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PROTECTION OF POPULATION IN CASE OF FLOOD RISK IN VARNA REGION

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CONTENTS

I. INTRODUCTION

The most common natural disasters are climate-related - 90% of all disasters are due to weather changes. Over the last decade, extreme temperatures and floods occur almost daily. This is confirmed by a UN report quoted by Reuters. The registered increase of floods is almost double, compared to the previous two decades, with most affected being the continent Asia.

"In a warming climate, people have to get used to the sudden and torrential rain," writes one of the Global Climate Risk Index's authors.

In 2016, the Balkan countries received assistance from the EU Solidarity Fund. The main data used for the Global Climate Risk Index comes from the insurance giant Munich RE.

Floods in Serbia in May 2014 have caused damage for more than two billion dollars, and in Bosnia and Herzegovina more than 90 000 people have been evacuated because of floods and landslides.

The flood in Greece on 15 and 16 November 2017 in Athens and Mandra and Kateriniarea took 19 lives.

Floods are most often caused by torrential rains and hailstorms, which, besides causing economic problems, also lead to problems related to the health of the population in distressed areas. Floods cause huge damage to floodplains, affecting large areas of residential and industrial sites, farmland and woodland. They activate landslides in the risk areas and create severe hygienic-epidemiological environment by polluting the settlements with mud, human and animal carcasses, destruction or damage to sewerage and water supply networks, with an increase in the population of rodents (rodents and insects), breaking of underground pipelines, flooding of sites with toxic waste, etc.

A UN study on Flood Risk Reduction in Southeast Europe for the period 1974-2006 shows that in our country floods present the greatest risk, followed by storms and hurricane winds, earthquakes, extreme temperatures, droughts and fires.

In many cases, floods can be deadly for humans and animals. In the world, 500,000 people die annually from drowning. In the Republic of Bulgaria - 160 people per year, with 30% of them being children, mainly in water basins inland or at unguarded beaches.

Floods affect people by increase of the intestinal infectious diseases with water transmission (enterocolitis, salmonellosis, shigellosis, viral hepatitis A, etc.), affect the mental health of people, their working capacity, quality of life, etc.

Rapid and adequate response is extremely important. Good training, rapid release of information, good coordination between the various institutions and sufficient awareness and preparedness of the population for proper behavior in flooded areas and self-help and mutual assistance (adequate first-aid care) are needed.

In case of flood the CEMA teams, the fire brigades and the police are mainly involved in the rescue activities as they have the necessary knowledge and training.

Planning of rescue and preventive measures is crucial for the protection of life, the environment and the cultural heritage.

Preparing and raising public awareness, adequate public participation and insurance are important steps to improve and enhance the quality of assistance for victims and reduce the negative effects of floods and other disasters.

Relevance and significance of the problem

Analysis of literary data shows the trend of continuous flood growth as part of the increased natural and anthropogenic catastrophes.

An important prerequisite for the effective protection and medical provision of the population is the scientific study of the causes, parameters, their regional manifestation and frequency, the factors influencing their severity, etc.

The evaluation of the gathered information shows that in case of floods problems arise for the protection and health systems, relating to the timely forecasting and rapid implementation of organizational, protective, preventive and rescue measures.

The research of most authors concerns mainly the study of the causes, parameters, consequences, systematization and organization of medical-sanitary procurement, provision of aids, etc.

Questions are considered to be predominantly fragmented and sensationally informative without seeking a deep causal link between anthropogenic regional pollution and the global deepening of the problem.

This requires a thorough and multilateral study, analysis and outlining of the most important issues that are constantly facing the protection authorities, the healthcare system and the injured and disadvantaged population, which needs a systematic and health training as well as timely information.

1. Floods are the number one disasters in terms of frequency and economic losses, followed by hurricanes, earthquakes, extreme temperatures, landslides, desertification, forest fires, etc.
2. The major floods in the world, Europe, the Balkan Peninsula and the Republic of Bulgaria are of Flash Flooding type.
3. By number of floods, Bulgaria falls into the medium-sized area of occurrence of cases for the European WHO region (4-12 per year).
4. The number per million of flood-related deaths in Bulgaria are (1-5), which is typical of the European WHO region for the period 2000-2011.
5. In Varna the floods are mainly of a Flash Flooding type (a spill of the Kamchiya River and the Provadiyska River), and in Varna, the cause is heavy rainfalls and insufficient sewerage system.
6. Rain floods are characteristic of urban areas, mainly due to insufficient sewage capacity or uncleaned sewerage shafts.
7. Population in the floodplain remains homeless and without property and needs evacuation, shelter, clean water, food, dry clothes and medical care urgently.
8. Two-thirds of the flood-related deaths are due to drowning and the last one – to injuries, heart attacks, electric shock, CO poisoning, and fires.
9. Victims in the floodplain most often suffer from injuries to the locomotor system due to impact of hard objects or dragging by the water, drowning as well as intestinal infectious diseases and hepatitis A virus infections.

10. The executive authorities, the law and order and the defense authorities in the district and the affected region organize evacuation from the floodplain, accommodation of the victims in evacuation centers and searching for the missing persons.
11. In the event of a flood, the medical service must organize rapidly first medical aid for the injured and hygienic-anti-epidemic measures.
12. The risk of floods and the scale of human and economic losses can be reduced by increasing preliminary training and education of the population.
13. In order to improve the protection of the population is useful to conduct in-depth and multilateral research, analyses and outlining of the most important problems facing the protection institutions and the medical insurance system, as well as to raise awareness and prepare the population for proper behaviour in floodplains and giving first aid to victims in the form of self-help and mutual assistance.

II. PURPOSE, TASKS AND HYPOTHESIS

1. Aim and objectives of the dissertation

The scientific aim is to investigate the flood risk as a major problem for the population in Bulgaria (and in particular in Varna region), to inform and prepare the population for proper behaviour during and after flooding and to offer prevention to reduce the adverse effects on their health and material insurance.

To accomplish this goal, the following research tasks were formulated:

1. Investigate and determine the risks of floods in the Republic of Bulgaria (and in particular in the Varna region). Developing a Model for Determining the Risk of Floods.
2. To analyse and summarize the activities of the institutions for protection of the population at a district, municipal and local levels - Varna.
3. Analysis and systematization of health risks due to floods.
4. Summary and analysis of medical aid following floods.
5. Investigate the awareness and preparedness for flood protection of foreign and Bulgarian citizens aged 18 and over.
5.1. To investigate the awareness and preliminary preparedness for flood protection of foreign citizens temporarily residing in Bulgaria.
5.2. To investigate the awareness and preliminary preparation of Bulgarian citizens for floods and to compare with that of foreigners.
6. Develop a strategy to prevent and protect the population from floods.
7. Based on the studies analyses and assessments, make recommendations that are relevant to provide effective relief and support to the population in the event of floods.

Basic thesis and research hypotheses

The main thesis of the dissertation is that floods are a significant problem which has an adverse effect on the population. Prevention and reduction of the negative effects can be made by raising the level of awareness and health knowledge of the population to help and assist in case of floods.

The following research hypotheses are formulated in support of the main thesis of the dissertation:

1. Floods are the cause of a number of problems for the life and health of people in the disaster range.
2. The planning, management and preparation for response are essential for quick overcome of the damages and their reduction.
3. If there is risk of flooding, the medical provision has to assemble sufficient staff and material reserves to cope in a real situation.
4. People should be well informed and educated to prevent material and health problems that can be aggravated by lack of training.
5. Raising awareness and knowledge on the issue of giving adequate self-hellp and mutual assistance should be prioritized and have greater importance for prevention of adverse consequences.
6. Foreign citizens have better awareness, self-esteem and preparedness for disaster protection (incl. in floods).

