TO
THE CHAIRMAN OF THE SCIENTIFIC JURY,
APPOINTED BY ORDER № P-109
-346 / 19.08.2021.
OF THE RECTOR OF THE MEDICAL
UNIVERSITY – VARNA

REVIEW

by Prof. Dr. Krassimir Borisov Gigov, MD
Professor of Emergency Medicine at the Department of Emergency Medicine and Marine Medicine, Faculty of Public Health, Medical University "Prof. Dr. Paraskev Stoyanov "Varna

Subject: Dissertation on "Medical aspects of water injuries at sea" by Assoc. Prof. Dr. Dimitar Georgiev Stavrev, MD, independent doctoral student for acquiring the scientific degree "Doctor of Sciences" in the professional field 7.1 Medicine.

Dimitar Georgiev Stavrev was born in Varna, where in 1979 he completed his secondary education at the VII ESPU. In 1987 he graduated from the Higher Medical Institute in Varna. From 1987 to 1990 he worked as a district paediatrician at the General Hospital in General Toshevo. In February 1990, after a competition, he began working as a lecturer in the Medical University - Varna. In his official development at MU-Varna he passed successively through the degrees "Assistant", "Senior Assistant", "Chief Assistant" and "Associate Professor". In the period 1990/1993 he specialized and defended a medical specialty in "Anatomy, Histology and Cytology" at the Higher Medical Institute - Sofia. From 2009 to 2011 he was a full-time doctoral student and obtained the educational and scientific degree "Doctor" (PHD) in the scientific specialty: 03.01.02 "Anatomy, Histology and Cytology" from the Higher Attestation Commission (HAC). He has passed a number of courses and qualifications, namely: "Modern methods of resuscitation in situations of water accidents" in the Bulgarian Red Cross - 1996; "Health Management in the Conditions of Health Insurance" at the Institute of Management and Entrepreneurship - Sofia - 1999; Diploma de therapeutique homeopathique CEDH 0101 -2003, "Homeopathic Therapy" CED, MU-Varna; "Fundamentals of diving and hyperbaric medicine" at the Military Medical Academy - 2008, BHAT - Varna; "Marine Instructor and Lecturer" at the Maritime Qualification Center - Varna / Maritime Administration - 2011; "Working with MS Office - Basic Training"

National Agency for Vocational Education and Training VET at ET "MODUS TRADE" - 2012; "Emergency psychological aid in critical / stressful situations." Institute of Social Activities and Practices - 2013; "Practical implementation of intellectual property protection. Inventions and scientific discoveries. " MU-Varna - 2013; "Interactive teaching methods" MU-Varna - 2013; "Assessment, Testing and Certification of seafarers" Executive Agency Maritime Administration - 2019.

In parallel with his research and teaching practice at MU-Varna, Assoc. Prof. Stavrev has been a guest lecturer in human anatomy at the University of Ruse since 2004, Lecturer at NULC of the Bulgarian Red Cross, Manager of the Home Care Centre and medical instructor in the lifeguard courses at the Regional Council of the Bulgarian Red Cross-Varna, Director of the Centre for Emergency Medical Assistance - Varna during the period 1998-2000.

In 2015 he was elected associate professor of Anatomy, Histology and Cytology at the University of Ruse "Angel Kanchev". In 2016 he was elected associate professor in the scientific specialty "Emergency Medicine (Marine Medicine)" at the Medical University "Prof. Dr. P. Stoyanov "- Varna.

Assoc. Prof. Stavrev participates in several projects as follows: Health Sector Restructuring Project, Component 3: Emergency Medical Care. On-site training. - Head of contract № RD-10-39 / 23.07.1999. and № RD-10-40 / 23.07.1999; "Infrastructure for sustainable development in the field of marine research, linked to the participation of Bulgaria in the European infrastructure EURO-ARGO" - part of the National Roadmap for Scientific Infrastructure, adopted by Decision № 692 of 21 September 2010 of the Council of Ministers of Bulgaria - Deputy coordinator for MU-Varna and a member of the steering committee; Project BG051PO001-1.1.09-0115 "BRC in support of labour integration through professional qualification of inactive persons" - "Qualification services and employment promotion" Contract № ESF 1109-03-02002 - Trainer; Project BG051PO001-3.3.07-0002 "Student Internships" OP "Human Resources Development", co-financed by the European Social Fund - Academic mentor; Project "Find a rescuer in yourself" № OMDS14001161VN / 23.04.2014 - Trainer; MSCA-NIGHT-2014: European Researchers, Night (NIGHT) - Expert; Project "Raising the awareness of older people about the response to disasters, accidents, catastrophes and first aid" Contract №115000835 VN / 22.06.2015 - Trainer.

