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Resilience of society in disasters caused by nuclear accidents

Vladimir M. Cvetković[123], Stefan Rikanović[2], Snežana Knežević[4]

[1*] *University of Belgrade, Faculty of Security Studies, Serbia*
[2] *Scientific-Professional Society for Disaster Risk Management, Belgrade, Serbia*
[3] *International Institute for Disaster Research, Belgrade, Serbia*
[4] *University of Belgrade, Faculty of Organizational Sciences, Belgrade, Serbia*

[*] *Corresponding Author: vmc@fb.bg.ac.rs*

Abstract

Keeping in mind that Serbia does not have a nuclear power plant and that there are justified reasons to introduce nuclear energy, it is necessary to examine citizens' level of information and preparedness for such disasters, i.e. the possibility of coping with a specific nuclear accident. Also, several nuclear power plants are in operation near Serbia, so caution and sufficient knowledge should be kept in mind and prevention measures would be implemented in this type of disaster. The research subject is the study of risk perception and preparedness for potential nuclear accidents. The research was conducted on the territory of Belgrade using multi-stage random sampling with 256 respondents. The research results indicate a severe need to inform and educate citizens about risk management in disasters caused by nuclear accidents in Serbia, bearing in mind that the results showed that preparedness is not at a significant level. Based on the research results, preconditions are created to create appropriate strategies, programs, and campaigns that would greatly help improve the awareness and knowledge of citizens about the correct and safe way to react in such situations.

Keywords: disasters, nuclear accidents, society, resilience.

1. Introduction

It is almost paradoxical that there is a positive correlation between social development and risk exposure (Beck, 2016). Although society has been evolving for centuries, favouring ensuring the security of members of social systems, society seems to be increasingly influencing its vulnerability. We first mean the negative anthropogenic factors present in nature, and it is clear that man is their only creator (Quinn, Castéra, & Clément, 2017). Even though it is expected that how society develops and influences all the concurrent processes, which include the development of technology, industry and digital technologies, society increasingly influences its insecurity by causing various disasters (Quinn, Castéra, & Clément, 2017). Not counting natural disasters that cannot be predicted, some occur under the influence of human factors (Gu, 2019). An individual cannot do much to benefit the social environment, but in communion with others, he can. On the other hand, it is expected that one person cannot provide too many negative actions directed towards the environment in which he is, but he certainly can in group action. From that, it can be concluded that even though a person is directed to behave conscientiously towards his surroundings, he does not do what significantly endangers him.

Given that the natural environment is increasingly endangered due to various negative factors (Geras'kin, 2016), knowledge and experience gained through practice and scientific research should be invested that will enable the use of natural energy in an economical way (Dong, Sun, Jiang, & Zeng, 2018), so that pollution or waste of natural resources is reduced as much as possible. For that purpose, we can mention nuclear energy, the use of which has been intriguing for decades and is the subject of negative criticism. First of all, it is no coincidence that atomic energy is so debatable if we consider the disasters that have occurred in the past. Some of the most important and greatest disasters will be listed in this paper. Namely, using nuclear energy reduces the exploitation of natural energy sources through nuclear power plants and increases energy efficiency (Petrescu et al., 2016). So, this type of energy represents a real challenge for scientists and researchers who aim to find an adequate solution for its use. A group of authors has found a way to use more so-called green energy and cause less waste and harmful substances to the environment. Then, it is expected that nuclear power could reduce the emission of harmful gases, especially those that come from the combustion of fossil fuels. If it does not start to be used adequately soon, research warns of the dangers due to the continuation of pollution. (Dong, Sun, Jiang, & Zeng, 2018). Moreover, it is considered that the emission of harmful gases is sometimes positively correlated with the country's economic development, so if the countries develop industrially, they can be more significant polluters of the environment (Dong, Sun, Jiang, & Zeng, 2018).

In addition, research in recent years has focused on developing small modular reactors used for nuclear power generation (Lokhov & Sozoniuk, 2016), but in a much more economical way. This means that there has been a global interest in these reactors, made according to the latest technology. They can be divided into four groups: water-cooled, with gas, with a liquid metal or with molten salt (Ingersoll, 2021). Suppose some of the leading countries globally, such as the United States, China, Russia, Japan and Canada, are working to find the best solution for this reactor. We can assume that its importance is great and that other energy

sources can be reduced. Although there are many positive aspects of the use of nuclear energy (Zhiznin, Timokhov, & Gusevc, 2020), countries are not always ready to develop nuclear power plants for several reasons. First of all, this is a very financially demanding investment, and in addition, there is a fear that has been allayed due to many nuclear accidents that have occurred in recent years (Blasio & Nephew, 2018). For safety reasons, many countries (Germany, Switzerland or Belgium) have decided to reduce or even suspend investments in nuclear research and nuclear power plants (NEI, 2020). The role of atomic energy is undoubtedly indisputable. Still, one should keep in mind the potential dangers it can pose, so it is understandable why many countries have decided to take this step. It is much more favourable to use fossil fuels to produce different types of energy (Radowitz, 2019), and environmental awareness at the global level is not so high, so countries do not think much about the consequences that can be caused (Lee, Markowitz, Howe, Ko, & Leiserowitz, 2015). It is interesting that not every country can invest in developing nuclear power plants and the use of nuclear energy. Still, there are specific principles that it must first meet, i.e. the responsible bodies involved in this process (IAEA, 2020). When it comes to the bodies that participate and are responsible for this process, the following three should be pointed out (IAEA, 2020): the government of the country in which the power plant is being built or invested in nuclear energy; the owner or the body that manages the power plant; the regulatory body responsible for it.

This paper will discuss risk management in disasters caused by nuclear accidents. It cannot be said that nuclear accidents have been frequent throughout history, nor have they always occurred under the influence of the human factor. Still, they have certainly always left far-reaching consequences for the social and natural environment (Geraskin, 2016). Given that nuclear accidents can hurt humans, which will not manifest until years later (Ohtsuru, Tanigawa, Kumagai, Niwa, Takamura, & Midorikawa, 2015), their research and risk assessment is not easy to determine. It is essential to adapt different methods and techniques to manage the given risks in nuclear accidents, considering that they cannot be identified with other accidents (Ravidran, 2017). Atomic energy can be of great importance to man, but if it is not used ethically or in a good way, it can also cause great misfortune for man on an individual level and for humanity. We witness that certain nuclear disasters' consequences are still visible today, even though they happened decades ago. Moreover, estimates suggest that their consequences will be visible for thousands of years (Symonds & Thomas, 2016).

2. Phenomenology of nuclear accidents

The area may have been covered many times, but nuclear disasters are still of interest to many authors (Magill, 2015), so they should not be neglected. If countries decide to test their chances of investing in nuclear energy, they must keep in mind the accidents that may occur, i.e. the causes and consequences of their occurrence (Baraniuk, 2017). The definition of nuclear disasters refers to the following: “A nuclear or radiological emergency is a situation that may arise as a result of an emergency or other unexpected event, human error, equipment failure and other irregularities, including malicious acts involving radiation sources, and require prompt action to mitigate serious adverse effects on human health and radiation and nuclear safety, quality of life, property or the environment, or any hazard that may lead to such serious adverse effects " (Law on Radiation and Nuclear Safety and Security (" Official Gazette of RS ", No. 10/2019) Article 5). So, although the occurrence of nuclear emergencies and disasters due to the action of anthropogenic factors is most often remembered throughout history, this does not have to be the case. One of the world's nuclear disasters occurred due to a natural disaster. On the other hand, as obviously, the world's most famous nuclear disaster is the one that happened in Chornobyl in 1986 and which occurred due to inadequate human equipment management (Ravidran, 2017). Regardless of how the nuclear accident occurred, it is crucial that a person can overcome it if he is sufficiently familiar with risk management in given situations, i.e. the basic rules he needs to cope with an emergency.

