent author	

Journal publications • with IF • other	35 6 29	14	21
Participations in national forums	21	9	12
Participations in international forums • with IF • other	21 15 6	9	12

Scientific contributions and directions in the scientific-research activity

The scientific works are arranged and presented in a detailed list, they are submitted with an author's reference for the scientific contributions and with the necessary evidence. They are divided into the following categories:

I. Dissertation paper with self-presentation "Neuropsychological disorders in obstructive sleep apnea" - dissertation for the award of educational and scientific degree "Doctor" in the scientific specialty "Neurological Diseases", code 03.01.19, 2018.

II. Independent monograph "Diagnostic and therapeutic approaches in cryptogenic stroke", 2021, Sofia, J.A.M.G BOOKS.

III. Publications - 35 scientific publications.

IV. Participation in scientific forums, divided into 4.1 National Forums - 21 participations and 4.2 International Forums - 21 participations.

The scientific works have covered various fields in neurology. Their thematic distribution is as follows:

- ✓ **Obstructive sleep apnea (OSA)**

The topic of obstructive sleep apnea is most widely discussed in scientific papers. The section includes a total of 11 works on the author's list and one defended dissertation. A significant part of the scientific research on the topic of obstructive sleep apnea is related to changes in cognitive functions and constructing a database of results from the assessments on the neuropsychological profile of the patients. Of great scientific and practical importance are the publications evaluating the role of different methodologies and concerning the selection of appropriate short tests for assessment, as well as the preparation of a short neuropsychological battery. Another part of the scientific works is focused on the analysis of the anthropometric

features of the patients with OSA. The author also has research on the risk factors for neuropsychological deficits in these patients.

The dissertation "Neuropsychological disorders in obstructive sleep apnea" aims to study the neuropsychological disorders in OSA and to establish the qualitative and quantitative specifics of the existing deficit, assessing the role of disease severity and the contribution of co-morbidity. The neuropsychological assessment includes many methodologies: MMSE, Epworth Sleepiness Scale, Beck's Depression Inventory, Fatigue Severity Scale, Stroop test, Trial Making Test A, Trial Making Test B, verbal fluency tests - phonemic one letter test, Isaac Set Test, Symbol Digit Modalities Test, Word List Recall Test. There are 103 subsequently diagnosed patients with OSA included and a control group corresponding in age, sex and educational status. Magnetic resonance imaging was performed on 20 patients. They are rated with visual rating scales. An essential part of the dissertation is devoted to the assessment of co-morbid conditions: arterial hypertension, diabetes mellitus, hyperlipidemia, gout, coronary heart disease, obesity, alcohol and drug use, smoking. Several scientific and theoretical contributions have been made: 1) The study confirms for the first time among the Bulgarian patient population the presence of neuropsychological disorders in patients with OSA, forming a detailed neuropsychological profile of patients with OSA; 2) Presents a comprehensive assessment of the executive functioning of patients with OSA, confirming that the presence of executive disorders is most characteristic of the neuropsychological profile of these patients; 3) The specificity of the methods used to study the executive functioning is determined by selecting short and specific tests suitable for inclusion in a short neuropsychological battery; 4) Relationships between the presence of concomitant pathology and the severity of neuropsychological changes are confirmed, and as the main risk factor for neuropsychological changes was reported the duration of the existing symptoms of the disease; 5) It is established that the presence of cortical atrophy is the cause of changes not only in general cognitive functioning, psychomotor speed and attention, but also in relation to disorders of executive functioning, and the severity of cortical atrophy depends on the level of minimal oxygen saturation and age. With scientifically-applicable character is one contribution: a short battery of neuropsychological tests is offered, suitable for assessing the neuropsychological condition of patients with OSA.

- ✓ **Cerebrovascular diseases**

The topic of cerebrovascular diseases is also widely discussed in the author's research. A monograph and a series of reviews, articles and scientific reports are dedicated to it (II, III 7, 20, 22, 25, 28, 34; IV 4.1.6, 4.1.7, 4.1.8, 4.1.9, 4.1.10, 4.1.11, 4.1.12, 4.1.14, 4.1.20, 4.1.21; IV4.2.3, 4.2.6, 4.2.12, 4.2.14).

The monograph "Diagnostic and therapeutic approaches in cryptogenic stroke" is completely independent and consists of nine chapters. It is dedicated to the definition, epidemiology, differential diagnosis and therapeutic recommendations for strokes of unclear genesis. Own cases of patients with rare causes of ischemic stroke are also shared. The monograph summarizes a large number of etiological and pathogenetic factors for the occurrence of strokes in different age groups. Some of the reasons considered are very rare, but knowing them will lead to a better diagnosis of cryptogenic strokes. The monograph is a valuable tool for specialists in neurology, rheumatology, cardiology, genetics, as well as students. The monograph has a theoretical and scientifically applied contribution to Bulgarian neurology.

Also of interest is a scientific participation (IV 4.2.12) presenting own data for atrial fibrillation screening in patients with unclear cause of stroke. A telemonitoring system was also used in 185 patients, with an average patient monitoring period of 96 hours. The conclusion is that the long-term monitoring of patients is superior to the 24-hour Holter monitor ECG in the diagnosis of atrial fibrillation, which is of theoretical and practical importance.

