REVIEW

by Prof. Krasimir Borisov Gigov, MD, PhD
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Medical University "Prof. Dr. Paraskev Stoyanov"- Varna
Member of Academic Examination Jury
pursuant to Order No. P-109-429 of the Rector of the MU-Varna dated 20.12.2019

Regarding: *Defence of Dissertation Thesis* ***"Protection of population at flood risk in Varna region"*** *for obtaining a scientific degree "Doctor of Science" in the specialty "Disaster Medicine", higher education area 7. "Health and Sports", professional direction 7.1. "Medicine"*

The author of the dissertation is Prof. Hristianna Angelova Romanova-Radeva, MD, PhD, Head of the Department of Disaster Medicine and Maritime Medicine, Faculty of Public Health, Medical University "Prof. Dr. Paraskev Stoyanov"- Varna.

Prof. Hristianna Romanova, MD, PhD was born on 01.06.1955. In 1979 she graduated the Higher Medical School in Varna, obtaining a Master's degree in Medicine. In 1985 he acquired the specialty "Organization of medical health protection", which was later equated with "Disaster medicine". In 2006, she obtained a PhD in the specialty "Disaster Medicine", by defending her dissertation titled "Disastrous situations in the Varna region and possible hygiene and epidemiological problems".

Prof. Hristianna Romanova, MD, PhD has 41 years of work experience.

Since January 2017 she has been the Head of the Department of Emergency Medicine and Maritime Medicine, and from 2018 on, she is a professor at the Medical University - Varna.

Since 2013 and until now, she has been a member of Academic Examination Juries for the acquisition of scientific degrees "Doctor", "Doctor of Science" and academic degrees of "Associate Professor" and "Professor".

Prof. Romanova has participated in specialized courses and seminars in Bordeaux (France), Kiev (Ukraine), Moscow, Sofia and Varna.

He has been a reviewer of articles in scientific journals and collections in the field of Disaster Medicine, Technological and Environmental Disasters, Emergency Assistance in Mass Casualties, etc.

The presented dissertation consists of 10 sections - introduction, literature review, goal, objectives and hypotheses, materials and methods, own researches, conclusion, general conclusions, contributions, literature and applications. The total volume is 225 pages.

The introduction includes general findings on the significance of the problems, which occur in floods – domestic and abroad, with a detailed analysis of the risk in the region of Varna.

Based on the analysis of the data from the literature review, Prof. Romanova summarizes that in case of flood risk facing the protection system, in particular the healthcare system, problems arise related to timely forecasting and rapid implementation of organizational, protective, preventive, rescue and medical measures.

It is clear from the conclusions drawn in the literature review that:

- Floods have the lead share among natural and anthropogenic disasters, both in frequency and in terms of economic losses, followed by fires and other disasters.
- The main floods in the world, Europe, the Balkan Peninsula and the Republic of Bulgaria are of the rainy - river type.
- In the Varna region, floods are also of rainy - river type (spill of the rivers of Kamchia and Provadia). In Varna, they are caused by heavy rainfall and insufficient sewage system.
- The population in the areas at risk of spill, looses their homes and property, and urgently needs shelter, clean water, food and dry clothes.
- The injured people in the flooded areas most commonly suffer from injuries of their musculoskeletal system, resulting from impact of solid objects or after being dragged by the waters, drowning, and development of intestinal infectious diseases and viral hepatitis A.
- The executive authorities, services of public order and protection of population in the district and in the affected region, organize the evacuation from the flooded area, the accommodation of affected population in evacuation centers and organize search and rescue for the victims.
- In the event of a flood, the medical service must quickly organize first aid to the victims in the disaster area and hospitalization in specialized hospitals.

The scientific goal of the dissertation is to study the risk of floods as a major problem for the population in the Republic of Bulgaria (and in particular in Varna region), the awareness and preparation of the population living in the area for proper behavior during and after flood and to propose prevention to reduce the adverse effects on their health and material security.

The following research **tasks** are formulated to achieve this goal:

1. To study and determine the flood risks in the Republic of Bulgaria (and in particular in the Varna region) and to develop a Model for determining the risk of floods.
2. To analyze and summarize the tasks and activities of the institutions responsible for the protection of population at national, regional and municipal level.
3. To research and systematize the health risks in flood situations.
4. To summarize and analyze the medical assistance in floods.
5. To study the awareness and evaluate the preparedness for flood protection of foreigners and Bulgarians over 18 years of age.
6. To develop a strategy for flood prevention and protection of the population.
7. Based on the studies, analyzes and evaluations, to make recommendations, which are relevant for the provision of effective assistance and support to the population in floods.

The materials and methods are well selected. The research objectives were achieved by use of qualitative and quantitative methods of social and health sciences.