He is the author of 99 real scientific publications on various aspects of medicine, including 2 monographs and 5 textbooks.

General presentation of the procedure and the doctoral student.

I present this review in my capacity as an internal member of the Scientific Jury, appointed by order № P-109-346 / 19.08.2021 of the Rector of the Medical University - Varna under a procedure for public defence of the dissertation.

The materials presented to me related to the defence of the dissertation have been prepared in accordance with the Act on the development of the academic staff in the Republic

of Bulgaria, the Regulations for its implementation and according to the Regulations for the development of the academic staff in the MU Varna.

The volume of the submitted dissertation is 254 pages and it is structured as follows:
- Introduction - 2 pages.
- Literary review - 68 pages.
- Goals and tasks;
- Materials and methods;
- Own research - presented in 5 chapters - 127 pages;
- Summarized conclusions, recommendations and contributions - 10 p.
- Annexes

The exhibited material is illustrated with 17 figures, 28 graphs and 14 tables. The annexes to the dissertation – 56, are presented on 44 pages in a separate book. The bibliographic reference includes 363 literary sources, of which 162 in Cyrillic and 201 in Latin. 128 of the cited sources are dated in the last 10 years.

Relevance of the scientific development

The problem studied in the dissertation is extremely relevant. Recent decades have been characterized by a steady increase in the frequency of disasters in the world and in our country. Accidents and catastrophes in the world's oceans causing water casualties have a vast geographical and demographic scope. There are many victims of accidents in the marine environment related to professional, sports, exploratory and leisure activities. Efforts to reduce the risk for the health of those affected and to optimize the algorithms for overcoming the medical consequences are a task for both the maritime and the medical scientific community. The issues of safety and medical provision in extreme situations at sea are subject to national and international regulations and institutions. They are in the process of continuous gradation according to the changing situation, both in the maritime industry and in tourism, sea sports, etc.

I fully support the conclusions that Assoc. Prof. Stavrev presents as a result of the in-depth analysis of printed and electronic sources. These areas are expected to deepen, which is a serious challenge for those involved in the planning and management of medical provision in emergencies at sea. The conclusions from the literature review on the interrelation of the development of the maritime industry, transport, tourism, sports and the generated thousands in Bulgaria and millions worldwide potential victims of water injuries in the marine environment are of a contributory nature. Methodologies need to be developed both to reduce the damage to human health at the time of the trauma, as well as to provide assistance. The classical methods do not lose their significance, but the variety of emerging situations and pathologies predetermines the continuous development and upgrading. The dissertation provides an answer to this need. The doctoral student aims to analyse the injuries, related to to marine accidents and catastrophes, caused by the marine environment on the health of those affected and on the basis of the conclusions to propose guidelines for reducing and overcoming water injuries at sea.

Characteristics of the dissertation

The innovative approach in choosing a topic and goal quite naturally requires extensive research, which is why I accept without objection the formulation of 5 objectives, which in my opinion comprehensively and in a targeted manner analyse those areas of science and practice that are necessary to achieve the goal.

The materials for research and analysis selected and applied by the doctoral student prove his desire to comprehensively cover the object of study. Naturally, the set of research methods corresponds to the scale of the goal and the analysed materials. I want to emphasize that the prepared and conducted questionnaire survey is proof of the ability of Assoc. Prof. Stavrev to extract the maximum amount of information accurately and in the necessary volume, with a seemingly scarce set of questions, but it is precisely the accuracy of questions and assignments that show the level of knowledge in the study area. The number of participants in the psychological, functional research and the survey is also impressive - 942.

I consider the materials and methods for solving the set objectives well-chosen selected and precisely executed. They systematically study the various aspects of marine water injuries - causes, mechanisms, medical damage, and the process of overcoming medical injuries in different stages - injury prevention, actions during an accident, overcoming the injuries in subsequent periods.

His own research on the topic covers a wide range of areas.