Among the other research works, two articles should be mentioned: one is an original article (III 22) presenting own data from a study of early symptoms of anxiety and depression in 117 patients. Several assessment methods were used: standard psychological interview, Montgomery-Asberg Depression Rating Scale, Hamilton Anxiety Rating Scale, Hospital Anxiety and Depression Scale- Depression Subscale, Combined Scale. Anxiety and depression have been identified in the early post-stroke period, sensitive methods are MADRS, HAD-S, HAM-A. This helps to find patients with whom it is good to conduct psychological monitoring and therapy. The other is a review article (III 20) examining the immunological aspects of ischemic stroke - aseptic inflammation due to ischemic stroke and systemic immune suppression, which is a predisposing factor for secondary bacterial infection.

- ✓ **Multiple sclerosis**

Another part of the scientific work is devoted to the neuropsychological changes and therapeutic possibilities in multiple sclerosis. They include review articles (III 18, 24, 35) and

own studies (III 9, 31; IV 4.2.1) on neuropsychological disorders in these patients. Of scientific and practical importance is an article dedicated to the treatment of relapse of opticomyelitis (a disease from the spectrum of demyelinating diseases), where a review of the therapeutic options in such patients is made and a clinical case of immunoglobulin treatment in a patient not responding to corticosteroid treatment is presented (III 23).

- ✓ **Spinal pathology**

A significant part of the scientific papers is devoted to the diagnosis and treatment of spondylodiscitis (III 2, III 3, III 32, IV 4.1.2; 4.1.3; 4.2.2). They include a review article and several reports of interesting clinical cases from practice.

- ✓ **Neuropsychological research in neurological diseases**

The patients in both researches were evaluated with multi neuropsychological batteries, evaluating memory, executive functions, psychomotor speed, basic cognitive functioning, these works are with theoretical and practical importance.

A series of reports have examined the neuropsychological disorders in brain tumors and arteriovenous malformations (IV 4.1.13; 4.1.9). A number of patients are presented, which were selected according to certain inclusion criteria, the imaging diagnosis and the localization of the changes are taken into account. The patients in both studies were evaluated with wide neuropsychological batteries, examining memory, executive functions, psychomotor speed, general cognitive functioning, these scientific works have theoretical and practical application.

In several other reports has been made assessment of anxiety and the presence of depressive symptoms, assessing hospital stress on admission to a medical facility in patients with various neurological diseases. Various evaluation methods have been used, there is a representation of the role of the psychologist and the psychological interview to evaluate the patients at risk and to assist in their adaptation in hospital settings (IV 4.1.15; 4.1.19; 4.2.8).

- ✓ **COVID-19**

In the pandemic situation, any information related to the neurological complications of the disease is accepted with great interest. Own observations are shared in scientific reports and articles (III 30, III33, III26, IV 4.2.19, 4.2.20). The review articles summarize the known

neurological complications and have a generalizing theoretical contribution, and the described clinical cases are of practical contribution.

- ✓ **Other**

Three scientific participations present interesting cases from practice. First is of a patient with probable Creutzfeldt-Jacob Heidenhain variant (IV 4.2.15). The other case is of an immunocompromised patient with systemic rheumatic disease with established cryptococcal meningitis, who recovers after the conducted treatment (IV 4.2.17). The third case is of a patient with a clinical and electromyographic finding of acute demyelinating Guillain-Barré polyradiculoneuropathy and concomitant neuroborreliosis (IV 4.2.16)

Impact factor

Dr. Mariya Dimitrova presents scientific research papers with overall impact factor of 56.78. With an impact factor are 6 scientific publications in Folia medica journal and 13 scientific papers, published in *European Journal of Neurology and International Journal of Stroke.* Individual impact factor of 22.08 have been calculated.

Citations

Dr Mariya Dimitrova has attached a reference from the Central Medical Library, which shows 18 citations in Bulgarian literature.

In summary, the scientific production presented by the candidate meets the minimum required national criteria, as well as the requirements of UMHATEM "N.I.Pirogov", exceeding them by indicator "Publications and reports, published in scientific journals, referenced and indexed or not in worldwide famous databases with scientific information '. The author's quantitative reference for research and scientific activity, presented below, illustrates this.

Group of indicators	Content	Associate professor Minimum number of points according to the national criteria	Associate professor Available points	Associate professor Number of points according to the criteria of UMHATEM "N.I.Pirogov" AD- Sofia
A	Indicator 1	50	50	
B	Indicator 2	-	-	

C	Indicator 3 or 4	100	100	
D	Sum of indicators from 5 to 9	200	915.25	1890 (with minimum requirements of 750)
E	Sum of indicators from 10 to 12	50	95	
F	Sum of indicators from 13 until the end		70	

4. Conclusion

The analysis of the work of Dr. Mariya Dimitrova presents her as a qualified neurologist, skillfully combining clinical activity with scientific research. Evaluated in their integrity, the scientific-metric data of the candidate are in full compliance with ZRASRB and PPZRASRB and the Regulations for development of the academic staff of UMHATEM "N.I.Pirogov" and cover the requirements for the position of "Associate Professor".

The above gives me grounds for a positive opinion, which is why I strongly suggest to the members of the Scientific Jury to choose Dr. Mariya Ivanova Dimitrova, MD, PhD in the academic position of "Associate Professor" in higher education 7. Health and sports in the professional field 7.1 Medicine and scientific specialty "Neurology" for the needs of UMHATEM "N.I. Pirogov".

07.06.2021. **ACAD. LACHEZAR TRAYKOV, DMS**