

REVIEW

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About

defense of dissertation work

on

dr. Svetoslav Kirilov Todorov

On topic:

„Organization of neurosurgical care in Bulgaria - comparative analysis“

Submitted for acquisition

on educational and scientific degree „Doctor“

In scientific specialty „Neurosurgery“

According to the regulations of the MU, the necessary documents for the defense of a dissertation and the acquisition of an educational and scientific degree „Doctor“ are included.

Biographical data

Dr. Svetoslav Todorov was born on 24.03.1988. In 2014, he graduated in Medicine at the Medical University-City of Pleven, and in 2018 he completed a second master's degree in Public Health and Health Management at the same university. Since the beginning of 2015, he has also been working at the Department of Neurosurgery of UMBAL Burgas AD. Burgas. Since 2021, he has a recognized specialty in Neurosurgery. In 2024, he was a part-time assistant in Neurosurgery for students from the Faculty of Medicine of Prof. Dr. Asen Zlatarov University. Burgas, and in February 2025, after a competition, he was appointed as an assistant in the Department „Anesthesiology, AG, Surgery, Orthopedics and Traumatology, Urology, Neurosurgery, Emergency and Intensive Medicine“ of the same faculty. Dr. Todorov is a member of BDNH and BASH. It regularly increases its qualification characteristics by participating in national and international congresses, as well as individual trainings in the country and abroad.

Relevance of the problem

The dissertation examines a current and significant problem for Bulgarian neurosurgery. The quality of the services offered is increasingly –discussable. At the same time, an approach to evaluating the offered neurosurgical care is not available in Bulgaria. The development of recommendations for the organization of neurosurgical care, based on comparative analysis, would definitely be of great help. This dissertation aims to present, analyze and compare the current state of neurosurgical care in the country. The main component is to develop and

introduce recommendations with guidelines for receiving neurosurgical assistance to Bulgarian patients in order to increase its quality and accessibility, corresponding in level and accessibility to that of a developed European country – Germany, as well as other high-income countries (HICs).

Structure and content of the dissertation work

The presented dissertation on the topic „Organization of neurosurgical care in Bulgaria - comparative analysis“ is in a volume of 129 pages. In terms of its structure, it fully meets all accepted requirements. It is composed of Introduction and Literary Overview (32 pages), Purpose and Objectives (1 page), Material and Methods (8 pages), Results (25 pages), Discussion (38 pages), Conclusions (1 page) (Conclusion (1 page) and Contributions (1 page), Bibliography (8 pages), Appendix (8 pages). The dissertation contains 6 tables and 48 figures. The bibliography contains 104 literary sources, of which 14 are in Cyrillic and 90 in Latin. There are 2 publications related to the dissertation work, two participations of a national and international conference with posters on the subject have also been presented.

The dissertation is structured according to requirements. The topic is current and new. In the literary review, a historical review of the Bulgarian Neurosurgery and the Bulgarian Society of Neurosurgery, the normative basis for carrying out the activity, organization of national and regional consultants, quality of the carried out medical activity, neurosurgical assistance in Bulgaria, carried out by doctors in relation to the population in 2021 -2022, global neurosurgery, experience of other countries in the organization of neurosurgical assistance: Germany, Turkey, Jordan, Spain, Iceland, Pakistan, USA – gender distribution in neurosurgery training as well as neurosurgical care during Covid-19. The goals and objectives are clearly and precisely formulated. The aim is to present, analyze and compare the current state of neurosurgical care in Bulgaria, as well as its organization. The main component is to develop and introduce recommendations with guidelines for obtaining quality and affordable neurosurgical care for Bulgarian patients, corresponding in level and accessibility to this, as of a developed European country – Germany, as well as other high-income countries (HICs). The tasks are to analyze neurosurgical assistance in Bulgaria and its distribution by region of the country; to study and analyze the current picture of neurosurgical assistance offered in Bulgaria from the point of view of hardware security (technical equipment); to make a comparative analysis of the parameters of the organization of neurosurgical assistance in Bulgaria with those of the Germany-country, a leader in European health care, as well as HICs , in particular in the offered neurosurgical care; to prepare recommendations for changing the system in order to improve the quality and accessibility of the offered neurosurgical care; to use artificial intelligence systems to detect correlations of individual diseases and predict the number of their operations along individual clinical pathways.

