



REVIEW

By Prof. Tsveta Georgieva, PhD, National Center for Public Health and Analysis

Member of a scientific jury according to Order No. 545/21.09.2022 of the director of the
National Center for Public Health and Analyses

about a dissertation on:

**"CHARACTERISTICS OF OCCUPATIONAL EXPOSURE TO BLOOD AND
BIOLOGICAL FLUIDS IN HEALTHCARE WORKERS IN HOSPITAL CARE AND
STATUS OF PRE- AND POST-EXPOSURE PREVENTION"**

with author assistant Dr. Irina Dimitrova-Toneva, Department of Occupational Health,
Directorate of Environment and Health Risk and scientific supervisor: Prof. Katja Vangelova, db
for awarding the educational and scientific degree "doctor" in the field of higher education: 7.

"Health care and sports";

professional direction: 7.1. "Medicine"; doctoral program: "Hygiene"

This review is based on the submitted dissertation, abstract and list of publications. The dissertation and the author's abstract fully comply with the required structure of a scientific work, according to the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations thereto, as well as the Regulations of the National Academy of Medical Sciences. The scientific supervisor of the doctoral student is Assoc. Katia Vangelova, MD

Irina Dimitrova Dimitrova-Toneva graduated from Sofia Medical University in 1985. From 1991 to now she worked at the National Center for Public Health and Analysis, Sofia, Bulgaria as a research assistant, and later as an assistant in the Department of Occupational Health, Directorate "Public Health and Health Risk". Her field of research is assessment of occupational risk factors for different occupational groups, with special attention to vulnerable groups, assessment of work capacity, assessment of heat exposure at work and health risks of workers in various industries. Participated in the development of the National Asbestos Profile of Bulgaria -

part of the National Program for the Elimination of Asbestos-related Diseases. He participates in the training of specialists in occupational health and safety

Dr. Irina Dimitrova - Toneva was enrolled on 8.6.2021 as a doctoral student of self-study, to the "Occupational Health" Department, Directorate "Public Health and Health Risk" and discharged with rights of protection by order RD-448/19/ 09.2022

The dissertation submitted to me for review treats especially hot topic. The health and social care sector is one of the largest in Europe, employing around 10% of the workforce in the EU. Ensuring healthy and safe working conditions for health workers is fundamental to the good functioning and sustainability of health systems. According to a study by the European Agency for Health and Safety at Work (EU-OSHA, 2014) on emerging risks, healthcare and social activities are among the risk sectors with the highest percentage of sickness absence - 58%. This is also confirmed by current WHO data (2020): 54% of health workers in low- and middle-income countries have latent tuberculosis (25 times more than the general population),

Due to the presence of biological, chemical, physical, ergonomic and psychosocial hazards, the health sector is considered one of the most dangerous. In the spectrum of health care risks, an important place is occupied by sharps injuries (SHIs), in which exposure to blood and biological fluids is possible, leading to the risk of infection with blood-borne pathogens.

The data available in our country regarding injuries with sharp objects and exposure to blood and biological fluids, as well as data on the immunization status of healthcare workers, show wide variations. The European Risk Observatory recommends harmonization at European level of monitoring systems regarding data collection and national surveillance of incident types and circumstances of blood-borne infections.

It is this, as well as the lack of sufficient data regarding the main causes of injuries and accidents among healthcare workers in Bulgaria, that gives Dr. Toneva reason to start her research.

Dissertation work is presented on 176 pages. It contains a literature review of 58 pages, aim and tasks - 1 page, contingent and methods - 4 pages, results - 47 pages, discussion - 8 pages, conclusions - 3 pages, appendices - 7 pages, references - 2 pages. The bibliography includes 300 literary sources, mostly from the last 10 years. It is illustrated with 27 tables and 51 graphs. Results of the subject have been published in 8 scientific publications, 5 of them in indexed and refereed journals. Results have been presented at 5 scientific forums.

The literature review spans 58 pages with a conclusion and examines in detail the importance of the problem, the economic and humanitarian burden of the risks of occupational exposure to blood and biological fluids in healthcare workers in hospital care; epidemiology and pathogenic (HBV, HCV, HIV); prevalence of injuries with sharp objects (SHIs) among healthcare workers, impact of individual positions; analysis of the regulatory framework and the effect of the introduced regulations at the European and National level; health consequences of NOP – transmission of blood-borne pathogens; vaccination against hepatitis B in healthcare workers - status and policies, prevention of NOPs and their possible consequences; PPE and safe medical devices; strategic documents; normative documents and researches of the NPO in Bulgaria;

On the basis of the conclusions of the literature review, a hypothesis was drawn regarding the importance of the problem, current state and lack of data regarding the main causes of injuries and accidents, which would support and guide the taking of adequate preventive actions.