III. MATERIALS AND METHODS

1. Research approach

The research is based on systematic analysis, aggregation and systematization of data, addressing the different factors and conditions that have an impact on the population in floods, with priority being given to raising awareness and health education.

Subject of the study are the people living in flood-threatening areas but not individuals or non-homogeneous groups.

An interdisciplinary approach is applied in the overall research process, predetermined by the specificity of the subject of the dissertation thesis and the phenomena studied.

The main objective is to build a strategy for the prevention and protection of the population from floods and to reduce the adverse effects on its health condition.

2. Methods of investigation

The research tasks have been achieved using qualitative and quantitative methods in the sphere of social and health sciences. A complex methodical approach has been developed to solve an important and interdisciplinary research problem, such as the problem of the impact of floods on the health and material resources of the affected population.

Methods of theoretical analysis, comparative analysis, methods of flood risk assessment are applied. In order to collect the necessary primary information, sociological methods are also applied - sociological survey by a poll of the risk areas' population.

All applied methods and analytical tools are directed to the fulfillment of the assigned scientific tasks, analyze and evaluate individual aspects of the studied phenomena and their complex use allows the subject to be examined in its entirety in order to achieve the goal of the dissertation work.

Data processing and statistical analysis are done using software program products - Excel 2013 and others.

3. Restrictive conditions for carrying out the study

The limitations accepted in the dissertation are as follows:

 Regarding the object of study:

• For the purpose of our survey, we have investigated people from the Varna district population located in flood risk areas and foreign citizens temporarily residing in the municipality of Varna:

• The sociological survey is territorially limited within the Varna district due to the specificities of the possible flood risks.

• Another important factor is the significance of the area under consideration for tourism during certain seasons and the significant increase of temporary residents during these periods.

 Regarding the subject of the study:

• Investigate and identify the risks of floods.

• To analyze and summarize the institutional measures for the protection of the population if there is high risk of flooding.

• To analyze and summarize the institutional measures for the protection of the population after flooding.

• Preparedness of the population for floods has been studied primarily to establish their ability to respond to and deal with changes in the environment during floods.

4. Materials used

The information necessary to achieve the aims and objectives of the thesis is provided by:

• theoretical study of publications by Bulgarian and foreign authors;

• secondary data from Bulgarian and international empirical studies;

• statistical information from Bulgarian and international databases and statistical reference books;

• primary and secondary data from Bulgarian and international organizations and institutions;

• Primary data from own sociological surveys.

In the course of the study materials from the The National Statistical Institute (NSI), the National Center for Health Information (NCHI), the Ministry of Health (MH), the Ministry of Environment

and Waters, the Ministry of Education, the National Center for Public Health and Analyzes (NCPHA), Regional Health Inspectorates (RHI), Regional Fire Safety and Population Protection Directorate, Varna Municipality, World Health Organization (WHO), World Bank, Eurostat, European Commission, United Nations Disaster Risk Reduction Office and others are used.

5. Subject of the study

To achieve the aim and tasks of the dissertation, subjects of the sociological surveys are people aged 18 to 80 from Varna district.

Signs of observation

- Factorial signs:

• Gender - male; female;

• Age - 18 to 35 years; 36-50 years; 51-65 years; over 66 years old

• Education - basic, secondary, bachelor, master;

• Type of settlement in Varna region (town, big municipality, small municipality or village)

- Resultant signs:

• Indicator for the assessment of the settlement in terms of flood risk.

• Indicator of awareness of the threat of flood disaster;

• Indicator for self-assessment of the theoretical knowledge on the behaviour of the population in floods;

• Indicator of self-assessment of theoretical knowledge on behaviour of foreigners in floods;

• Indicator of self-assessment and evaluation of the theoretical knowledge on population behaviour after floods;

• Indicator of self-assessment and evaluation of the theoretical knowledge on behaviour of foreigners after floods;

• Indicator for evaluating the theoretical knowledge and proper behaviour of the population towards an injured person;

• Indicator for evaluating the theoretical knowledge and proper behaviour of foreign citizens towards an injured person;

• Indicator for evaluating the self-assessment, knowledge and proper behaviour after flooding of foreign citizens compared to Bulgarian citizens.

6. Sociological methods

The purpose of a sociological survey is:

1. Study on the population preparedness for proper behaviour in flood risk areas.

2. Explore people's awareness and knowledge of self-help and mutual assistance in floods.

3. Assess the population's preparedness to deal with a disaster situation such as flood for prevention of consequences including epidemics.

4. Investigate the awareness and knowledge of foreign citizens temporarily residing in the Republic of Bulgaria (Varna) for self-help and mutual assistance in floods.

5. Make a comparative assessment of the preparedness of the Bulgarian population and of foreign citizens to deal with a disaster situation such as flooding and prevention of the consequences.

The questionnaire regarding the awareness and knowledge, the assessment and self-assessment of foreigners and local residents of Varna District for flood protection consists of 32 questions. In 15 questions, all possible answers have been formulated and specified in advance, two questions are open and 15 are combined, with an opportunity being given for a personal opinion.

The principle of impartiality to a certain kind of person, human qualities or education is respected. We believe that we have predisposed the respondents to perceiving the questions. The principle of anonymity of respondents is respected. We explained to the surveyed people that they were randomly selected for participation in the survey.

We used mostly solid pre-coding in advance. The questions are well structured and clear to the researcher. The classifier is formulated in the process of developing the questionnaire and is fixed in it.

Questions concern the following areas:

• Characteristics of respondents - an important part of the survey. The aim is to be adult citizens seeking correlation between sex, education, residence and training.

• Self-assessment of disaster preparedness.

• Self-assessment for first aid to a victim at the accident site.

• Evaluating the preparedness of respondents for disaster risk - incl. floods and epidemics.

• Defining awareness and knowledge to protect against floods.

• Evaluating preparations for prevention and dealing with post-disaster complications, including after floods.

• Assessing the ability of the respondents to provide first aid to a victim in the disaster area.

IV. PERSONAL RESEARCH

1. Summarizing and analyzing the institutional measures for protection of the population at district, municipal and local level. Model for Determining the Risk of Floods in Bulgaria (and in particular in Varna District)

According to the Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks, the risk areas in Bulgaria are divided into the following four zones: Dunavski; Black Sea; East Aegean and West Aegean.

The four areas are entrusted to the regional Basin Directorates, subordinate to the Ministry of Environment and Waters.

Varna area is an important and essential part of the Black Sea region and the developed risk assessment methods involve a multi-disciplinary and varied disciplinary approach and analysis.

Determining the risk of flooding, preventing, mitigating and overcoming the consequences, impose a unified management process.

In the case of floods, planning is an essential part of the rescue operations. It is a complex set of events. Its compilation requires an in-depth analysis and a high preliminary preparation for competent discussion of a huge amount of data.

The study explores different types of flood plans.

Planning includes: resource planning, activity planning, and a final result planning.

Plans identify priority objects and activities, outline responsibilities, timing, include monitoring and flood risk assessment.

Each disaster, including floods, is characterized by three main elements: *suddenness, time and threat*.

The *suddenness* is not so much with the time of the disaster beginning as with the character of its manifestation and flow. Usually development differs from expectations and the crisis causes events that are not foreseen.

The second element is *time*. Disaster always arises and develops very rapidly in an extreme shortage of time to overcome the controversy that has arisen and to restore the system's disturbed balance.

The third element is the possibility of increasing the *threat*. It grows to a certain maximum and is capable of destroying the system in which it manifests.

