



Marija JEVTIĆ*

Tanja NOVAKOVIĆ**

Mirjana LABAN***

Tatjana TAMASŽ ****

KNOWLEDGE (EDUCATION) AS AN IMPORTANT FACTOR IN DECREASING POPULATION VULNERABILITY (EXPERIENCES FROM UNS - FTN)

Abstract: Different emergencies, chronic or acute, such as climate change, as well as the increase in the frequency and intensity of extreme events caused by climate change, have led to an increase in population vulnerability. Adapting to climate change and a reduction of the influence of catastrophic events on ecosystems has become a focus of interest of various sectorial policies. Education is an important element for decreasing vulnerability to climate change, hazards, and emergencies. At the Faculty of Technical Sciences at the University of Novi Sad, at the educational program Disaster risk management and fire safety, students learn about the multidisciplinary aspects of the field of impact reduction of disastrous events. This paper focuses on the importance of integrating fundamental concepts of disaster risk management into educational systems, and also emphasizing, at the aforementioned academic program, the importance of public health as an important element of building communal resiliency.

Key words: Population vulnerability, Education, Knowledge, Public Health, Risk reduction, Vulnerable groups

* Full professor, University of Novi Sad, Medical Faculty, Hajduk Veljkova 3, Novi Sad, Serbia
Institute of Public Health of Vojvodina, Futoška 121, Novi Sad, Serbia, marija.jevtic@uns.ac.rs

** Teaching Assistant, University of Novi Sad, Faculty of Technical Sciences, Trg Dositeja
Obradovića 6, Novi Sad, Serbia, tanjanovakovic@uns.ac.rs

*** Assistant Professor, University of Novi Sad, Faculty of Technical Sciences, Trg Dositeja
Obradovića 6, Novi Sad, Serbia, mlaban@uns.ac.rs

**** PhD student, University of Novi Sad, Medical Faculty, Hajduk Veljkova 3, Novi Sad, Serbia,
ttamas@uns.ac.rs

1. INTRODUCTION

As a result of man's actions on a local and regional level, changes in the environment are visible on a global level. Climate change represents the greatest threat, and the ramifications of acting on the principle of "business as usual" are frightening, especially taking into account that the increased vulnerability of certain communities towards the influence of disasters is already evident. According to CRED data [1], over 301 catastrophic events have been reported just for 2016, and over 102 countries have been influenced by them [1]. These events have affected 411 million people, while 7628 have died [1]. The total economic damage, caused by disasters, has been estimated to be at 97 billion American dollars [1]. Scientific evidence points towards the fact that catastrophic events are going to become more frequent, changes in evaporation will lead to overabundant rainfall, and that both the frequency and intensity of various severe weather conditions will increase [2]. The total challenges of urbanization under the effect of climate change is the point of interest for many experts who wish to secure a safe future for the future generations, as well as to secure the sustainability of all systems and to increase their resiliency [3]. The Paris Climate Summit in 2015 (Climate Conference - COP 21), represented a global agreement important to public health, serving as an answer to the threat of chronic catastrophes and the rising vulnerability of the human population.

By mitigation, we mean efforts to reduce or prevent greenhouse gas emissions. Adaptation means preparing for a safer and more efficient life in spite of the ramifications of climate change and includes steps such as securing cities against high winds and gales, protecting crops from high temperatures and droughts, as well as developing technology that facilitates these measures [4], but also adapting the body to the changed or new environment. In normal conditions, individuals are capable of maintaining an internal dynamic balance, or rather, a physiological optimum. Man's ability to adapt is limited [5], but there is often a tendency to overestimate the defensive abilities of humanity, which is a very dangerous notion, for it devalues the efforts that are invested into the improvement of the environment.

Taking into account that by 2050 more than two-thirds of the human population will live in urban environments, the rising risk towards both individual and collective health is evident, as is the vulnerability of cities. The goals of sustainable development emphasize the connection of urban health and the health of the population. They emphasize the importance of an inclusive, safe, adaptable and sustainable approach towards city development, by which the number of deaths and people at danger will decrease, as will the economic losses caused by disasters, all with the focus on protecting low-income households and at-risk individuals[6]. The challenges of urbanization under climate change are the focus of a great number of experts, who wish to secure a safe future for future generations, as well as to secure the sustainability of all systems and to increase their resiliency [3].