It is clear that due to the consequences caused by nuclear disasters in the world, they are becoming a subject of interest and attracting a lot of attention (Ohtsuru, Tanigawa, Kumagai, Niwa, Takamura, & Midorikawa, 2015). Their consequences are visible immediately but also years after they happen. Only some of the effects caused during the accident are the release of large amounts of radiation into the environment, which hurts humans but also the entire biodiversity; melting of the reactor, which causes the release of harmful substances into the air; and others that cause a chain reaction of adverse effects. Nuclear accidents occur due to inadequate reactor treatment in a nuclear power plant (Gu, 2018). It follows from this that the most critical skill is to manage it to ensure the safety of the entire nuclear power plant, i.e. the least possible possibility of an unforeseen situation. The former traditional understanding of the protection of nuclear reactors has been surpassed because there have been many disagreements that arose after atomic accidents in the twentieth century. However, there is no absolute certainty even in the modern understanding of reactor protection. Therefore, the risk of a nuclear accident always exists and arises due to the incident. What is new in current reactor safety is faster detection of reactor failures or any warning that something is not working correctly (Gu, 2018).

It is impossible to talk about the consequences of nuclear accidents or repair them if the attention is not focused on the reasons for their occurrence (Bendix, 2019). As stated several times during the work, the main reasons these disasters disappear are technical-technological, i.e., improper management of power plants by people or through natural disasters that will cause a malfunction or accident. The last major disaster due to natural factors was in Fukushima in 2011 (Aghakouchak, 2018), and its consequences have been the most studied in recent times. After this disaster, experts had more severe fun with the functioning of the reactor and the possibility of repairing faults as soon as signs of them appeared (Rose & Sweeting, 2016). This study aims to calculate the rate of failure of reactors. Namely, in 2016, there were 443 reactors globally, of which the United States owned the most significant percentage. Based on previous accidents and the scale of international nuclear events, they concluded that this country has the most excellent chance of a nuclear accident occurring in its territory in the next 25 years. Also, this does mean major nuclear disasters and minor reactor failures that destabilise the operation of the power plant. When it comes to countries with nuclear reactors, official data show that the United States still leads in the number of nuclear reactors. It can be concluded that they invest the most in developing and using nuclear energy (Statista, 2021) after they are France with 57 reactors, which is not a tiny number compared to America, especially China, which has fewer as a much more extensive and more populous country. It could also be the result of accidents in Japan, which have led them to think about the dangers that atomic and nuclear energy can cause. What can be concluded

based on this chart is that the level of economic development of the country is not positively correlated with investment in nuclear energy. This is argued that, for example, Sweden or Germany, as highly developed countries, do not have a large number of nuclear reactors (Statista, 2021).

One of the important reasons nuclear accidents can occur is natural disasters (Aghakouchak, 2018). The conditions in which humanity lives today depend on their treatment of the natural environment. There have been fires or floods due to global warming in the last few years. In addition, unforeseen disasters such as earthquakes or tsunamis occur. One such natural disaster has caused the Fukushima nuclear accident (IAEA, 2016). The Director-General wrote an International Atomic Energy Agency report that clearly states that this accident was caused by a tsunami followed by a strong earthquake. In the introductory word, it is mentioned that this was the most significant nuclear accident after Chornobyl in 1986. The number of people evacuated after this accident exceeded 100,000, and some have not returned to their homes. What stands out, in particular, is the actions of the staff during the disaster and during the repair of its consequences, which will be explained in more detail later during the work. The report also confirms that there were obvious difficulties in the operation of this power plant before the accident. As a result of the information, all other countries that own nuclear power plants were ordered to additionally test their reactors and work on them as a precautionary measure, which was done.

3. Prevention of nuclear accidents

Immediately after the nuclear accident in Japan, an emergency was announced, which included activities for the general public, starting with the rapid evacuation of people (IAEA, 2016). Knowing the consequences that could happen to the population, the state and its organs soon began to implement measures to mitigate the effects. Some of the critical dangers are the following that will be discussed (Ravidran, 2017). The greatest threat is radiation that cannot be seen or felt; it is not noticeable. These consequences can occur in different ways, both for the person and his entire environment. They happen in the first 60 days if it is an acute exposure, which means that the person was exposed to radiation to a considerable extent. If there are no critical consequences, the next ones are postponed according to the level of reaction, followed by late/late, and finally, chronic or genetic consequences of radiation (Jorga, 2016). The general public has reason to be frightened about the effects of radiation because they are inevitable in some form when a nuclear accident breaks out. Radiation poisoning or other types of pathology can occur after the human body is exposed to these rays (Jorga, 2016). They damage cells and cause cancer, and can even lead to death. Also, they hurt people, but the consequences also affect the earth, i.e. all other living beings (Geraskin, 2016). Namely, if plants and animals are exposed to radiation, it can cause entire chain reactions in the ecosystem and disrupt its basic functioning. Much radiation will be absorbed depending on the degree of radiation plants or animals have been exposed to or irradiated. Then, they can show anomalies of different types in a certain period. On the other hand, there is a possibility that animals or plants will not be modified if radiation exposure is treated adequately, i.e. if these disasters are successfully managed (Geraskin, 2016). Integrated use of knowledge and research data obtained from studying similar topics is crucial for coping in these situations. We are exposed to a certain level of radiation daily (Zeegers et al., 2017), but it is not a significant source of danger. However, there are methods to examine this level of exposure. For these consequences of radiation caused by high radiation levels, the World Health Organization states that it causes burns and radiation diseases visible on the skin (Jorga, 2016). The consequences are also visible in the possibility of developing cancers of various types and other conditions. The effects of radiation are felt by organs such as bone marrow, skin, gametes, cartilage and mucous membranes. In external contamination, radiation is introduced through the consumption of food, water or in contact with other elements from the external environment (Jorga, 2016). As already mentioned, radiation is dangerous because the human senses cannot identify it. Also, radiation manifests depending on the dose and source of radiation. You can get skin burns or skin cancer, worsening the blood picture, reduced vision or reduced quality of lung cells. If we are too exposed to the sun's ultraviolet rays, we can get skin cancer and a decrease in blood leukocytes, which further causes adverse effects on other systems in the body (Einstein & Hill, 2016). These are just some of the symptoms; many others depend on the type of radiation. The primary way for a person to manage the risk of radiation exposure is to detect it first. There are devices for measuring radiation levels that warn a person about radiation status to know what to do accordingly.