The risk assessment of past floods in the Republic of Bulgaria to be repeated in the future and the potential adverse effects that may occur are made taking into account the following factors:

Number of floods registered in the same place. Repeating floods in the past is an indication of the possibility of repeating themselves in the future. This analysis also assesses whether there has been a change in the conditions and causes of the flood, such as built-in protective and water-holding

facilities, whether they provide reliable protection or floods have been recorded again in the same area, whether floods are still present.

Range of flooded areas. The data collected about past floods in most cases lack sufficient data on spatial distribution. Therefore, the methods proposed in the Methodology and described in the methodology for identifying future floods have been used to reconstruct the extent of flooded areas from past floods.

An analysis and systematization is complied with the following:

the existence of protective and water-holding facilities built after past floods and their condition, the proximity of a settlement with a registered flood in the past, proximity to potential pollutants; the presence of endangered cultural heritage sites in or around a populated area with past flooding; the presence of modern business assets, the possible appearance of new business enterprises in areas with registered floods; demographic development in the settlements, trends in population development; repetition of past floods - setting a high probability of past flooding in the future, regardless of the assessment of the significance of past damage. The change in the structure of the settlements, including changes in the settlement structure and the infrastructure.

Model for Flood Risk Assessment

Typical of floods is the presence of a warning stage, which is possible due to the existence of sufficiently developed forecasting and monitoring activities related to hydrometeorological risks.

Only in the case of floods caused by the deliberate destruction of hydrotechnical facilities cannot be expected a warning stage for their occurrence (Milushev, 2008).

Risk Assessment. A process of collecting, analyzing and evaluating of available information to determine acceptable levels of risk assumption for an individual, group, contingent, society and the environment. Includes hazard identification and characterization, probable frequency, duration, volume and time of impact.

Risk analysis is a detailed study conducted to understand the nature of the unintended consequences of an event involving human life, property, and the environment. It can be defined as an analytical process that gives information about the probability of flooding and the consequences of the adverse event.

Flood risk is a function of the frequency (probability) of flooding, exposure and possible damage.

The probability of flooding is most often defined as the frequency at which the phenomenon at or above the set intensity level is observed annually.

Damage depends both on the parameters of the hazard (quantity and speed of water, duration of impact, etc.), as well as on the vulnerability of exposed people, infrastructure, ecosystems, etc.

The combination of danger and vulnerability leads to a risk defined as the probability of occurrence of some damage within a certain period of time.

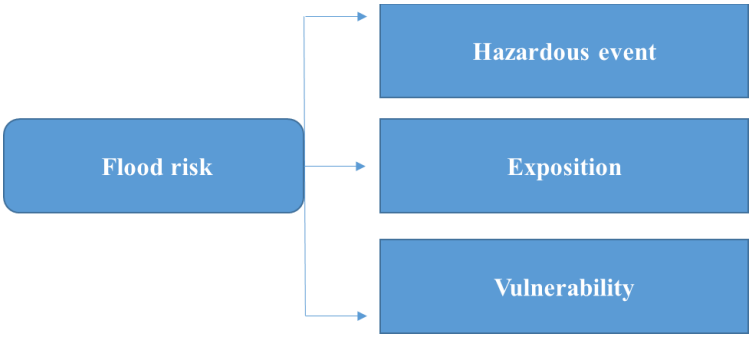
Where the risk is a dangerous event (flood), including its likelihood of occurrence, the vulnerability is a lack of sustainability, the exposure is the presence of people or infrastructure at the site of the disaster.

The flood risk is a function of three factors: those related to the flood hazard; human and natural systems exposed to inundated waters and the vulnerability of these flood systems.

The Flood Risk Assessment has four stages (Fig. 1):

- identification of the hazard;
- assessment of exposure;
- vulnerability assessment;
- Risk Assessment.

Fig 1 Flood risk



Different factors have to be taken into account regarding the flood risk: previous floods; educational level; the difference between people directly affected by floods, decision-makers, etc.

Important aspects of the flood management approach are full decentralization of local authorities as well as community-based mutual assistance.

The severe consequences for the country's population and economy are a prerequisite for management and defence institutions to implement a number of disaster reduction programs, projects, and risk reduction and prevention.

Of the 4,390 dams in Republic of Bulgaria, which were checked in 2017 and 2018, more than 2,000 were found to be "risky" and 81 were " pre-disastrous". Especially bad is the condition of the Beli Iskar Dam, which has not been renovated for nearly 80 years.

When defining the areas threatened by floods of the main river currents, protective facilities, such as facilities that presumably designate the river sections as being significantly exposed at risk from floods, are usually not taken into account. The experience from past floods until now shows that floods often result in the breakage of dikes, which further increases the risk of flooding for the

areas below them. There is currently insufficient and reliable information on the state of the protective dykes and it is not possible to adequately assess their protective capability.

Through summarizing and structuring the experts' reports it was established that there is a potential flood risk for 167 territories in Varna region.

The implications of future floods investigated, including the consequences of past flooding, are classified into the four categories of the Directive.

Human Health Category: In 69 of the potential floods there is an exceedance of the significance threshold for affected residents for the location. Affected elements of the critical infrastructure or affected buildings of public importance (hospitals, schools, etc.) exist in three of the potential floods. Affected wells, pumping stations and public water treatment plants are in 22 of the potential events.

Business Activity Category: 60 of potential events were evaluated as significant in aggregate economic value. According to the criterion of affected infrastructure (roads - highways, I and II class, railways, bridges, transmission networks and other linear infrastructure) the threshold of significance is exceeded in 30 of the potential floods.

Environment category: In 22 of the potential events are affected protected areas for drinking water and in 38 – Natura 2000 areas. In 21 of the potential floods there are sewerage of settlements and Urban Sewage Treatment Plants. In 18 of the potential events, industrial activities (outside IPPC and SEVESO) are affected by pollution sources under the Priority Substances Directive and the Hazardous and Noxious Substances Directive. In 12 of the potential events are affected IPPC and SEVESO enterprises and others.

Category Cultural Heritage: In 16 of the potential events cultural monuments of UNESCO and national significance are affected.

By decision of the municipal councils in the areas of possible floods, special commissions are established each year for the implementation of preventive measures and the management of the flood control.

The flood risk assessment in Varna region is:

- river spill (Kamchiya River, Provadiyska River and Ana dere River) and threats to nearby municipalities and fields;

- after heavy rainfall (floods over 30 l / m^2 or intense melting of snow and overflow of surface water) - the impact of certain urban areas (especially smaller settlements at and below sea level), problems with sewerage, etc.

- damages of hydro-equipment (dams - Tsonevo, Trastikovo, Eleshnitsa, Gen. Kiselovo, Snezhina, Komarevo-Hrabrovo etc.) and flooding of adjacent areas

- floods caused by deliberate action.

67 reservoirs have been mapped in Varna territory, 15 of which are identified as potentially dangerous and are subject to annual inspections by a committee appointed by the regional governor.

Tsonevo Dam is one of the largest dams with a volume of 300 million m^3, but in the recent years usually the available water is about 113 million m^3. Snowfall leads to an increase in the water masses in the dam. The dam is in good condition and is not a serious risk for the flood of the surrounding areas.

Eleshnitsa dam is small one near the Tsonevo dam, a tributary of the Kamchia River and is potentially the most dangerous and in the "pre-disastrous state", because in heavy rains its level rises in hours. His rudder was damaged in 2015 after a flood. It has a large water catchment area but is located in a narrow location. The water is undermining the dam wall, and there are several villages in the Dolen Chiflik municipality, located below the dam - the village of Grozdevo, the village of Nova Shipka, the village of Dabravino and the village of Venelin. Emergency construction measures are necessary at the cost of 700 000 leva.