Section 4.1. studies the extreme situations at sea leading to water injuries on a global scale and their manifestation in Bulgaria. Assoc. Prof. Stavrev, on the basis of the summarized information, builds a global picture of the dynamics and trends of the problem. The conclusions of the conducted analyses are of significant value for the theory of emergency medicine. Medical damages in accidents and catastrophes at sea not only do not decrease, but they become more diverse, with new types and variants. Natural disasters are becoming more frequent, anthropogenic accidents are increasing in scope and more and more people become involved. The Republic of Bulgaria is not isolated from the world developments of the issue, while at the same time it marks a positive tendency to reduce water injuries.

Section 4.2. studies the medical needs in a marine experiment and a scheme for medical provision in a such experiment has been proposed. After an in-depth analysis of the world's and Bulgarian experience in marine experimentation, Assoc. Prof. Stavrev proposes valuable scientific information to be obtained about the physiological and mental reactions of volunteers in the experimental simulation of a maritime accident.

Section 4.3. presents the laboratory of marine medicine created during the development of the dissertation and the analysis of the obtained results from own researches for the period. A model has been developed to study the effect of living in an aquatic environment under normal and extreme conditions. It includes new approaches and research that have not been done until now. The parameters of the physiological manifestations of the respiratory, cardiovascular systems and musculoskeletal system are taken into account. The obtained results are archived, analysed, entered into tables and presented graphically. No less important are the studied psychological processes at individual and group level of potential victims and

rescuers in a maritime accident. The system for upgrading research approaches and expanding the scope of research increases the objectivity of the results.

Section 4.4. studies the preparedness of the population to provide assistance in case of water injuries. The summary of the results from the comparison of the different categories of persons shows a relatively high preparedness to provide first aid in the general scenario of 68.4% and a lower one for water injuries in the marine environment - 43.6%. This should not be mechanically transmitted to all members of society, because the study is deliberately aimed at the active part of the population from appropriate age groups. The respondents received the training in providing assistance and self-help mainly from the BRC system, less from educational institutions and to a very low extent from the family and the mass information providers (media). No significant differences in the results were found in regards to the place of residence in the different districts or according to the size of the settlements. The existing system for preparing the population for prevention and counteraction to water injuries at sea is diverse, comprehensive and effective. A proof of this finding is the decrease in the number of deaths from water accidents in sea waters on the Bulgarian coast, which has reached a level of 1.2 ‰ per 100,000 according to WHO measurements.

Section 4.5. studies the possibilities for inter-institutional interaction in case of incidents, accidents and catastrophes along the coast related to water injuries in territorial waters and areas of responsibility in the Black Sea. The system for providing assistance at sea is far from comprehensive and there are additional opportunities for development. Survival in an aquatic environment in the event of a disaster is dependent to a large extent on the infrastructure, therefore blockage or disruptions in it can compromise or hinder the organized search and rescue system. Assoc. Prof. Stavrev reports and analyses the possible interactions of the trained lifeguards from the Bulgarian Red Cross with vessels of the Medical University - Varna, emergency teams of the Centre for Emergency Situations and specialized hospitals in the city of Varna. In the conditions of the experiment, the time and metric parameters were precisely reported with subsequent analysis and conclusions. The search for new forms of interaction between different structures and institutions in counteracting water injuries widens the possibilities for response to accidents at sea. The creation and testing of good informal organizational forms provides options for flexibility in the systems for emergency assistance at sea.

The results of the research are impressive, which have been analysed in detail by the author. These results are summarised in 9 generalized conclusions, namely:

- the impossibility to influence the natural factors leading to water trauma is related also to the insufficient reliability of the contemporary early assessment and forecasting systems ;
- the development of methods to reduce the damage caused by water injuries should be aimed at continuously improving the safety of maritime activities and maintaining the good quality training of potential rescuers;
- the presence of an earthquake zone along the Black Sea coast and other potential factors does not exclude the possibility of unusually high and destructive sea waves. Despite that many settlements in Bulgaria are located at low altitude, population is exposed to relatively low risk from such events in comparison to other countries with low coastline;

- among the anthropogenic sea accidents, shipwrecks are those resulting in most casualties, and over the time the risk of large events of this type for Bulgaria is decreasing;