There are different levels of radiation exposure after the Chornobyl disaster and the consequences that can be caused after it (BBC, 2019). It was noticed that the workers who were the first to take part in repairing the damage due to the outbreak of the disaster were exposed to the most significant radiation. After that, some were not exposed to the same extent, but certainly, their radiation is not negligible and leaves consequences. The consequences are listed here in the form of vomiting, internal bleeding or death within just two weeks. So, as in the previous case, it is about acute radiation. Interestingly, regardless of the scale of the accident in Fukushima that occurred in 2011, employed workers were many times less exposed to dangerous radiation than in Chernobyl (BBC, 2019). We can assume that this is due to mistakes learned from the past and the use of more modern protective equipment. The data on the maximum level of radiation to which employees at nuclear plants are allowed to be exposed is also essential (BBC, 2019). This is followed by stories of radiation that are not dangerous to human life and do not cause significant consequences. There is also a difference between the exclusion zones due to the Chornobyl radiation and the Fukushima disaster.

Preventive measures are necessary and indicate excellent opportunities for successful remediation of consequences (Ravidran, 2017). The example in Fukushima is a witness to the fact that if expert groups and special units are ready to act in similar situations, the consequences can be remedied relatively quickly, certainly much faster than those created at Chornobyl (NEI, 2019). The importance of applying preventive measures lies in the fact that these situations do not happen. If they do, reduce their adverse effects, which are undoubtedly harmful to humans and the environment, as much as possible (Hadleigh-Dunn, Labib, & Agwu, 2019). This leads us to conclude that regardless of whether a country has had a case of nuclear disaster, it must have a ready plan of reaction and organisation in case an accident occurs. Probably taught by experience from previous natural disasters and precisely the Chornobyl nuclear disaster, Japan has responded very successfully to this challenge and shown a difference in skilful risk

management, as evidenced by the enormous difference in the number of victims (Bendix, 2019). Emergency management requires some prior knowledge, which facilitates dealing with them promptly and with as minor damage as possible (Ravidran, 2017). Even when society encounters disasters for the first time, training and education must be held beforehand and at least practical experiences based on simulated situations to make the reaction in real cases more credible (Ohba, Tanigawa, & Liutsko, 2021). The genuine part will consist of an overview of applicable prevention measures at the individual and community level in a nuclear accident. It has already been mentioned that people must have at least some basic knowledge of engaging during emergencies. Given that any natural or technical-technological disaster can happen anytime and anywhere, it only contributes to the importance of providing essential training to the civilian population (Cvetković, Jakovljević, Gačić, & Filipović, 2017). Also, in areas at potential risk of a nuclear disaster, special attention should be paid to training in the field of emergencies caused by nuclear accidents.

For example, it is essential to know how to handle devices that measure radiation levels, especially for people who are relatively close to nuclear facilities. Then they will know what level of radiation they faced and what should be done about it (Ravidran, 2017). Then, it is not out of place to learn the allowed level of radiation a person can be exposed to in everyday life or at some periodic level. In order not to go into details that are not the subject of this paper, it is essential to mention that devices we use every day, such as mobile phones, microwaves, radios, and other technical devices, do not pose any danger to us (Symonds & Thomas, 2016). On the other hand, radiation through medical equipment in treating some diseases can be harmful. There is a rule that after a few hours, the radiation level drops. If we have provided ourselves with adequate shelter from nuclear accidents or radiation in general, and if we stay in it for more than seven hours, we can reduce the consequences (Ravidran, 2017). More detailed preventive measures will be explained in the next few lines through a particular classification into actions that can be implemented by an individual and standards that the community should carry out by the orders received from the competent authorities.

People often do not know how to protect themselves, so they should be educated on many levels to save themselves and other people in unforeseen situations. When it comes to nuclear accidents, it is essential to know a few fundamental rules that anyone can apply (Ravidran, 2017): the level of radiation decreases over time. After several hours of radiation, it falls. This does not mean that the environment is safe after a few hours, but it does mean that it is less contaminated, and it is also necessary to provide particular shelter in the form of protection. It is considered essential to hide underground for this type of protection. So any kind of basement can be helpful; then, it is necessary to stay away from windows or other openings in the house or shelter because the radiation spreads through the air and through radiation, which means that rarely any material has adequate protection against it; if possible, protect yourself with some more substantial and more massive objects. This means that at no cost should you go out into the open and be exposed to radiation, but close yourself inside thicker and more massive walls or materials.

It is necessary to point out that a person cannot be ready to react quickly after the outbreak of a nuclear accident if he is not trained or educated at least about the basic things that are necessary for the realisation of these types of emergencies (Nomura et al., 2016). For this reason, it is essential to educate people in potentially endangered areas around nuclear facilities. The entire population must know at least some basics in repairing the consequences of any disasters and unforeseen circumstances. Still, those living near nuclear power plants should consider the possibility of an accident. In this regard, the competent authorities must educate the population in the endangered zones in various ways and organise practical training activities or the application of preventive measures (Tsujiguchi et al., 2019). The authorities must adequately identify the basic needs and act on them. This means that the available resources for emergencies should be directed toward repairing their consequences; therefore, it is pretty logical that a significant part of the funds must be directed toward the health system (Kaur, 2020). It is also essential that staff working in health, safety and similar services in endangered areas to ensure the safety and health of the population be trained to deal with patients in the event of a nuclear accident. Given that radiation exposure differs significantly compared to some injuries due to other natural disasters, vulnerable patients require special care, which, among other things, poses a danger to the staff itself, given that they are in contact with the patient who was exposed to high levels of radiation (Jorga, 2016). One of the essential tasks of managing the risks of disasters caused by nuclear accidents is the training and willingness of staff to respond to these challenges (Kenan & Jovanović, 2015). It is essential to pay special attention to the team working in the security services, at nuclear facilities and in health care institutions. Case studies and studies have been conducted to examine the extent to which personnel are genuinely prepared to face a type of emergency and how much they can be counted on when it comes to saving lives and providing first aid in a nuclear accident (Tsujiguchi et al., 2019). The next part will describe some research that dealt with the training of experts and staff and readiness to work in given emergencies.

Nuclear safety and security are essential for work at a nuclear plant; however, it turns out that there are fewer and fewer experts in this field lately, so this problem should be solved given that the need for them is growing (Kenan & Jovanović, 2015). The fact is that nuclear accidents do not happen often, but that is not a reason to neglect staff training and risk management strategies. Far from it, considering that these disasters leave far-reaching consequences, serious training should be taken about the movement of people who will manage emergencies. With that in mind, a group of researchers at the University of Pennsylvania and several other colleges in the United States are conducting timely courses and training on nuclear safety and emergency response in a nuclear disaster. This training aims to train as many experts as possible in this field, i.e. to attract personnel who will deal with nuclear safety. Also, it is no coincidence that these courses take place in this country because it has the most significant number of nuclear reactors and invests the most in atomic energy (Statista, 2020). The US Department of State and the Global Threat Reduction Initiative have found a way to form groups of experts who will pass on their knowledge and desire to deal with nuclear security to young people. The loss of technical and professional support in this sector is unacceptable, so it is essential to compensate quickly. The number of experts in this field is decreasing, and young students have lost interest in nuclear safety. The focus of these professional training, which these two organisations and universities across America are holding, is to create a scientific climate that will nurture the importance of nuclear safety. Interestingly, this brings together cooperation at the international level, emphasising American atomic security and global security. The courses that participants can attend are divided into several classifications depending on their interest in nuclear energy (Kenan & Jovanović, 2015): international nuclear safety policy;

detectors and source technology; application of detectors, sensors and sources for radiation detection and measurement of radioactivity; nuclear safety laboratory; risk and threat analysis and assessment; design and analysis of security systems for nuclear and radiological facilities.