The remaining water bodies are relatively safer. Regularly, autumn-winter prophylaxis of the hydro-technical facilities of the Irrigation Systems Solely Owned Joint Stock Company - Varna Branch and emergency personnel instructions are regularly carried out. In recent years, thefts of parts of the facility have been a problem. For example, the theft of metal shutters from the drainage gates of the Kamchia River can be a cause of floods on its banks when high water emerges. Digits of the corrections of the Kamchia, Provadiyska and Ana dere rivers are in good operating condition and under constant observation by the Irrigation Systems SO JSC Varna.

The presence of a pier in Varna protects the vessels, the port facilities and the station from the destruction and the sea floods at high waves. The city is situated on a terraced area, high above sea level and floods occur less frequently than in Burgas or Pomorie.

For Varna municipality there is also a risk of flooding in case of intense rainfall. In such cases, the water masses can not be absorbed by the rainy outflows. Existing drainage channels are dimensioned and can absorb surface water if they are directed into their troughs but very often the water flows into the streets, overflows sewage for surface water and the water goes above curb level. In such cases, it is possible to flood the ground floors, or invasion of water in basements, basements, etc. premises.

The most vulnerable area of Varna is the central part, the one around the railway station, the area between Primorski Blvd., Slaveikov Square, Devnya and G. Piyachevic strs., Vladislav Varnenchik Blvd., Maria Louisa Blvd., Tsar Osvoboditel Blvd., etc., where the lowest points of the city's water catchment area are located.

Floods of this kind are possible in spring and autumn when most of the rainfall shafts and outflows are blocked due to leaf fall and the rainwater cannot be taken by the sewerage system.

This causes flooding of some of the road and pedestrian underpasses which blocks the transport - road congestion due to engine stall or moving parked cars on the sidewalks to the roadways,

landing of ground and other materials on the road that hinder or completely obstruct and block traffic.

The results of the analyzes can be summarized in the following conclusions:

1. The risk of flooding in Bulgaria (Varna District in particular) is real and depends on three factors which are related to: flood possibility, human and natural systems exposed to inundated waters and their vulnerability.
2. The flood risk assessment model is developed in four stages: hazard identification; exposure assessment; vulnerability assessment; risk assessment.
3. The strategy on the safety chain (prevention, preparation, response, recovery) has to be supplemented by material provision.
4. Flood management is well developed and structured and includes: management of flood-threatened areas, technical protection facilities and preventive measures.
5. The flood risk assessment for Varna District is:

- river spill (mainly Kamchiya River and Provadiyska River);
- following torrential rainfall (over 30 l / m 2) affecting urban areas located below sea level or due to sewerage problems, etc .;
- accidents at 15 out of 67 potentially dangerous dams (most probably the Eleshnitsa Reservoir) and flooding of adjacent territories.

2. Organization of the population protection at national, regional and municipal level summary and analysis (with accent on the Varna municipality)

The organization of disaster protection (including floods) is well developed and advanced and is based on: Legislation; Organizing and updating a special disaster protection organization; Development of preliminary strategy and disaster response plans; Training and preparation; Building of information systems; Improvement and maintenance of the emergency medical system; Resource provision; Preliminary preparation for concealment, evacuation or temporary or permanent rehoming if necessary, etc.

The basic principles for disaster protection (including floods) are well formulated, developed by specialists and include: Everyone's right to protection; Priority of saving lives to other activities; Disclosure of Disaster Risk Information and the Activities of the Executive Bodies; Priority of preventive measures; Responsibility for the implementation of the protection measures; Phased deployment of defense forces and resources.

Disaster protection (including Floods) is very well organized (based on mandatory and voluntary structures) and includes a number of activities:

- Starts with preparation and implementation of preventive activities;

- Specific protective actions at an imminent flood risk, or other disaster;

- Coordination of measures implemented by the Unified Rescue System (URS);

- Material provision;

- Assistance and disaster recovery;

- Acceptance of aids, etc.

The organization of disaster protection (including floods) is well developed and advanced at republican, regional and municipal level. Algorithms for activities before, during, and after flooding have been developed.

The Regional Directorate of Fire safety and protection of the population (FSPP), together with experts from Irrigation Systems Ltd - Varna, the Basin Directorate and the voluntary formations of the municipalities and the owners carry out the activities included in the Operational Protection Algorithm for Immediate Flood Danger.

The flood protection system is managed by: Ministries (departments), Specialized departmental structures and Unified Rescue System (URS) forces.

The URS establishes the organization, coordinates and manages the actions of its component parts in their preparation and action in floods and in the conduct of the Rescue and emergency restoration work. The main constituent parts of the URS are: the Regional Directorate of Fire safety and protection of the population, the Regional Directorate of the Ministry of Interior, the CEMA (Centre for Emergency Medical Assistance) and the BRC.

Since 2018, a Disaster Risk Reduction Strategy has been in place, including for floods. (2018 - 2030)

In the case of floods, the institutions should: alert, take measures to minimize the amount of damage and eliminate the consequences on time.

Operational flood protection activities are coordinated by the Chief at the site, who is head of the relevant Fire safety and protection of the population territorial unit or an official person authorized by them.

Different information systems - Crisis Management Center, Operational and Dispatch Management System, Unified Dispatch Service on duty, Environmental and Water Monitoring System, etc. have been developed, tested and successfully operated. Following the example of the only modern information system installed in Burgas monitoring the level of water bodies, similar one should be bought in Varna.

BRC is rapidly involved in floods to help provide material assistance and first aid to victims through DERBAC and also trains lifeguards and future drivers in specialized first aid courses.

In flood protection plans, disaster training for managers is provided, as well as training on demand for the general population, sole traders and legal entities (to organize training for their workers). According to a program approved by the Ministry of Education and Science similar training is organized in schools by the directors.

Conclusions:

1. The flood protection organization is well structured and advanced.
2. The Regional Directorate of Fire safety and protection of the population (FSPP), together with experts from Irrigation Systems EAD - Varna, the Basin Directorate and the voluntary formations of the municipalities and the owners carry out the activities included in the Operational Protection Algorithm for Immediate Flood Danger.
3. The flood protection system is managed by: Ministries (departments), Specialized departmental structures and Unified Rescue System (URS) forces.
4. The Unified Rescue System establishes, coordinates and directs the actions of its constituent parts in the event of floods. The main constituent parts of the URS are: the Regional Directorate of Fire safety and protection of the population (FSPP), the Regional Directorate of the Ministry of Interior, the CEMA (Centre for Emergency Medical Assistance) and the BRC.
5. Since 2018, a Disaster Risk Reduction Strategy, incl. floods (2018 - 2030), is in action.
6. In the case of floods, institutions shall: Provide a warning, take measures to minimize the amount of damage and eliminate the consequences on time.
7. Operational flood protection activities are coordinated by the Chief at the site, who is head of the relevant Fire safety and protection of the population territorial unit or an official person authorized by them.
8. Different information systems have been developed, tested and successfully operated.
9. BRC is rapidly involved in floods to help provide material assistance and first aid to victims through DERBAC.
10. In flood protection plans, disaster training for managers is provided, as well as training on demand for the general population.
11. It is necessary to inform and train the comunity about the flood risk and to obligatory train the population for proper action and first aid in the form of self-help and mutual assistance in disasters.

3. Health risks during floods – analysis and systematization

Floods are most often caused by torrential rains and hailstorms, which, besides causing economic problems, also lead to health problems of the population in the disaster areas.

In the case of floods, the medical losses are not located in a precisely defined area, but along the flooded area. There are often difficulties in search and rescue of the casualties.

The organization of First Aid may be delayed, so it is essential that the whole population is prepared to help the casualties in the disaster area on time.

Secondary and long-term consequences often create difficulties for the medical service and require more investment and more skilled professionals.