- along the Bulgarian coast, the main potential victims of water injuries at sea are people who use the sea goods for recreation, sports and entertainment;

- marine experiments in their medical part make a significant contribution to the safety of those residing in marine environment;

- the research within the marine science program shows good physiological indicators of those dedicated to marine professions. An increase in the level of stress resilience in the students after passing a training course for lifeguards has also been identified;

- the study of the readiness of different categories of persons to provide assistance in a situation of water injuries at sea shows a high level of readiness to provide first aid in general incidents (68.4%) and significantly lower readiness to provide first aid in case of water injuries in marine environment (43.6%);

- the search for new forms of interaction of different structures and institutions in counteracting water injuries expands the possibilities for reaction in case of accidents at sea.

In this way the ability of the doctoral student to interpret large data sets and to reach the essential characteristics of the considered scientific and / or practical problem is proved. As a fully competent researcher, Assoc. Prof. Stavrev only conducts research with the aim to apply the results in practice. The results of the study were used to include the topic of water injuries at sea in the training programs for medical students, graduate students, health management students, lifeguards, in programs for continuing education and others.

Contribution and significance of the research for science and practice

The final discussion carried out on the achieved results again presents the doctoral student as an established scientist who, on the basis of an original theory, seeks and identifies practically applicable solutions of a major scientific and practical problem. I support the summarised conclusions and I accept the scientific-theoretical and scientific-practical contributions of the dissertation as reliable, valid and significant. Most of the conducted surveys are done for the first time in our country, due to which the obtained results have distinct contributive features.

Publications on the topic of the dissertation

The doctoral student has submitted for review 37 real publications that have been published in Bulgaria and abroad - 3 of them are textbooks, 2 monographs, articles - 8 in collections of reports and 24 in scientific journals (2 of them are foreign). All publications meet the requirements of Art. 54 (3) of the Regulations for the development of the academic staff in MU Varna (ten are required). The last of the presented publications is published in an impact factor journal "Journal of IMAB - Annual Proceeding (Scientific Papers)", indexed by DOAJ, Elsevier - EMBASE, Scopus coverage, Clarivate - Master Journal List, Index Copernicus, Google Scholar, MIAR, eLIBRARY. RU, CiteFactor, OAJI, WorldCat, EZB, ROAD, ZDB. Each of the publications is related to a specific objective, or presents an aspect of the objectives covered in the dissertation.

The structure and content of the presented abstract also meet the legal requirements and summarize the purpose, objectives, materials and methods, the results of analyses and studies, as well as the summaries, conclusions, recommendations and scientific contributions.

Critical remarks and recommendations

Regarding the dissertation, I have no substantial remarks.

Personal impressions

I have known the doctoral student for many years and I have witnessed his development as a doctor and researcher. He is a respected member of the Red Cross organization of the city of Varna and many of the achievements of the organization are due to his sense of responsibility and high competence. The dissertation once again proves his commitment to emergency medicine, and to marine medicine in particular, which presents him with a number of challenges, for the solution of which he spares no effort and time. His desire to look for new, unexplored or unresolved areas is one of his main features as a scientist.

CONCLUSION:

Assoc. Prof. Dr. Dimitar Stavrev has the necessary theoretical knowledge and sufficient practical experience enabling him to formulate original hypotheses, to conduct in-depth, comprehensive and at the same time focused research and analysis, in order to solve significant theoretical and practical problems through the application of modern methods and means.

The dissertation presented to me is dedicated to a topical issue and it has been developed thoroughly and comprehensively. The structure and the analyses, summaries, conclusions, the scientific-theoretical and scientific-practical contributions, which are contained in it, meet all the requirements of the Act on the development of the academic staff in the Republic of Bulgaria (ZRASRB the Regulations for its implementation and the Regulations for the development of the academic staff in the Medical University - Varna.

I give a positive, high evaluation of the dissertation and especially of the innovative approach and the offered proposals, which are easily applicable in practice, and which will optimize the systems for prevention and treatment of water injuries at sea. That is why I strongly suggest to the esteemed members of the scientific jury to vote positively for the award of the scientific degree "Doctor of Sciences" to Assoc. Prof. Dr. Dimitar Georgiev Stavrev, MD in the doctoral program "Disaster Medicine".

22. 10. 2021.

Reviewer:

/ Prof. Dr. Krassimir Gigov, MD