3. Influence of demographic, socio-economic and psychological factors on risk perception

It should be pointed out that risks are all around us and that they follow us every day, whatever we do in life. Individuals are exposed to risk every day, whether it is some business situation or examples of another kind (Türkkan & Hırca, 2021). In some cases, individuals enter risky positions because they create a unique feeling of excitement and increase their adrenaline (Sund, Svensson, & Andersson, 2017). However, we must not lose sight of situations that individuals cannot influence or that they do not choose to have. As can be concluded, these situations are riddled with natural disasters, and people cannot control them but must react by their readiness and information. There is a lot of research done on the influence of socio-economic, demographic and psychological factors on the perception of risk in disasters of various kinds, some of which will be mentioned in the paper. Of course, this is primarily about hazards that not only people do not choose but also occur relatively rarely, such as floods, fires, strong winds, technical and technological disasters and more (Sjöberg, 2000).

Knowing how individuals react to unforeseen disasters and their perception of risk is essential for a security policy to see if they can respond in case of need. In addition, a distinction needs to be made as to how they view risk at the individual level, focusing on themselves and how they see a risky situation that can be devastating for other community members, that is, for the whole society (source). For example, a study studied the perception of risk from the aspect of an individual who views the risk situation as a potential danger to him. He is personally endangered and scared for his life. In this study, the risk is considered subjective because it relates directly to the individual (Sjöberg, 2000). As mentioned, there are significant studies on the study of risk perception. Therefore, a category of studies examines the personal perception of risk by individuals who often overestimate low-risk risks, i.e. underestimate high-probability risks (sources). Then, some studies aimed to investigate how different factors affect belief and knowledge about risk (source). Of course, when we talk about aspects, we think first of sociological, psychological and demographic factors. For example, scientists have studied how individuals experience different dangers ranging from climate change, floods, fires, nuclear disasters, fear of nuclear waste and more (source). Also, there is even a categorisation of risks into the following three (Olofsson & Öhman, 2015): known; controlled; fear of danger.

Counting on the need to examine the information and readiness of citizens to react in case of technical and technological disasters with a focus on nuclear accidents, we can assume that there is some difference in socio-economic, demographic or psychological factors on risk perception. So, depending on which socioeconomic factors affect individuals, their perception of risk will be different. Socioeconomic characteristics can often play a decisive role in risk behaviour and perception (Martinez-Arias, Prades, Arranz, & Macías, 2000). For example, the population living in territories often affected by natural disasters is mainly accustomed to these phenomena, which means that they can be ready for an adequate reaction compared to citizens who do not often encounter natural disasters (Cvetković, 2018). As can be concluded, the reason for this lies in the fact that citizens who are accustomed to disasters are taught how the system works and are ready to take various measures that they have already learned. In this regard, they are better acquainted with what should be done in given situations and how to respect the signs of the warning system in shared dangers (Cvetković, 2016). We should not forget that certain risks cannot be prevented, nor can measures be implemented to eliminate them (Cvetković, 2016). What is essential is that the citizens are better informed about the preventive measures that they can implement if they want to repair and reduce the occurrence of negative consequences. Suppose they are better acquainted with preventative measures and the essential information they need to know about specific disasters. In that case, they will find it easier to overcome their challenges. In addition, people who have already gone through some kind of disaster or similar trust the media that report on the accident and are more willing to respond to this challenge than citizens who have not had the opportunity to face a disaster (Cvetković, 2016). This happens because there is a fear that the accident will happen again; their experience makes people feel more ready to react to an accident. On the other hand, there is an opportunity for citizens who have never survived a disaster to show readiness to respond in such situations, even though they have not had the chance to learn the measures that need to be implemented (Cvetković, 2016).

Socio-economic determinants, demographic, psychological and other factors have been examined regarding risk perception. It can be concluded that there is a difference when these factors are compared with a particular risk (Sund, Svensson, & Andersson, 2017). These three characteristics contain several different but interrelated elements that can affect an individual's behaviour in disasters, risk perception, implementation of preventive measures or similar (Cvetković, 2016). We will first pay attention to demographic factors, and later we will focus on socio-economic and psychological ones. Regarding demographic characteristics, we include the following (Cvetković, 2016): gender, age, level of education, and success in high school. Also, regarding demographic determinants, research has revealed different results in terms of risk perception in terms of gender, age, level of education and others. For example, it has been investigated that women perceive risks as more significant and more dangerous than men (Sund, Svensson, & Andersson, 2017). Specifically, these cases involve risks such as floods, fires, theft, air accidents, car accidents and health risks. We cannot say the reason for these results, nor will we link them to the characteristics of women and men, but we will keep in mind that men view risks with less fear than women (Sund, Svensson, & Andersson, 2017). Then, women also consider situations such as violence and crime, technical-technological disasters, and environmental disasters riskier than men (Barke, Jenkins-Smith, & Slovic, 1997). Interestingly, the significance of these results varies by territory. For example, in the United States, women must view risks as more dangerous and more significant, while in Sweden, the classification of risks by gender is less critical (Sund, Svensson, & Andersson, 2017).

In addition to gender, many other demographic characteristics can affect risk perception, such as age. One study found a negative correlation between age and risk perception of air accidents, fires, or car accidents (Savage, 1993). So, it is considered here that

older people have less fear of the above accidents. On the other hand, young people are more afraid of fires, car accidents, etc. Furthermore, when it comes to health risks, a positive correlation has been observed; for example, older people are more afraid of cancer than younger people (Lazo, Kinnell, & Fisher, 2000). Also, older people perceive the risks of nuclear waste or nuclear disasters as much higher and more dangerous than youth (Andersson & Lundborg, 2007). Speaking of demographic characteristics, we should not neglect the level of education. Namely, studies have found a difference in risk perception depending on education (Sund, Svensson, & Andersson, 2017). Of course, education should not be seen as a precondition for different perceptions of risk, but we could link it to greater awareness of disasters and accidents that may occur. In this regard, highly educated people may be more aware of the risks, i.e. situations that can cause different types of accidents and deal with them (Sundblad, Biel, & Gärling, 2007). One study found that people with lower levels of education are less aware of the dangers that a disaster can cause and do not view the risks as extremely dangerous (Sundblad, Biel, & Gärling, 2007). In addition to these, some studies have not seen a link between different levels of education and risk perception, i.e. fear of certain disasters (Andersson & Lundborg, 2007). Namely, the studies mainly dealt with the perception of the risk of natural disasters such as floods, earthquakes, hurricanes or strong winds, and the so-called everyday risks such as fire (Knuth et al., 2015). In these studies, fire is declared an everyday risk, primarily because it can occur in a household where people live every day. Of course, this does not mean that fires resulting from natural disasters are excluded from other research studies. After demographic characteristics, it is essential to pay attention to socio-economic factors that may affect risk perception. In this regard, we can mention the following (Cvetković, 2016): employment; the amount of income of the individual; marital status.