2. POPULATION VULNERABILITY

The importance of the frequency and intensity of catastrophes has led to an intensification of research whose focus is the assessment of the economic and social cost of climate change, relating to the vulnerability of populations, infrastructures and financial systems that can be affected by disasters. The attention of the international community is directed towards vulnerability, especially to the fact that adaptation to climate change and the reduction of the influence of catastrophic events on ecosystems can have an important role in decreasing population vulnerability to natural disasters. Vulnerability is ubiquitous, dynamic, and an idiosyncratic trait of every community (household, region, country, infrastructure or some other element), and can be defined, in one way, as a degree to which a certain society, structure, office or geographic region can endure a certain hazard at the expense of its nature and structure, as well as their actual proximity to areas prone to hazardous events [7]. A catastrophe occurs when a natural disaster affects a population that is not adequately prepared for, or is not capable of recovering from, the consequences of a catastrophic event without assistance. Potential dangers - hazards affect a group of individuals who are usually at varying levels of preparedness, resistance and with different capacities for recovery. Vulnerability does not only include bodily integrity, but also standards of living and other economic, social, political and ecological influences. Certain individuals, households or other groups can be more vulnerable than others (the elderly and children) to the influence of potential dangers. Variability is conditioned by changes in living standards (adequate and sustainable standards of living contribute to a decrease in vulnerability) and the increase or decrease of poverty (low-income groups are more vulnerable to, and less capable of recovering from, the consequences of catastrophic events). Hazards and extreme events can change the context of economic and social development, which as a consequence, decrease the ability of the population to adequately react to future extremes. The cumulative effects of events such as hurricanes, floods or droughts do not only destroy material property and human lives, but also can influence the ability of the individual to prosper. Losses create socioeconomic hardship and later influence mental health [8].

Frequent emotional reactions after catastrophes (fear, sadness, anger, guilt, shame, helplessness), which in combination with rational reactions such as confusion, indecision, worry, can make recovery last for days, weeks, months or years after a catastrophe, and so, in turn, represent a threat to public health. Specific risks to health caused by climate change which in the future can be expected to occur in Europe are: An increase in morbidity and mortality caused by direct exposure to high temperatures; malnutrition caused by a decrease in food production; an increase in the number of alimentary and hydric epidemics due to the rise in temperatures; an increase in the number of respiratory diseases due to the extension of pollen season; change of the geographic distribution of vector-borne diseases [9] [10]. Morbidity, as a consequence of natural catastrophes caused by climate change, includes injury, emotional stress, epidemics and an increase in endemic diseases. The relative number of injuries and deaths varies and is contingent on a multitude of factors, such as the type of catastrophe, population density and distribution, environmental conditions, preparedness levels and timely warnings. Injuries are usually more common than deaths during hurricanes and tornadoes, while deaths are more common during floods, avalanches, and landslides [5].

3. THE CONTRIBUTION OF EDUCATION IN DECREASING POPULATION VULNERABILITY

Education for the purposes of gaining knowledge in order to reduce the exposure towards hazards and vulnerability towards catastrophes, increase the level of preparedness to react and to recover, and so in turn increase community resilience towards catastrophes. This is one of the priorities of the Sendai Framework for Disaster Risk Reduction 2015-2030 [11].

With careful assessment and planning, physical protection and environmental protection, as well as with a readied action plan, we can prevent extreme events from causing catastrophic outcomes [12]. One of the ways to mitigate risk of natural catastrophes is to introduce catastrophe education at all education levels, in order to raise the consciousness of citizens on the importance of preventive measures directed towards risk reduction and to increase the readiness to respond in the case of a certain natural catastrophe [13]. Schools are universal institutions which provide knowledge and skills, and their role in catastrophe prevention (and its consequences) is vital. Successful mitigation of the consequences of catastrophes can be a valid indicator of a successful education [12]. The acquisition of knowledge on the risks of catastrophes, including their prevention, mitigation and on the preparedness, reaction, rehabilitation and recovery during catastrophes, should be included as part of both the training of experts who are to deal with these issues, and part of the education of citizens. [14].

Including the process of acquiring knowledge on risk management relating to catastrophic event into the educational programs and curricula for all levels of education is important in a number of ways: Raising public consciousness on the presence, causes and effects of catastrophes; understanding risk and its parameters; understanding the available instruments of risk transfer; building a culture of catastrophe prevention; active involvement of the population towards reducing vulnerability; efficient responses during emergencies, etc. The integration of fundamental concepts of disaster risk management into school systems provides the opportunity of educating experts who are prepared to solve complex problems relating to risk management, but especially solving problems focusing on decreasing vulnerability in industrial and economic systems, and in public institutions. The importance of creating multidisciplinary programs based on case studies that facilitate not only the creation of new knowledge but also the acquisition of new skills is emphasized. One issue is that, so far, mental health as a subject has been given very little attention in the academic programs [15].