Analysis of Real Disaster Situations - Floods in the Varna District and Impact on the Intestinal Infectious Disease

The August 1986 flood was of rainy-river type after heavy rains in the area. The incoming waters of the Provadiyska River covered large surface (about 50 acres) of the vegetable gardens and fields around the town. There is no central sewerage system in the town of Provadia, which is compensated by pits and septic tanks. When flooded, a critical sanitary and hygienic situation is created in the settlement, especially in the watereded vegetable gardens, where high school brigades work in the autumn.

The analysis of the epidemic situation after the flood in the last quarter of 1986 showed a higher intestinal contagious morbidity - 861 per ten thousand in the Varna District against 333.4 in 1985 and 248.7 in 1987.

In Provadia, intestinal contagious morbidity reached 631.5 on account of Viral hepatitis - type A, in the age groups of 8-14, 15-19, 20-29 in the last quarter of 1986.

The incidence of Viral hepatitis - type A increase is 3-4 times compared to previous periods. The epidemic process spreads through faecal-oral route of distribution and due to the length of the incubation period, its occurrence is in the fourth quarter of the year.

During the September 1999 flood, as a result of torrential rains in the villages of Kamchia Valley, the pumping stations of many villages were watered. Several accidents to the water supply network had been identified. Water samples were non-standard in turbidity, colour and mechanical impurities.

On 10th Sept.1999 in Goren Chiflik the turbidity reaches 10 mg / l at a rate of 1.5 mg / l.

Microbiological analysis shows non-standard water in the municipalities: Byala, Popovich, Dyulino, Grozdevo, Dolen Chiflik, Shkorpilovtsi and Poles.

The research analysis shows that there was a slight increase in enterocolitis in separate periods from 03.09.1999 to 13.09.1999, and on 10th Sept.1999 there was a slight increase in Viral hepatitis type A.

Total intestinal morbidity for the entire disaster period is not increased compared to previous years without reported critical situations.

The following urgent hygienic and anti-epidemic measures have been carried out to mitigate the consequences and eradicate the disaster:

- Cleaning of settlements from sediments and sludge, removal of carcasses of dead animals, removal of household waste in regulated landfills.

- Outbreak disinfection and deratization events.

- Increasing residual chlorine content in drinking water.

- Flushing and disinfection of the water supply network and water basins.

- Recommendations for the population to boil water from the water supply system.

- Applying gammoglobulin prophylaxis on 635 people, mainly in the village of Goren Chiflik, etc.

From the collected and systematized data on the two flood disasters, it is clear that the following measures are particularly important:

- carrying out focal disinfection and deratization activities;

- increasing the content of residual chlorine in drinking water;

- recommendations for the population to boil water, etc.

Conclusions:

1. The overall negative effects of floods on public health are - a limited number of deaths and injuries; possible increase in the incidence of communicable diseases; severe food and water shortages; an emergency evacuation need.
2. Major direct health effects of floods are: drowning, trauma, electric shock, intestinal infections, airborne infections, possible chemical contamination, lack or polluted water, and stress.
3. Indirect effects are: impeded access to medical care, huge material losses, impaired water and food supplies, evacuation difficulties, mental health problems, etc.
4. Increased mortality in the flooded area is possible from:
- falling into fast-running water - water level of 15.2 cm - immediate risk of drowning;
- driving through a flooded area - water level of 61 cm;
- hidden dangers under water (eg missing shafts);
- water of unknown depth;
- exposure to insects, animals and reptiles in flooded waters;
- passing through bridges with flood hazard;
- crossing flooded rivers or streams;
- debris from buildings, objects worn by water, etc.
5. Significant is the impact of floods on mental health, including anxiety, panic attacks, increased stress, mild to severe depression, phobias, lethargy, sleep problems, increased alcohol use or medication, anger, mood swings , increased tension, suicidal thoughts, and more.
6. To mitigate the consequences and eradicate the disaster, it is essential to carry out urgent health-hygiene and anti-epidemic measures.
7. Secondary and long-term effects often create difficulties for the medical service and require more investment and more skilled professionals.

4. Investigation and Analysis of Flood Medical Assistance

By examining the causes and consequences of floods, the following main features relevant to the organization of medical care can be identified:

1. The occurrence of the event in most cases is not unexpected - There is time to activate the previously elaborated flood plans of the medical service and to make changes, if necessary, in the organization of pre-hospital and hospital structures for adequate response;
2. Affecting often large areas with damaged infrastructure, limited search and rescue access to the casualties and unusual conditions, which hampers and can endanger the medical staff.
3. The diverse pathology is a real possibility for many affected by the disaster, running from the scene in need of first aid - traumatic injuries, with aspiration of water, frostbite, infections, intoxication, etc.
4. Often with discrepancy between the necessary and available forces and means - shortage of medical property and medical staff. The need to prepare the whole population for flood control and protection, self-help and mutual assistance.
5. Need to quickly organize search and rescue activities and medical care.
6. Mandatory hygienic and anti-epidemic measures in the flood area.
7. Rapid evacuation from the flooded area.
8. Lots of cases among the survivors of the disaster of "Acute psychological stress reaction" - referring to the psychological experiences of a normal person after great suffering from the loss of relatives or property and another kind of stress "reaction to the affect " - extreme despair, inadequacy, aggression (misconduct, threatening not only the injured but and rescuers).

The floods with their negative impact pose a real danger to the health and life of the population and put the following basic goals in front of the medical provision through applying good organization and different measures:

- saving the lives of the victims;
- rapid evacuation;
- preventive measures;
- fast recovery of the injured person's health;
- prevention of emergency and development of infectious diseases;
- reducing mortality and disability, etc.

A major oversight in the preparedness for reaction of the health system in floods is the lack of clear coordination across the whole spectrum of public health and the provision of a unified and mandatory approach to the preparedness of healthcare professionals and the population for floods. In Bulgaria, the rescue medical, therapeutic and hygienic-anti-epidemic units are being constructed by the civil health system, and a limited number of them by the Bulgarian Red Cross (BRC).

The organization of medical aid for floods has a somewhat different nature than the organization of medical care in other major disaster situations. It may be necessary to disclose a Temporary Medical Point near the flooded area if there is no health facility nearby.

The co-ordinator of the medical, management and logistical activities for the relevant hospital and outpatient care facilities is the Director of the Regional Health Inspection in the respective area.

Timely and constant communication is necessary: with ministries, radio, television, non-governmental organizations, foreign embassies, wireless stations, the Internet, e-mail, fax,

telephone, public and private agencies, personal contact,etc. It is important to have feedback and coordination between the different institutions. Effective communication reduces the health risks and health consequences in the short and long term.

The health effects of floods can be categorized as direct and indirect, and the actions of the institutions in terms of time can be classified as immediate, medium and long term. In many ways, these periods overlap, but the classification is useful for assisting planning and flood management. In order to reduce the medical consequences of floods, for most important are considered: vulnerability factors, morbidity profile, mortality profile, flood mitigation measures, etc.

We believe that in Varna because of the limited nature of damages and number of injured, based on past events, the medical needs of floods can be controlled by the local medical staff and the available medical provision.