Employment and the amount of an individual's income can be linked in several ways because we assume that someone who is employed is at the same time financially independent. Research has shown that people who have higher monthly incomes believe that they can more easily bear the risk of disaster to overcome the negative consequences of the same (Kostyuchenko & Movchan, 2015). Then, when it comes to fire risk perception, a study shows that employed people are more willing to take specific preventive measures than the unemployed (Cvetković, 2016). Let's build on employment and the ability of citizens to take particular actions to either repair the consequences of disasters or take preventive measures. We can judge that households with higher incomes have more significant opportunities to take specific steps (Cvetković, 2016). On the other hand, citizens whose gains are much more modest and, in some cases, even insufficient, are not able to use their resources in the same way to protect themselves from the consequences of natural or other disasters (Cvetković, 2016). Also, citizens who pay for an insurance policy have a relatively low perception of the severity of the risk of some natural disasters (Xu et al., 2019). In addition, they believe that if they are financially independent, i.e. if they have enough income, property and insurance, they will be able to bear the consequences of the disaster and its negative effect on their family more easily. This is why their perception of risk hazards is relatively low (Xu et al., 2019). Low-income populations perceive natural and other disasters as high-risk situations to which they will not be able to respond quickly (Kostyuchenko & Movchan, 2015). Interestingly, social networks and acquaintances influence their perception of risk regarding financial readiness for them. In this regard, we cite the importance of the ability of households to borrow money or other resources from their friends, relatives or acquaintances in the event of the need to remedy the negative consequences of a disaster (Xu et al., 2019). For example, households in rural areas and rural families have a more comprehensive network of friends they can count on to lend them money in case of need. Unlike urban homes, rural households are less prone to purchasing natural disaster insurance policies (Xu et al., 2019). However, rural families with higher incomes have shown interest in insurance against natural disasters. Concerns that an accident may occur and a high chance of losing what they have gained through their work lead household members to ensure their properties (Cao, Xu, Xie, Liu, & Liu, 2016).

After demographic and socio-economic factors, it is time to explain the psychological determinants that can affect the perception of the risk of natural and other types of disasters. Psychological factors include the following (Cvetković, 2016): fear of a particular disaster; previous experience with similar situations; risk perception; motivation to react in a certain way. All psychological factors are interrelated, so it is no coincidence that individuals may feel fear of disaster if they have had previous experiences with similar situations (Knuth et al., 2015). In psychological factors, the study of fear of natural and other disasters is widespread, and studies indicate relatively different results. For example, a study conducted in 2015 in the Republic of Serbia confirmed that out of 2,500 respondents, almost half of them feel fear, about 30% do not feel fear, while about 16% of citizens are not sure whether they feel fear of natural disasters caused by floods (Cvetković & Sandić, 2006). The study results also show a close relationship between fear of floods and gender, age, education, marital status, employment status, monthly income and other demographic and socio-economic characteristics (Cvetković & Sandić, 2006). Then, the same study showed that employed citizens fear natural disasters, which can be related to their information and training to react in given situations, and are aware of the dangers that can follow after natural disasters of different kinds (Cvetković & Sandić, 2006).

Natural disasters and how they cause consequences of a psychological nature can be seen in the appearance of anxiety, depression or post-traumatic stress (Novia, Hariyanti, & Yuliatun, 2020). These psychological consequences can cause fear and the above disorders and many other products reflected in frequent mood swings, decreased interest and motivation for some activities, etc. Natural disasters are significant provocateurs of human mental disorders (Niitsu, Takaoka, & Uemura, 2014); moreover, if the psychological problems of people caused by natural disasters are not resolved in a short period, there is a distinct possibility that people will fall into complex mental states (Niitsu, Takaoka, & Uemura, 2014). People who have survived some type of disaster and suffer from post-traumatic stress usually show symptoms such as recurrence of this event while constantly avoiding the potential next occurrence of the disaster (Briere & Elliott, 2000). Suppose post-traumatic stress is not resolved in time. In that case, there is a high possibility that people may fall into a depression that can be cured with regular visits to a psychotherapist and appropriate medications (Bravo, Rubio-Stipec, Canino, Woodbury, & Ribera, 1990). Beyond these symptoms, individuals may develop a sense of guilt that they justify by being guilty of not reacting in time or not being ready enough to face a given situation. This problem is present because the victim cannot overcome the pain he is currently dealing with; he cannot continue with his life so far, nor does

he want to forget what happened. Of course, such reactions are related to large-scale disasters in which the individual or his close people were directly affected (Briere & Elliott, 2000).

We should not forget the interdependence of psychological factors with others that we talked about a moment ago. This statement shows the relationship between fear of natural disasters and the population's place of residence or occupation (Novia, Hariyanti, & Yuliatun, 2020). So, for example, people engaged in agriculture have an intense fear of drought or floods, which can endanger their yield and their lives directly and the lives of their families. In addition to this, people generally face the fear of a specific disaster and the consequences that may be caused (Briere & Elliott, 2000). Post-traumatic stress disorder is just one of the psychological consequences of a disaster. In addition, trauma may develop in survivors of the accident, which may take some time to overcome (Andersson & Lundborg, 2007). People who have witnessed in any way the natural devastation that has caused any kind of death, suffering, injury, loss of property, material destruction, loss of shelter and other accidents will indeed feel some form of psychological problem that must be resolved as soon as possible (Novia, Hariyanti, & Yuliatun, 2020). Shortly afterwards, post-traumatic stress disorder may occur months or even years after the situation that caused or provoked it (Bravo, Rubio-Stipec, Canino, Woodbury, & Ribera, 1990). The stress that the victim experiences results from the trauma she experienced due to a disaster and all the consequences have to do with it. Trauma is a condition in which the victim participates psychological, but her situation is accompanied by psychological difficulties and experiences that make her feel vulnerable and unstable (Carlson, 1997). After suffering a natural disaster, some cases exhibited forms of behaviour that were not previously part of their standard behaviour patterns (Elliott, 1997). For example, if a person has survived a disaster, he may fear not having clean water or drinking water for a long time after it, fear destroying a shelter, or fear losing loved ones. Then, he may feel uncertainty, maladaptation to suffering, and unable to perform his daily tasks (Elliott, 1997). This fear does not disappear when a person changes the environment in which the accident happened but follows him for a while wherever he is.

4. Methods

The general hypothesis of this paper is that there is a strong agreement of respondents with the view that they are not sufficiently informed about the management of disaster risk caused by nuclear disasters. The population of the sample consists of all adult citizens of Belgrade. The research was conducted on the territory of Belgrade using multimethod random sampling. After the settlement and the street, every other household on the left and right sides of the road was selected by the mentioned method. Every male and female citizen who turned more than eighteen according to the principle of next birthday was surveyed. The sample included 256 respondents. Regarding the explicit goal, it is important to note how the respondents' socio-economic, demographic, and gender characteristics can influence the reaction in the event of a nuclear disaster. There is also a tendency to examine how these characteristics affect the level of basic information about nuclear disasters and their possible consequences. The survey questionnaire was formulated based on previously established goals and research ideas, and the inspiration was obtained based on reviews of many scientific studies and research that had the same or similar topics of interest. Before conducting the research, a pilot research was conducted on only a few respondents to check the comprehensibility and clarity of the question before contacting the respondents with the survey questionnaire. This reduces the possibility of survey error or misunderstanding of the question and the concept of the questionnaire.