Even though progress in developing resiliency and mitigating damages has been achieved, extensive decreases in vulnerability, and also a decrease in disaster risk, necessitates persistence, with a clear focus on people and their health and the conditions for creating quality living standards, as well as regular follow-up activities [11]. It is of the utmost importance to the health of the population and the community at large that the notion of a health crisis and the concept of public health, as an important element in building a culture of resiliency of communities, be integrated into the educational system at various levels and in various areas[16].

3.1. Experiences of UNS-FTN - course “Disasters and vulnerability”

At the Faculty of Technical Sciences at the University of Novi Sad, as part of the education program Disaster risk management and fire safety, students learn about the multidisciplinary aspects of disaster risk management. During the undergraduate (8 semesters) and postgraduate/master studies (2 semesters), the students acquire knowledge and skills relating to the field of complex activities for emergency planning, reacting to emergencies, as well as activities relating to the restoration of a community after an emergency has occurred.

For the purposes of identifying possible problems and solutions which can provide the best results, content relating to emergency response is conceptualized in a way that the focus is placed on the analysis of previous experiences. In this way, critical thinking of students is encouraged and developed. In order to acquire applicable knowledge relating to disaster recovery, students conduct comprehensive analyses of communities, i.e. determine the strengths and weaknesses of the observed community, and identify the factors required for the communities’ successful recovery and the renewed facilitation of sustainable development. The ultimate goal is the mastery of the knowledge and skills needed to create and improve disaster management strategies and to create and improve plans and procedures that are a fundamental precondition for timely and adequate emergency response. Taking into account that the basis of risk management is the decrease in the number of human casualties and the preservation of the bodily integrity of the individual, the students of the Disaster risk management and fire safety program are, during their sixth semester, introduced to the concept of public health and the decrease in population vulnerability, through the academic course “*Disasters and vulnerability*“. So far, this course has been taken by 4 generations, or rather, 94 students (29 female students and 65 male students).

During the practical sections of the course, students have shown the greatest interest, and the highest performance, during assignments that essentially take the form of case studies. It is expected that students research and analyze certain current events and specific problems that are present in their environment, and on that basis provide their own suggestions on how to solve said problems and to improve the existing structures. The topics that were subject to research and analysis during the practical portion of this course, and for which the students showed the most interest during their assignments, were the following: Demographic features of a population, recognizing vulnerable groups, responding and communicating during emergencies, analyzing cause and effect chains of actual catastrophic events, health safety. Students learn the importance of planning, and learn how to facilitate and organize activities used to decrease population vulnerability. Also, they, in the interest of public health, study the types of interventions executed under catastrophic event conditions, including understanding how to organize on a local, national and international level, as well as understanding the importance of international partners. Through a range of practical assignments, the students deal with the following topics: regulations and conventions in the field of humanitarian law; strategies of prevention and rehabilitation in the domain of health safety under disaster conditions; the role of state institutions and NGOs; partnership between organizations on various levels; operational aspects of humanitarian interventions; planning and accommodation during emergencies; food and water provisions during emergencies;

assessment of population needs, health aspects during a crisis, the importance of data relating to infectious and noninfectious diseases; mental health of the population during emergencies.

The ultimate outcome of this academic course is the acquisition of knowledge and skills that allow for the critical assessments of current national and international strategies, application of the appropriate analytical models that are relevant to public health, formulating proposals for the improvement of activities, and the development of appropriate management strategies during emergencies, as well as planning, coordination, monitoring and evaluating humanitarian activities and activities in the public health domain.

4. CONCLUSION

Introducing disaster risk management into school programs and curricula at all educational levels, a community will increase its own capacity for disaster risk management, and by that token, decrease its vulnerability. By educating experts we facilitate the development of qualified professionals who can contribute to the development of a resilient and sustainable society, professionals who can lead projects for disaster risk management and can help decrease population vulnerability on a local, national and international level, and contribute to the development of the field of disaster risk management. Finally, it is important to highlight the significance of developing the Ph.D. program which would allow to comprehensively educate a number of experts in the region who would with their own work and knowledge contribute to risk management, and the preservation of public health, during catastrophic events.

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