From her own studies, Prof. Romanova first focuses on determining the risk of flooding in the Republic of Bulgaria (and in particular in Varna region). She developed a Model for determining the risk.

The following findings of the author are summarized in the conclusions drawn:

- The flood risk is real and it depends on three factors: those associated with the risk of flooding; human and natural systems exposed to raising waters and the vulnerability of these systems to flooding.
- The model for determining the risk of floods is developed in four stages: identification of the danger; assessment of the exposition; assessment of vulnerability; risk assessment.
- It is important to implement a strategy in regards to the safety chain (prevention, preparedness, response, recovery).
- The management of activities in floods is well developed and structured. It includes: management of the territories at risk from floods, technical protective facilities and prevention measures.
- Out of the existing 4 390 dams in the Republic of Bulgaria, which were inspected in 2017, over 2000 were found to be "at risk", while 81 are in a "pre-emergency" state.
- The assessment of flood risk in the region of Varna is the following: flooding of the rivers of Kamchia and Provadia; accidents in hydro installations (15 potentially dangerous dams - mostly the dam of Eleshnitsa, out of the total 67) and flooding of adjacent territories, as well as after intense prolonged rainfall (over 30 l / sq. m - affecting some urban areas).

In regards to the second objective - To analyze and summarize the tasks and activities of the institutions responsible for the protection of population in floods, the author has made the following conclusions:

- The organization of the protection of population in floods is well structured and adapted to our conditions.
- The Regional Directorate "Fire Safety and Protection of Population", together with specialists from "Irrigation Systems" EAD - Varna, the Basin Directorate and the voluntary formations of municipalities and owners, carry out the activities included in the algorithm for operational protection in the event of an immediate flood danger.
- The management in the system for protection of the population from floods is carried out by: Ministries (departments), specialized departmental structures and forces of the Unified Rescue System (URS). The URS organizes, coordinates and manages the actions of its constituent elements in the event of floods and the conduct of emergency rescue and recovery works. The main constituents of the URS are: "Fire Safety and Protection of Population", the Ministry of Interior, the Ministry of Health (EMS Centres) and the BRC (Bulgarian Red Cross).
- A Disaster Risk Reduction Strategy (2018-2030), incl. floods is in force since 2018.
- In the event of floods, the institutions issue warning, they take measures to minimize the amount of damage, and eliminate the consequences in a timely manner.
- Operational flood protection activities are coordinated by the Head on site, who is the head of the respective territorial unit of the RD "Fire Safety and Protection of Population" or another official authorized by him/her.
- There are various information systems that have been developed, tested and are successfully operating - Crisis Management Centre, Operational Dispatch Management System, Unified Dispatch Office, Environmental and Water Monitoring System, etc.
- The flood protection plans include training of managers and for the population - optional training at request.

The third objective – 'Research and systematization of health risks in floods' is also well developed by Prof. Romanova.

The conclusions reached include the general negative effects of floods on the public health, the main direct and indirect health effects, the impact of floods on the mental health of the population in the affected areas, etc.

The objective 'summarize and analyze the medical assistance in floods' is also properly

clarified.

The conclusions drawn correspond to the necessary and timely organization and management of the medical assistance in case of floods:

- It is a distinctive quality of the emergency rescue operations during floods (including medical) are carried out in phases (at periodic intervals), as in all disasters, but the isolation phase is short or it even may be absent.
- In the Republic of Bulgaria, medical, health and hygiene-epidemic response activities are carried out mainly by the capabilities of the Ministry of Health.
- The medical support implements various main tasks before, during and after floods.
- In case of floods, the available health facilities may be used, without changing their purpose or structure.
- The coordinator of the activities for provision of medical care, management and logistical functions for the respective hospitals for in-patient and out-of-hospital care in the event of floods is the Director of the Regional Health Inspectorate in the respective area.
- The medical support structure in case of floods includes governing bodies, forces, resources and facilities, part of the permanently operating health system.
- The need for timely and continuous communication between the various institutions has been underlined.
- In the region of Varna, due to the limited nature of damages and casualties, based on past events, the medical needs in case of floods can be managed using own medical staff and existing medical support.

Of particular interest is the study of awareness and assessment of the preparedness for floods of foreign nationals and Bulgarian population over 18 years.

An anonymous survey was conducted among 230 English-speaking respondents (ES) from 12 countries in Europe and Asia - England, Wales, Germany, Ireland, Sweden, Spain, Norway, India, Japan, United Arab Emirates, Scotland and Portugal and 230 Bulgarian citizens (BG) residing in Varna region.

The method chosen is an anonymous survey using a 32-question questionnaire, filled in by the respondents.