Sample

The total number of respondents is 256, and the sample included 109 men and 147 women, which is a percentage of 42.58% of men and 57.42% of women. The age group most included in the sample is 49-58 years old, whose number of respondents is 114, or 44.53%. The next group of respondents with 53 persons was aged 29-38, then there were 47 respondents aged 18-28, and finally, 42 respondents aged 39-48. The sample included the most respondents (80) with higher education, i.e. 70 with higher education, 69 with a four-year secondary school and 37 with a three-year secondary school. Also, when it comes to marital status, the most significant number of respondents is married (167), above 65%, followed by a group of respondents who are engaged (37) 14.45%, in a relationship (44) 17.19%, followed by respondents who are divorced (5) 1.95% and those who are unmarried (3), i.e. 1.17%. When it comes to household size, the largest share of respondents lives in a household with a total of three members (89) 33.59%, then in a household with four members (68) 22.56%, then in a household with five members (46) 17, 97% and finally in a household with one member (35) 13.67%, ie with two members (21) 8.2%. In terms of monthly income, the largest share of respondents has more than 90,000 dinars available on a monthly basis (123) or 48.05%, followed by a group of respondents with monthly cash income between 50,000-75,000 (92) 35.94%, then a group of respondents with a monthly income of 25,000-50,000 (33) 12.89%, and finally respondents who receive between 75,000-90,000 RSD (8) 3.13% per month. More than 64.84% of respondents are employed, while 35.16% are unemployed. The occupations of the respondents were also examined. Most of the respondents fall into the group of professions of service or trade (68) 26.56%, followed by administrative officials (62) 24.22%, followed by artisans with related occupations (46) 17.97 %. Technicians or associate experts (42) 16.41%, then there are managers (35) 13.67%, and finally technicians and associate experts (3) 1.17% (Table 1).

Table 1. Sample structure (N = 256).

Variable	Categories	N	%
Gender	Male	109	42.58
	Female	147	57.4
Age	18-28	47	18.36
	29-38	53	20.70
	39-48	42	16.41
	49-58	114	44.53
Education level	High education	80	31.25
	Higher education	70	27.34
	Three-year high school	37	14.45
	Four-year high school	69	26.95
Marital status	Engage	37	14.45
	Unmarried	3	1.17
	Divorced	5	1.95
	In a relationship	44	17.19
	Married	167	65.23
Household size	Household with two members	21	8.20
	Household with one member	35	13.67
	Household with five members		
	Household with three members	46	17.97
	The household has four members	86	33.59
Income level	25.000-50.000	33	12.89
	50.000-75.000	92	35.94
	75.000-90.000	8	3.13
	More than 90.000	123	48.05
Employment	Employed	166	64.84
	Unemployed	90	35.16
Number of employed members in the household	2	210	75.27
	3	46	24.73

5. Results

Bearing in mind that one of the essential goals of the research is to examine the readiness to manage the risks caused by nuclear disasters, the first question that respondents face is their willingness to take relevant measures if they find themselves in a given situation. Namely, when asked if they think they would know what steps to take if they find themselves in a nuclear disaster situation, the majority of respondents, 51.17%, answered that they would not manage, and 28.91% responded that they do not know. The rest, 19.92%, answered that they would work. More than half of the respondents do not think they would manage in case of a nuclear disaster, 29% do not know if they would work, i.e. 20% of them believe that they would operate in a situation of the outbreak of nuclear disaster. The next question referred to their perception of their willingness to help others in the event of a nuclear disaster. The majority of respondents answered this question; as many as 75.78% of respondents answered in the affirmative, i.e. 18.19% of them responded that they did not know, and only 7.03% of them answered that they were not able to help others. Counting on the fact that the important goal of this research is to examine whether respondents are ready and sufficiently trained to react in the event of a nuclear disaster, they point out the following: 73.44% of respondents say they do not think they are ready to respond in case of nuclear disasters, i.e. 26.56% of them believe it is prepared. The upcoming question is whether the respondents believe that they are sufficiently aware of the consequences of the nuclear disaster. The following answers were given to the question: 30.86% of respondents said they thought they were adequately aware of the effects of a nuclear disaster. In comparison, the remaining 69.14% said they did not know they were sufficiently aware of the consequences of a nuclear disaster. There was a tendency to examine the fear among the people regarding the possibility of a nuclear disaster. A percentage of 41.41% of respondents state that they are afraid, while 58.59% are not afraid that there could be a nuclear accident in their environment. We cannot determine the specific reason for the respondents' answers. Still, we can assume that many respondents answered that they are not afraid of a nuclear disaster in their environment, primarily because of the city of Belgrade and the Republic of Serbia. There is no nuclear power plant. When asked whether respondents would be ready for an emergency evacuation in a nuclear disaster, the following answers were given: 56.25% of respondents said they were prepared to evacuate in a nuclear disaster. In comparison, 43.75% said they were not ready or thought it was necessary.

The upcoming question refers to the volunteering of respondents in the event of a nuclear disaster. When asked if they are ready to volunteer in their country in a technical-technological disaster, all respondents answered in the affirmative. On the other hand, the question was whether they would volunteer in a neighbouring country in the event of a technical-technological disaster, respondents provided the following answers: 80.86% of respondents answered that they would volunteer, 17.97% do not know whether to volunteer, and all 1.17% of respondents indicated that they would not volunteer. When asked whether they would comply with all measures adopted by the state in the event of a technical-technological disaster, respondents gave the following answers:

73.44% of respondents said they would abide by state measures, 26.56% of respondents do not know whether to comply with standards and none of the respondents stated that they would not comply with the criteria prescribed by the state. The next question refers to the need of the respondents to receive primary or additional education on the issue of disaster risk management caused by nuclear accidents. Accordingly, 56.25% point out that they think there is a need for this primary or additional education, while 43.75% do not believe it is needed. Building on the previous question, there was a tendency to check whether the respondents would attend any training on managing the risks of disasters caused by nuclear disasters. Therefore, 59.76% of respondents answered that they would listen to education, while 40.24% would not listen to education on disaster risk management caused by nuclear accidents.

When it comes to the opinion that respondents know much more about managing the risk of disasters caused by nuclear accidents than others, respondents gave the following answers: 37.11% of respondents stated that they do not agree with the given position, 17.18% of them do not agree nor does he disagree with this view, 27.73% of respondents agree with this view, 17.98% of them disagree at all, while no respondent stated that he entirely agrees. Regarding the attitude "I would know how to cope in the event of a nuclear disaster", the respondents give the following answers: 23.44% of them disagree, 19.14% of them are neutral, i.e. neither agree nor disagree, 40.23% of respondents agree, 17.19% of them disagree at all, while none of the respondents stated that they completely agree. There was a need to examine awareness and opinion about the danger of a nuclear disaster. In this regard, with the attitude that the nuclear disaster is not as dangerous as others say, 35.54% of respondents state that they do not agree with this view, 44 neither agree nor disagree, 26.56% of them agree, 20, 7% of respondents do not agree at all, and there are no respondents who fully agree with this view. Another position on examining the awareness of the danger of a nuclear disaster is stated, which points out that a nuclear disaster can be more dangerous than a natural disaster. 17.18% of respondents disagree with this view, 44.53% neither agree nor disagree, 30.08% of respondents agree, 8.21% of them agree, while no respondent disagrees with a given attitude.