Conclusions:

1. Main features relevant to the organization of flood medical care are:
   - There is no sudden occurrence of the event in most cases.
   - Affecting often large areas with damaged infrastructure.
   - The diverse pathology is a real possibility for many affected by the disaster, a variety of pathologies is also available - traumatic injuries, water aspiration, frostbite, infectious diseases, intoxications, etc., requiring first aid starting from the scene of the accident.
   - Often with discrepancy between the necessary and available forces and means - shortage of medical property and medical staff. Need to prepare the entire population for flood control and protection.
   - Need to quickly organize search and rescue activities and medical care.
   - Mandatory hygienic and anti-epidemic measures in the flooded area.
   - Rapid evacuation from the flooded area.
   - Mass of psychological deviations among the survivors of the disaster, etc.
2. It is characteristic that during the floods, the frequency (periodicity) of rescue measures (including medical) is the same as in any disaster, but the isolation phase might be brief or even absent.
3. In our country the medical, therapeutic and hygienic-anti-epidemic units are built up by the civil health system and a limited number of them by the Bulgarian Red Cross (BRC).
4. Medical provision carries out various basic tasks before, during and after floods. A coordinator of medical, management and logistical functions of the relevant health care facilities for hospital and non-hospital flood care is the Director of the Regional Health Inspection in the area concerned.
5. Timely and permanent communication between ministries, radio, television, non-governmental organizations, foreign embassies, wireless stations, the Internet, e-mail, fax, telephone, public and private agencies and personal contact of representatives of the population is necessary.
6. In Varna, due to the limited nature of the damages and injuries, based on past events information, the medical needs in floods can be mastered by their local medical staff and the available medical provisions.

5. Studying the awareness and preparedness for floods of foreigners and Bulgarian population age 18+

5.1. Studying the awareness and preparedness for floods of foreign citizens temporarily residing in the Republic of Bulgaria (Varna)

A survey of 230 young people, English – speaking (ES), from 12 countries of Europe and Asia - England, Wales, Germany, Ireland, Sweden, Spain, Norway, India, Japan, the United Arab Emirates, Scotland and Portugal - was conducted.

A sociological method has been used to study the awareness and preparedness for floods of foreign citizens residing in the Republic of Bulgaria.

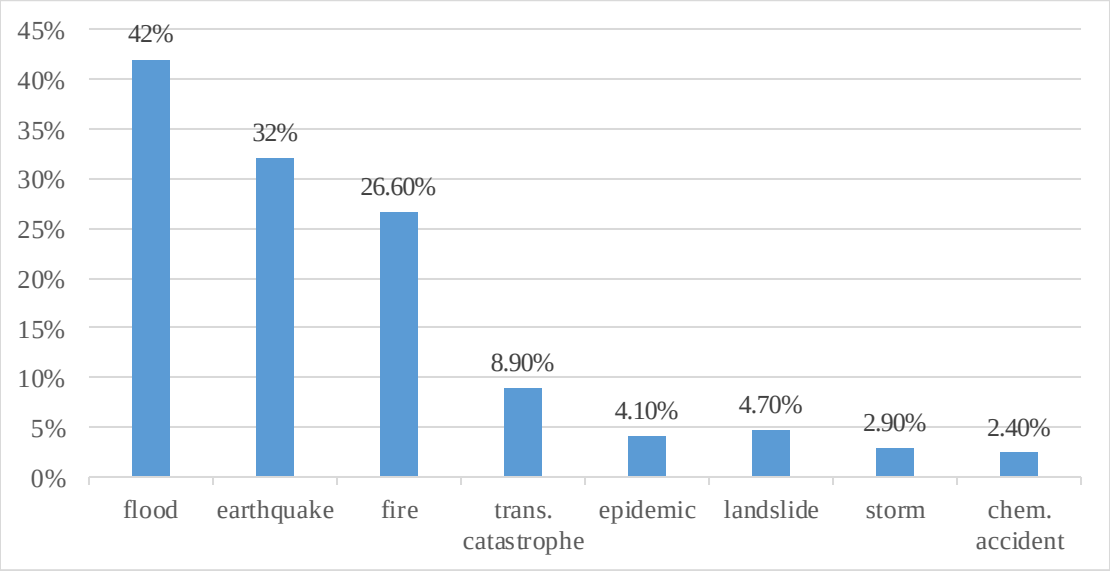
The method chosen is anonymous survey through a poll filled in personally by the respondents.

44.7% of men and 55.3% of women were interviewed. Among them, with college education 23.1%, high school graduates - 23.1% and university diploma - 53.3%.

227 responded that during the interview they stayed in the city of Varna.

To the question, "Which of the above disasters have you ever experienced?" the following responses were given: the highest percentage of respondents have experienced floods - 42%, 32% - earthquake, 26.60% - fire, transport accidents 8.90%, and other disaster situations - from 2.40% to 4.70% (Figure 2).

Figure 2. Answers to the question "Which of the above disasters have you ever experienced?"

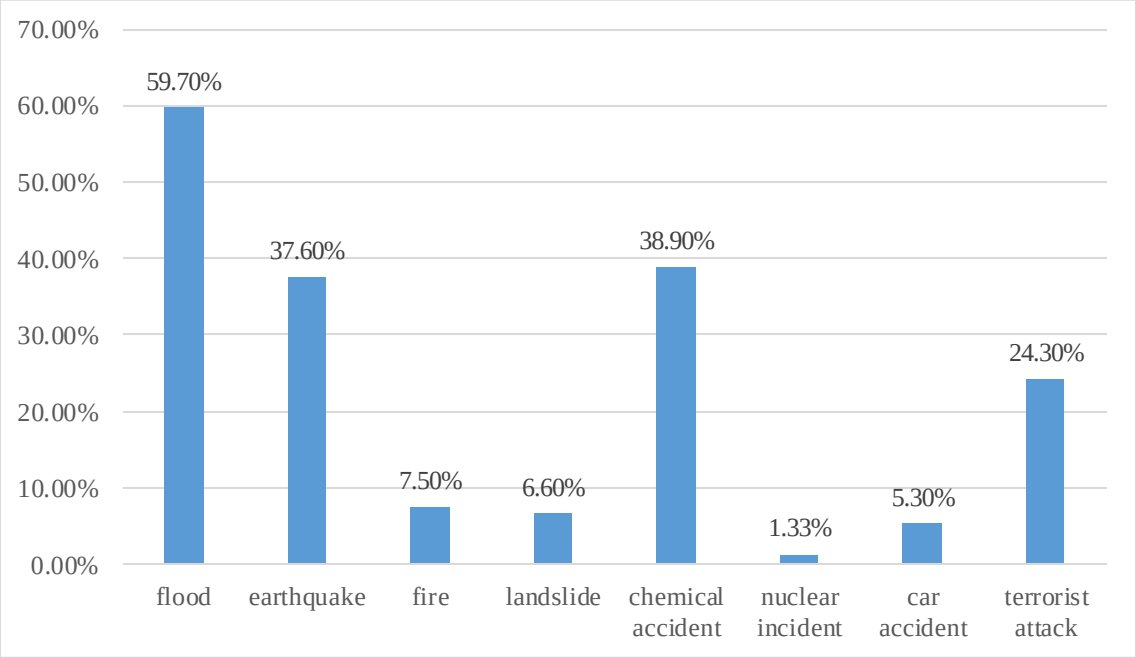


10.6% reported that they had never experienced any of the disasters cited. Nearly one-third pointed out more than one disaster situation.

The question, "Which of the above cited disasters do you consider to be of the greatest threat for an epidemic outburst?" arouse a lot of interest among the respondents.

A high percentage - 59.70% - know that an epidemic can occur after flooding, but a wrong answer – that an epidemic is possible after a chemical accident, is given also by a relatively high percentage - 38.90%. (Figure 3).