The survey is of a high value with the reported high percentage of respondents who have experienced a flood (42.00%).

The majority of respondents (64.60%) have not been informed whether they live in a zone prone

to flooding.

It has been identified that both target groups of the study have poor evacuation preparedness - only 5.30% of ES and 8.90% of BG.

Due to lack of knowledge and poor preparedness for disaster situations, 54.60% of foreigners and 45.50% of Bulgarians will leave the area and will worsen the epidemic.

The self-assessment made by the Bulgarian respondents of their disaster preparedness is quite low, which also corresponds to the cross-check questions - 75.00% believe that they do not have sufficient knowledge.

It was estimated that the awareness and preparedness of the study group of 230 foreigners temporarily residing in Varna is better than that of the 230 Bulgarian citizens living in Varna region.

Almost all respondents from the two surveyed groups want to gain more knowledge and prefer (61.00% BG and 79.40% ES) to participate in a training course.

Some of the findings from the surveys are of great interest, such as the established fact that foreign citizens able to swim are almost twice as many as the Bulgarians. This favours the survival or rescue in high waters.

In a separate objective, Prof. Romanova has prepared a "Training Strategy for flood prevention and protection of the population" and presents a large number and valuable "Main recommendations to ministries and institutions for flood risk reduction".

The contributions of the dissertation are highly valuable and they are are divided into two main groups: Scientific-theoretical and Scientific-applied, where the greatest practical value belongs to:

- Developed 5 types of leaflets for raising awareness and knowledge of the population about issues related to floods.
- 1000 copies of the leaflets were distributed to the participants in the sociological surveys, to their relatives, to employees of Varna Municipality, the Basin Directorate, members of NGOs and citizens. The leaflets are distributed electronically using social networks, e-mails and others.
- Active participation on 18 and 19 September 2018 in the training seminar organized by the Ministry of Environment and Waters on the problems related to the floods from the Plan for Management of Flood Risk in the Black Sea region for the Basin Directorate 2016-2021.

Lectures "Health risks in floods" have been developed and presented to train the competent authorities attending the seminar.

- A First Aid Medical Package (required for injuries and floods) was developed and made available to NGOs.
- For the first time developed a Conceptual model for assessment of population preparedness in case of disaster risk with a focus on floods.
- For raising the awareness and knowledge of the population in regards to disaster protection and first aid, a "Training Strategy on issues related to floods" was developed.
- The summarized survey, including the leaflets, have been provided to and are being implemented in practice by the Ministry of Education and Science, Ministry of Labour and Social Policy, Ministry of Health, the Municipality of Varna, the EMS Centre, the "Fire Safety and Protection of Population" Directorate, the BRC, NGOs and the Black Sea Region Basin Directorate.
- Research supervising of a PhD student enrolled in 2019 with a thesis entitled "Floods - health and environmental issues for the Danube Region"
- Advising in the development of disaster protection plans at the Medical University "Prof. Dr. P. Stoyanov" - Varna (plans for actions in case of severe earthquakes, floods, snowstorms, black ice and icing, industrial accidents, fires and trans border radioactive contamination.
- Work as a national consultant in Disaster Medicine – expert reports and recommendations in disasters.
- Participation in the expert council of health care system national consultants in the Medical Specialty Disaster Medicine
- Participation in working meetings at the Regional Governor in connection with projects and management of disaster situations in Varna region and others.

The thesis is accompanied by a list of 289 literary sources, 116 of which with Cyrillic characters and 173 with Latin characters. The literary sources are up-to-date, from prestigious Bulgarian and foreign authors and editions, and above all they have a specific focus on the problem areas - subject of the dissertation.

The dissertation is richly illustrated. 9 tables, 82 figures have been developed and photographic material (5 images) has been provided.

The annexes to the dissertation are 10 and include: two survey questionnaires (in Bulgarian and English), a Conceptual model for monitoring of the population at flood risk has been developed,

5 leaflets with general and health recommendations for reducing the risk of floods, as well as two developed tables with potentially dangerous water bodies in the region of Varna.

Conclusion

The dissertation work of Prof. Hristianna Romanova, MD, PhD "Protection of population at flood risk in Varna region" is relevant and up-to-date and meets the scientometric criteria, as well as it corresponds to the Regulations on academic development in the Medical University - Varna for awarding of the scientific degree "Doctor of Medical Sciences".

In view of the above, I vote in favor and propose to the Honorable Scientific Jury to award Prof. Hristianna Angelova Romanova – Radeva, MD, PhD with the scientific degree "Doctor of Sciences" in the specialty "Disaster Medicine".

Report prepared by:

/Prof. Krasimir Gigov, MD, PhD/