It was also necessary to examine whether the respondents would have confidence in the competent authorities to respond to a nuclear disaster's dangers adequately. Accordingly, 17.58% of respondents disagree that they trust the competent authorities to respond to the risks of nuclear disaster adequately, 13.67% neither agree nor disagree with this view, 24.22% agree, and 44.53% agree fully agrees. In contrast, no respondent agrees at all with this view. It remains to be examined how much the respondents are interested in attending courses and training on managing risks caused by nuclear disasters. Therefore, as many as 40% of respondents disagree with the need to organise training courses for responding to nuclear disasters, 1% disagree or disagree, 35% agree, and 24% fully agree. At the same time, no respondent completely disagrees. With the attitude that people in the area are not aware of the consequences of a nuclear disaster, 17% of respondents neither agree nor disagree, 28% of respondents agree, and 55% of respondents agree.

Crossing the level of education and the respondents' answers to whether they think they would know what measures to take in case of a nuclear disaster, we get the results shown in Table 2. Insight into it, we can conclude that 14.8% of highly educated people would not manage, 10.2% do not know if they would work, and 10.2% think they would care. People with higher education mostly believe that they would not manage, i.e. 76% of them would not mind, while the minority feels they would work or do not know. When it comes to respondents in high school, for the most part, a neutral answer is provided, i.e. respondents do not know what measures they should take in the event of a nuclear disaster. People with a four-year school are divided between a positive and a negative answer, while respondents with a three-year school answer "I don't know" or not to cope. Also, no one said they would manage. The results of research that testify to the connection between the level of education and the question of whether the respondents would know what measures to take if they find themselves in a nuclear disaster situation indicate that there is a statistically significant correlation between the given variables $p = 0.16$. The results of cross-tabulation of gender and questions on whether they think they can help others in a nuclear disaster are shown in Table 4, both in percentage and absolute about the total number of respondents surveyed. More than 80% of females answered in the affirmative; no person said they did not know, while less than 20% thought they could not help others. When it comes to men, a higher percentage answered positively, while three times fewer males claim they do not know. Looking at the bigger picture, 75.8% of the total number of respondents responded positively, and 17.2% answered: "I don't know". In comparison, only 7% of respondents answered negatively to the question, and this 7% are exclusively female.

The results of research that testify to the relationship between gender and whether they are ready to help others in a nuclear disaster indicate a statistically significant relationship between the given variables $p = 0.43$. As the alpha value (α) is equal to 0.05, we conclude that the null hypothesis is rejected. The null hypothesis states no statistically significant correlation, i.e. dependence between the observed features. The results of the cross-tabulation of education levels and whether they consider themselves sufficiently trained to react in the event of a nuclear disaster can be seen in Table 6. Higher education respondents in, 7.5% stated that they believe 24% do not think they are trained enough to react in a nuclear disaster. Also, when it comes to higher education respondents, about 4% of them believe that they are sufficiently trained, while about 23% of them do not think so. Then, according to the respondents who have completed three years of high school, 14.5% of them state that they do not consider themselves sufficiently trained to react in a nuclear disaster. Regarding respondents who have completed a four-year high school, about 15% state that they consider themselves sufficiently trained, while 12% believe they are not adequately prepared. The research results, which testify to the connection between the level of education and whether they consider themselves sufficiently trained to react in a nuclear disaster, indicate a statistically significant correlation between the given variables $p = 0.4$. As the alpha value equals 0.05, we conclude that the null hypothesis is rejected. The null hypothesis states no statistically significant correlation, i.e. dependence between the observed features.

Male and female respondents are completely divided when answering whether they think they are sufficiently aware of the consequences of a nuclear disaster. As 42.6% of respondents are women, so is the same percentage who answered that they do not think they are sufficiently aware of the consequences. On the other hand, all-male respondents, 57.4% of whom responded positively to the question. The results of research that testify to the relationship between gender and whether they believe that they are

sufficiently familiar with the consequences of a nuclear disaster indicate a statistically significant relationship between the given variables p = 0.42. As the alpha value (α) is equal to 0.05, we conclude that the null hypothesis is rejected. The null hypothesis states no statistically significant correlation, i.e. dependence between the observed features. The results of cross-tabulation of education levels and whether they are afraid that a nuclear disaster could occur in their environment can be seen in Table 10. About 7% of higher education respondents said they feared a potential nuclear disaster. In comparison, about 24% said not to be afraid. Also, when it comes to respondents who have completed three years of high school, 14% point out that they are worried, while 27% of respondents with four years of high school say that they are not afraid.

The results of the cross-tabulation of occupations and whether they consider it necessary to receive basic or additional training in managing the risk of disasters caused by nuclear accidents are shown in Table 12. Based on the results, it can be seen that employed workers express the greatest need to receive additional education on the issue of managing the risks of disasters caused by nuclear accidents (26.6%). Low rates are defined by technicians or associates (1.2%) and administrative staff (7%), while medium rates are expressed by experts and artists (16.4%), artisans (18%) and managers (13.7%). The research results, which testify to the connection between household size and the question of whether they are ready for emergency evacuation in the event of a nuclear disaster, indicate that there is a statistically significant correlation between the given variables p = 0.50. As the alpha value equals 0.05, we conclude that the null hypothesis is rejected. The null hypothesis states no statistically significant correlation, i.e. dependence between the observed features. The results show that 43.7% of respondents answered that they think it is unnecessary when asked if they would be ready for an emergency evacuation in a nuclear disaster. Most of them are people whose household has four members and, to a lesser extent, people whose household consists of three members. More than 50% of respondents answered that they are ready to evacuate in the event of a nuclear accident, where people living in five-member households are in the lead in this section, followed by people in three-member and one-member households. People in three-member households are divided into an almost perfect relationship. Respondents living in households with one, two and five members answered exclusively in the affirmative.

Looking at the respondents' answers, according to their level of education, to whether, if they were able, they would listen to education on the topic of disaster risk management caused by nuclear accidents, it can be seen that there are variations. There are twice as many highly educated people who would not listen as highly educated people who would listen; on the other hand, people with higher education respond more positively, while only less than 15% of people with this level of education give a negative answer. People who own a three-year school reacted positively, and those who have a four-year high school are divided, but a more significant number would not listen to education. Given different genders, there are noticeable differences in whether they would volunteer in an outbreak of a technical-technological disaster in a neighbouring country. All male respondents responded positively, while more than 50% of female respondents answered thoroughly. A tiny percentage of women responded negatively, while just over 40% said they did not know if they would volunteer in a neighbouring country.

The research results, which testify to the connection between household size and the question of whether they are ready for emergency evacuation in the event of a nuclear disaster, indicate that there is a statistically significant correlation between the given variables, p = 0.36. As the alpha value (α) is equal to 0.05, we conclude that the null hypothesis is rejected. The null hypothesis states no statistically significant correlation, i.e. dependence between the observed features. To the question: "Do you think you are sufficiently aware of the consequences of the nuclear disaster?" Respondents who are employed and unemployed on average answered equally. Based on the ANOVA analysis, at the 95% security level, we conclude that the employed and the unemployed do not give equal answers to the previously asked question on average.