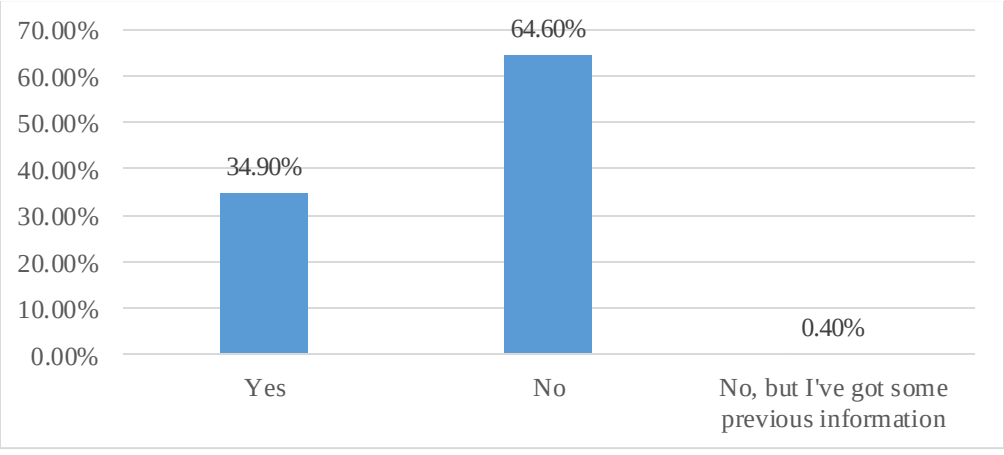
Figure 3. Answers to the question "Which of the above cited disasters do you consider to be of the greatest threat for an epidemic outburst?"



One third (37.60%) correctly know that an epidemic may occur after an earthquake and ¼ (24.30%) - after a terrorist attack.

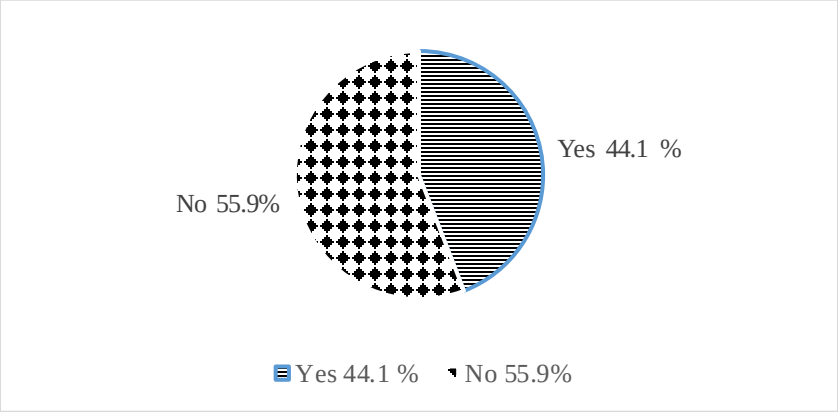
To the question "Are you informed whether you live in a high flood risk area?" the percentage of respondents who gave the answer "No" is extremely high - 64.60% and this could threaten their life, health and property in a real situation arises. (Figure 4).

Figure 4. Answers to the question "Are you informed whether you live in a high flood risk area?



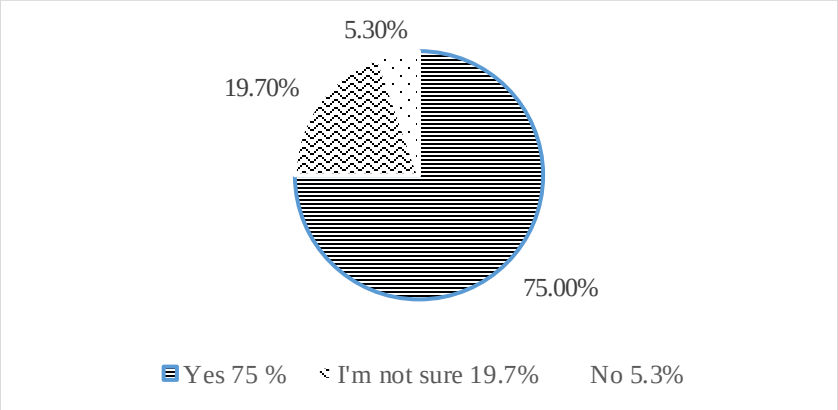
It is noteworthy that less than half of the respondents (44.10%) have got an insurance on their property in case of disaster (including floods), but only 5.30% have prepared a bug-out-bag with documents, food and are ready to be evacuated if disaster strikes (including floods) , which will make it very difficult for them in a real situation. (Figure 5)

Figure 5. Answers to the question "Do you have property insurance for disasters (including floods)?"



Self-assessment of First Aid knowledge (respiratory resuscitation and indirect cardiac massage) is very high: 75.00% respond positively. (Fig. 6).

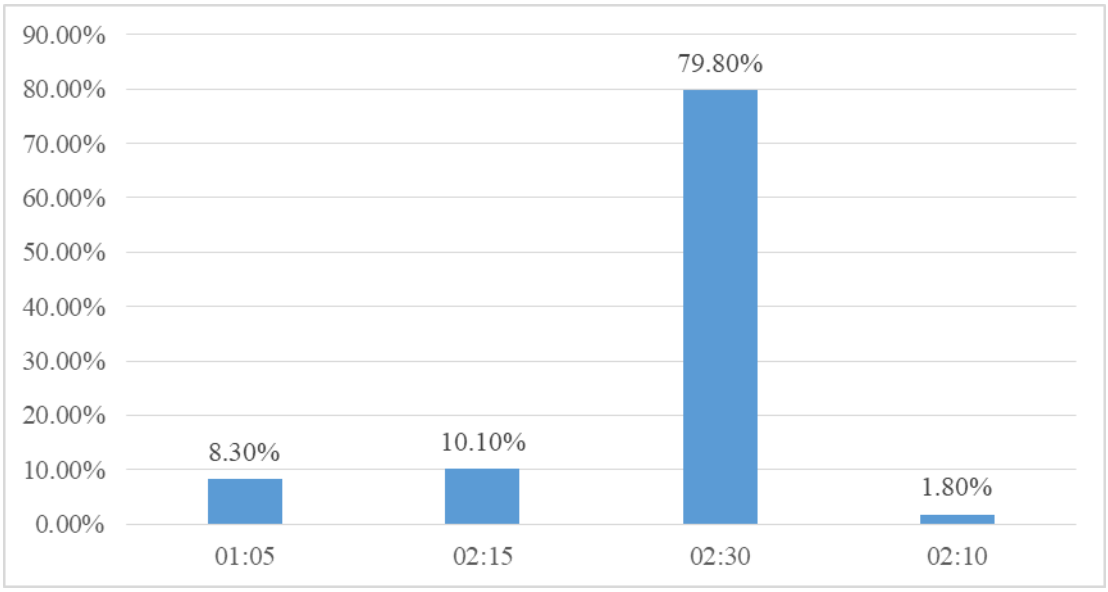
Fig. 6 Answers to the question: "Do you know how to give First Aid to a victim?"



In order to check whether respondents' self-confidence is based on knowledge, we asked the question: "What is the ratio of ventilation to chest compressions?"

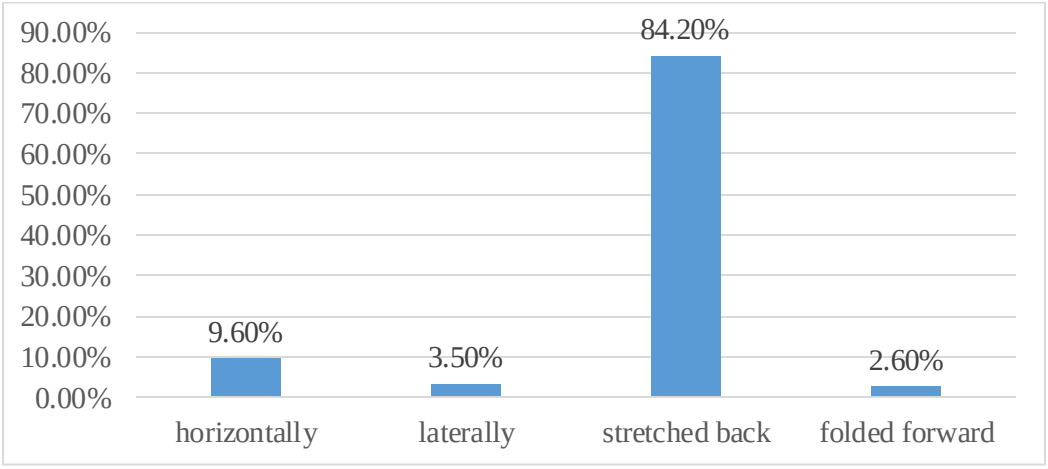
True answers gave 79.80% of the respondents, which we consider as very good preparation to deal with a real situation and to give first aid. (Fig.7)

Fig. 7. Answers to the question: "What is the ratio of ventilation to chest compressions?"