Methodology and organization of the study

In the section material and methods, searches were carried out in Medline, PubMed, Google Scholar, Web of Science and Embase for studies related to neurosurgical care in Bulgaria, analyzed the seven main clinical pathways in 135 medical facilities in Bulgaria, on which operations and therapy in neurosurgery are carried out for a seven-year period, an electronic questionnaire was developed to establish the current state of neurosurgical care in Bulgaria, containing 4 main sections: Personnel support of the neurosurgical clinic/department with 10 main questions; Apparatus support with 19 main questions; Operational activity of the

neurosurgical clinic/department with 19 main questions; Accessibility of imaging diagnostics in the neurosurgical clinic/department with 3 main questions; the results of which are presented in the form of graphs and tables summarizing the information from the inquiry of the participants; a study was made covering a comparative analysis between the organization of neurosurgical care in a developed European country – Germany and the current state of the organization of neurosurgical care in Bulgaria. Statistical methods used for processing and analysis were used.

Results and discussion

The results and discussion are set out in 65 pages and are perfectly illustrated with tables and figures. The overall results are given and the conclusions drawn from them. The tasks set have been comprehensively and clearly answered.

Conclusions

1. The performed analysis of the main medical facilities providing neurosurgical assistance in R. Bulgaria finds that there is a pronounced asymmetry in the distribution by regions of the country.
2. The analysis of the performed neurosurgical operations in the country shows that in 2020 there is a trend towards a significant decrease in them, which is determined by the beginning of the Covid pandemic. There is also a tendency to perform neurosurgical interventions in medical facilities where no neurosurgery clinics/departments have been opened.
3. The analysis of neurosurgical operations in Burgas shows that 41% of them were realized in „UMBAL-Burgas“ AD. As here, the tendency to perform neurosurgical interventions in medical facilities where there are no open clinics/neurosurgery departments is maintained.
4. The conducted survey for the analysis of personnel, hardware security, operational activity and accessibility to imaging diagnostics confirms the asymmetric distribution of neurosurgery clinics/departments by regions in the country and the neurosurgeons working in them, as there is a concentration in the capital and a pronounced shortage in given areas, e.g. Northern Bulgaria.
5. The comparative analysis of the parameters of the organization of neurosurgical care in Bulgaria with those of Germany shows that there is a shortage of personnel both for Bulgaria and for a developed European country, such as Germany. However, there are significantly more neurosurgeons per capita in Germany compared to Bulgaria. In addition, access to neurosurgical care in Germany is evenly distributed throughout the country, which provides quick treatment for patients, regardless of their location, while in Bulgaria treatment for patients from afar while in Bulgaria the treatment for patients from places far from the big cities may be delayed.

Contributions

The contributions from the submitted dissertation are as follows:

1. An innovative study of the current state and organization of neurosurgical care in Bulgaria was conducted for the country. Problems and opportunities for improvement have been identified.

2. An original study of the parameters of the organization of neurosurgical care in Bulgaria was carried out with those of Germany and conclusions were drawn.

3. Recommendations have been prepared for the structures in the country responsible for the organization of health care in order to improve the quality and accessibility of the offered neurosurgical care.

4. With tools of artificial intelligence, the following were made: forecasting of the performed neurosurgical operations on hospitals and pathways; a comparative analysis of the relationships between diseases and operations was made; data clustering was done.

Publications

1. Publications:

1.1. St. Todorov, Organization of neurosurgical care at UMBAL Burgas AD in patients with spinal cord injury, Magazine "Burgas Medical Journal" ISSN: 2815-4649, issue 1, 2024, 33-35

1.2. Childhood Spinal Traumatism, Todorov St, Mirazchiyski B, "Spinal Surgery" Magazine ISSN: 2815-3642, VOLUME II, Issue 1-4, 2023.

2. Participation in national congresses and symposia related to the dissertation topic:

2.1 S. Todorov, E. Sotirova, Z. Kirovakov, Investigation of the Neurosurgical Operations in Bulgaria with the InterCriteria analysis method- poster in Third International Symposium on Bioinformatics and Biomedicine- July 4-6, 2024, Burgas, Bulgaria

2.2 St. Todorov, Y. Enchev, NEUROSURGICAL ASSISTANCE IN BULGARIA – STATUS QUO- poster of XXX National Conference on Neurosurgery, October 13-15, 2023., Pravets.

Conclusion

The dissertation work developed and presented for defense on the topic „Organization of neurosurgical care in Bulgaria - a comparative analysis by Dr. Svetoslav Kirilov Todorov is related to an important, current and socially significant topic in neurosurgery and draws attention to an underestimated problem related to it. The material provided allows for substantial conclusions and conclusions to be drawn. The dissertation is properly structured and meets regulatory requirements.

I believe that the dissertation has been completed and I am voting with „YES“ acquisition of an educational and scientific degree „Doctor“ in the scientific specialty Neurosurgery by Dr. Svetoslav Kirilov Todorov.

05/05/2025.

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

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