The purpose of the development is to evaluate the frequency of occupational exposure to blood and biological materials among healthcare workers in the hospital care of the city of Sofia, to characterize pre- and post-exposure prophylaxis among workers, their perception of the risk of infection with blood-borne pathogens, as well as to assess the practical application of Directive 2010/32/EU, transposed in our country by Ordinance No. 3 of the Ministry of Health /2013.

To achieve the set goal, 8 tasks were set. A contingent of 2,744 health workers from 19 hospitals in the city of Sofia was covered, and appropriate survey and statistical methods were used to collect and evaluate the data. Applied in an adapted standardized questionnaire-survey for self-assessment of exposure to blood "Exposure of hospital personnel to blood and blood-borne infections"

The results are presented on 47 pages, illustrated with tables and figures and discussed in the light of the latest scientific literature, regulatory requirements and specific problems for Bulgaria.

Data from the conducted study show a high incidence of incidents of contact with blood and/or biological materials among hospital healthcare workers. Analysis of the results are consistent with literature data and show an unequal prevalence of sharps injury among healthcare workers. The frequency of incidents is significantly dependent on the nature of the workplace. It is the highest in maternity wards - 84.2%, followed by jobs in surgical departments and emergency care (over 70%). The frequency is lower in reception departments, DCC, physiotherapy and

imaging departments. These observations follow the literature of a high incident rate in surgery and emergency care workers compared to outpatients. The problem of under-reporting of incidents persists. The results of the survey show that hospital health workers generally do not properly grade the risk of infection with HBV, HCV, HIV. Adverse psychosocial factors are also found to influence the frequency of incidents. High stress at work, lack of influence on its organization, lack of safety from outsiders and patients correlate with the frequency of accidents in the previous year, and the risk of an accident is significantly increased in the presence of high stress at work

In the discussion of the results, the doctoral student concludes that the importance and necessity of improving the psychosocial environment and eliminating existing shortcomings and deficits in the practical implementation of the preventive procedures laid down in the regulations for the risk group of health workers is obvious. The findings of the study, low coverage with full vaccination, ignoring the potential danger of blood of unknown infectious status, high proportion of workers not reporting an incident, low coverage of post-exposure prophylaxis, inaccurate perception of risk are indicators of inadequate knowledge of the investigated workers and unsatisfactory level of safety and prevention of the risk of infection associated with exposure to blood and/or body fluids in an injury incident.

Based on the results, 12 conclusions were drawn, which fully meet the set goals and objectives.

The contributions of the dissertation are grouped as:

1. CONTRIBUTIONS OF A SCIENTIFIC - THEORETICAL CHARACTER, as follows: for the first time, an assessment of the NOP was carried out in healthcare workers in hospital care, in parallel with an analysis of the causes of the injuries, the perception of the risk of infection, the influence of organizational characteristics of the work and the functional state of the workers, pre- and post-exposure prophylaxis; An assessment was made of the relationship of the NPO with psychosocial factors - characteristics of the work and the organization of work; The scope of measures for pre- and post-exposure prevention of infection with blood-borne pathogens in the professional groups of hospital health workers was evaluated.
2. SCIENTIFIC - APPLIED AND METHODOLOGICAL CONTRIBUTIONS, which include the adaptation of a questionnaire for self-assessment of exposure to blood/biological fluids and the prevention of infection with blood-borne pathogens in

case of injury; characterization and assessment of the frequency of exposure to blood/biological fluids in the main professional groups of hospital health workers and depending on the type of hospital facility, workplace, patient status; finding unsatisfactory incident reporting rates and coverage of pre- and post-exposure prophylaxis of infection with blood-borne pathogens; characterization and assessment of health workers' perception of the risk of infection with HBV, HCV, HIV during occupational exposure to blood; evaluate the implementation of Directive 2010/32/EU and Regulation 3/2013 of the Ministry of Health and characterize the gaps established in practice in the prevention and control of blood exposures; prepared recommendations to eliminate gaps in the implementation of Directive 2010/32/EU and Regulation 3/2013.

The recommendations and proposals made in connection with the enrollment of Dr. Toneva as a doctoral student of independent training have been taken into account, namely the conclusions have been refined and presented in a more synthesized manner. The presentation of the contributions has also been refined, appendices have been added that include the questionnaire cards used; recommendations are made.

In conclusion, I consider that the development of assistant professor Dr. Dimitrova-Toneva is a completed dissertation work and has a significant contribution. The topic is very current and has a scientific and applied contribution in the field of healthy and safe working conditions of medical specialists. The dissertation work fully meets the requirements of the National Institute of Social Sciences and Humanities and the rules of its implementation and the Rules of the National Institute of Health and Welfare for the Development of the Academic Staff. I give a high rating to the dissertation work, I vote positively and recommend to the esteemed jury to award the ONS "Doctor" to assistant professor Dr. Irina Dimitrova-Toneva in the field of higher education 7. Health care and sports, by professional direction 7.1. Medicine, doctoral program: "Hygiene".

Prepared the review:

Prof. Tsveta Georgieva, PhD

1.11. 2022