5. Discussion

The research brought significant results and indicators in managing risks caused by nuclear disasters. Based on the critical data surveyed, 51% of respondents believe they would not know what measures to take in a nuclear disaster. These data indicate a need for additional education and training on disaster risk management caused by technical and technological disasters, focusing on nuclear accidents. In support of this data, it was noted that the respondents are ready for additional education on disaster risk management and to attend a lecture on responding to situations caused by technical and technological disasters. This finding is similar to data obtained from similar studies (Trajano, 2019). First of all, there was a tendency to investigate how well the respondents were informed about the consequences and ways of reacting to nuclear disasters, i.e. whether they thought they would cope in the given situations. As a result, it was reported that respondents felt that they were not sufficiently informed on this issue. In further work, it is concluded that highly educated respondents, to a greater extent, imply that a nuclear disaster can be more dangerous than a natural one. This data can be compared with the research conducted, and it is related to a similar topic that concerns the protection, control and prevention of nuclear disasters (Ravidran, 2017). Then, respondents over the age of 39 expressed high agreement with the view that mandatory training courses should be organised to respond to nuclear disasters. Furthermore, the level of income of the respondents does not determine their need for additional education about the management of the risks caused by nuclear disasters. In this regard, respondents of different income levels are ready to receive further education and training. Also, women showed greater fear of the dangers of a nuclear disaster.

When it comes to the attitude that they have confidence in the competent authorities that can adequately respond to the dangers of nuclear disaster, about 23% of respondents said they agree. It is essential to ensure the confidence of respondents and society in general in the competent institutions and measures. The state would eventually prescribe. For comparison, after the outbreak of the nuclear disaster in Japan, the Government of Japan introduced rapid evacuation and various types of activities that the emergency implies. In this regard, the society showed great obedience to the institutions there, which required strict adherence to measures to mitigate the consequences of the nuclear disaster (Ravidran, 2017). An analysis of the response to the Fukushima nuclear disaster showed that locations near the nuclear power plant reacted urgently at the community and individual level (Nomura et al., 2016),

which greatly affected the smaller number of victims (Bendix, 2019). The very fact that a person cannot be ready to react quickly if he is not trained enough is a great challenge to work on education, providing basic information about responding to and repairing the consequences of a nuclear disaster (Ravidran, 2017). In this case, people need to be trained in disaster risk management caused by nuclear disasters, especially if they are in endangered places (Tsujiguchi et al., 2019). Given that many countries today invest in nuclear energy and that one part of the paper shows how many atomic reactors exist in European countries, it is almost imperative to train people on the potential dangers and consequences of nuclear disasters so that in the event they can adequately to react. We assume that each state will take adequate measures to repair the effects of the disaster. Still, the individual must know on an individual level what needs to be done in the first reaction to minimise damage to him and his immediate environment (Ravidran, 2017). Given that our research showed that a large percentage of respondents (76%) believe that they can help others, it is necessary to support this result with a real test in the form of lectures, training and possible workshops that would give people a closer picture of risk management from disasters caused by nuclear disasters.

In addition to the respondents, it is essential to train employees in various related positions who would eventually find themselves in the first stroke of assisting in nuclear disaster response (Kenan & Jovanović, 2015). A study aimed to examine how much security students at the University of Pennsylvania are informed about nuclear safety. The main goal of this training was to train a growing number of researchers and experts on basic and more detailed information on nuclear disasters and their response to them to increase the number of personnel dealing with nuclear safety (Kenan & Jovanović, 2015). The lack of experts in this field is very worrying, which becomes even more problematic if people are not aware of the dangers of a nuclear disaster daily, nor would they know how to react to it if it occurs. Therefore, cooperation at the global level is gained by investing in measures to protect against nuclear disasters. Interestingly, there is an apparent disagreement with the view that the nuclear disaster is not as dangerous as others say, as evidenced by about 36% of respondents disagree with this. Some studies indicate that low radiation levels can be harmless to humans or their environment, supporting these data. However, respondents still express fear and precautions that would guide them in a given situation. The greatest fear arises due to the possibility of developing different types of cancer or other diseases (Symonds & Thomas, 2016). On the other hand, there is evidence that only 1% of radiation comes from the nuclear industry, while all the rest is from our everyday environment (Symonds & Thomas, 2016). Additional research indicates that there is a great fear that the consequences caused by a nuclear accident are permanent and that they cannot be easily remedied, especially when it comes to human physical health (Ohtsuru, Tanigawa, Kumagai, Niwa, Takamura, & Midorikawa, 2015). Of course, a distinction should be made between the regular use of nuclear energy and the outbreak of a nuclear disaster that causes much more far-reaching consequences (Renn, 2016). More than 55% of the respondents fear that the people around them are not aware of the effects of a nuclear disaster, which is not negligible. This fear is not unjustified if we take into account the fact that man's immediate and immediate environment may indeed be endangered due to the outbreak of a nuclear disaster in the sense that its habitat and basic foodstuffs may be contaminated and disabled (Tsujiguchi, Chieko Itak, Kitaya, Shiroma, & Kashiwakura, 2018).

The fact is that there is a need for people to have basic knowledge on the issue of engagement and response in emergencies (Cvetković, Jakovljević, Gačić, & Filipović, 2017). More care needs to be taken for potentially exposed areas to technical and technological disasters. Our research showed that 37% of respondents do not think they know much about managing the risk of tragedies caused by nuclear accidents. About 60% of them would listen to education on risk management of disasters caused by nuclear accidents. This information can be taken as a starting point for the future organisation of additional education, seminars and other activities where you can learn more about how to cope, react and take essential measures in a nuclear disaster. Some research aimed to examine the readiness of the respondents to protect themselves in the event of a nuclear disaster and to check how much the respondents are ready to develop a culture of nuclear safety and security (Trajano, 2019). The data of the mentioned research can be compared with the results of this master's work insofar as there are precise data that the respondents do not think they are sufficiently trained or ready to react to in case of a nuclear disaster. In this regard, the results of this research can be used to improve the risk management of nuclear disasters.

4. Conclusions

The research contributes significantly to this scientific field, considering the smaller number of such studies in Serbia. It is essential to keep in mind that the research was conducted on the territory of Belgrade, where nuclear energy is not currently used. Still, in relatively recent history, there was a situation when the Republic of Serbia was exposed to the consequences of a nuclear disaster indirectly. Also, several nuclear power plants are operating near the country, so caution and sufficient knowledge should be kept in mind and prevention measures would be implemented in this type of disaster. Based on that, there was a need to examine the social strata on efforts to respond to, prevent and inform about the dangers of nuclear disasters. The research part first aimed to investigate how many people think they are ready and told about reacting to situations caused by nuclear disasters, i.e. whether they consider themselves sufficiently trained and whether they perceive the danger of given conditions. As already mentioned in the last part of the paper, it turns out that the respondents feel that they are not ready enough to react in these situations and that they express a desire and need to be further educated on this issue. Then, it is essential to know that a large percentage of respondents are willing to respect the measures taken by the state in the event of an outbreak of this unforeseen situation and to agree or fully agree with the view that they trust the authorities and institutions to respond to dangers nuclear disasters adequately. They are also ready for a possible evacuation and assistance in the form of volunteering in the event of a nuclear disaster. This research could further support similar topics to improve nuclear disaster risk management practices. Then, there is space and possibility to expand the scope of this research and obtain even more detailed results and data on information and training of the population on the consequences of nuclear disasters and ways to better protect themselves from them. It is essential to know at least basic knowledge, protection and prevention measures in responding to technical and technological disasters, bearing in mind that they are not uncommon and that the consequences can indeed be devastating. In addition, as the need of the respondents to receive additional education was noticed,

it is not out of place to use this mood regarding the culture of nuclear protection and safety. When it comes to the limitations and difficulties of this research, the fact is that the research was conducted in the territory of the city of Belgrade and not in the territory of the Republic of Serbia as a whole.

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