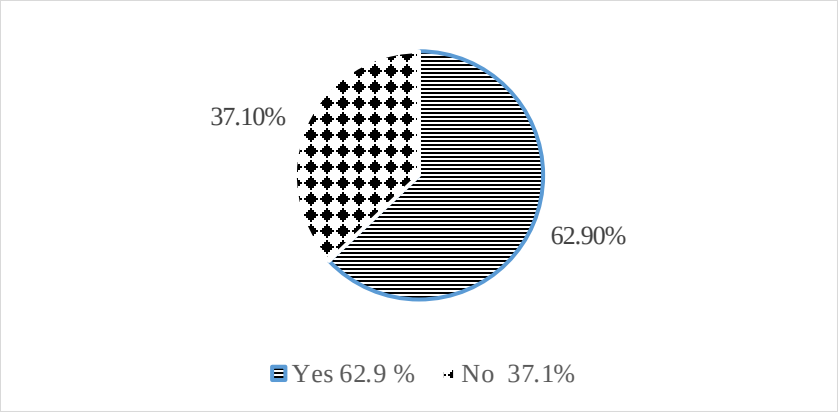
The re-examining question, "What should be the head position of the victim in respiratory resuscitation?" a true answer is given by 84.20%, which again confirms the high awareness of the respondents. (Figure 8).

Fig. 8. Answers to the question: "What should be the head position of the victim in respiratory resuscitation?"



To the question "Have you been trained in first aid in the disaster area?", 62.90% of the 228 respondents answered positively. (Fig. 9).

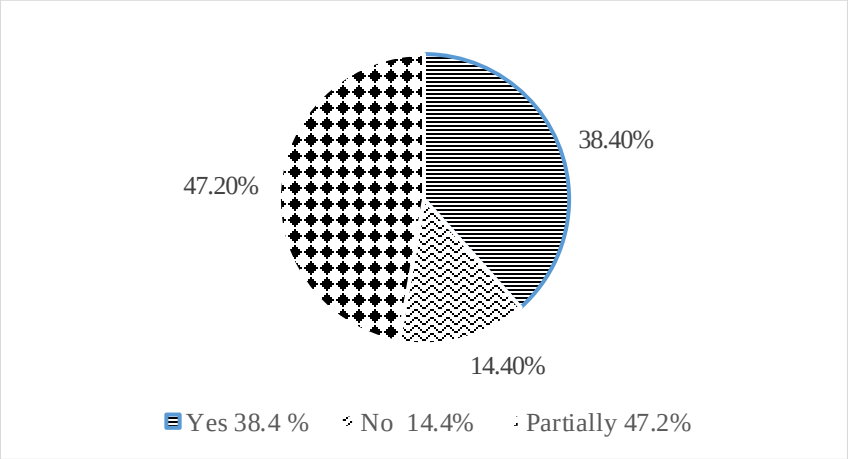
Fig. 9 Answers to the question: "Have you been trained in first aid in the disaster area?"



We estimate their self-confidence in first aid in a disaster area as high and based on real pre-training in nearly 2/3 of the respondents.

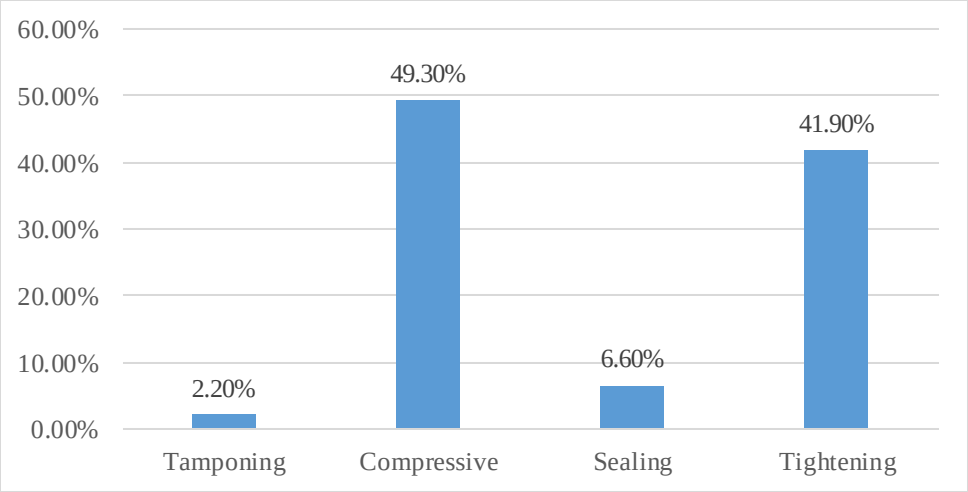
The self-esteem of young people for making dressings is considerably lower: only 38.40% responds affirmatively, and 47.20% are hesitant and respond “partialy”. (Figure 10).

Fig. 10 Answers to the Question: "Can you make a wound dressing?"



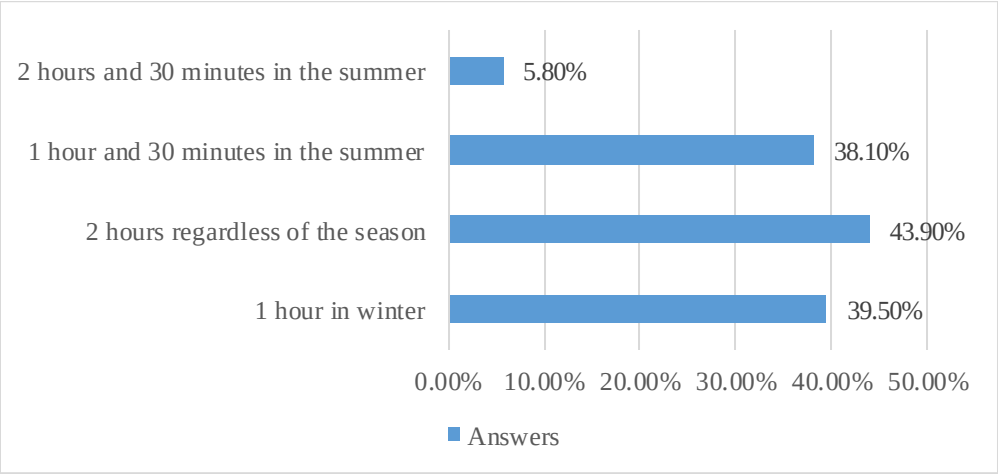
To the verifying question, what bandage should be done for arterial bleeding, a true answer was given by 41.90%, which confirms the low awareness of wound dressings and our assessment is good preparation. (Figure 11).

Fig. 11 Checking the English – speaking respondents’ knowledge: "In case of arterial bleeding, the following dressing should be made:"



To the question, "For how long maximum can the tightening dressing stay in case of arterial bleeding?", correct answers were given by 39.50% and 38.10% respondents respectively, which again confirms the low awareness and weaker readiness to provide first aid by bandaging. The wrong answer's percentage is higher - 43.90%. (Figure 12).

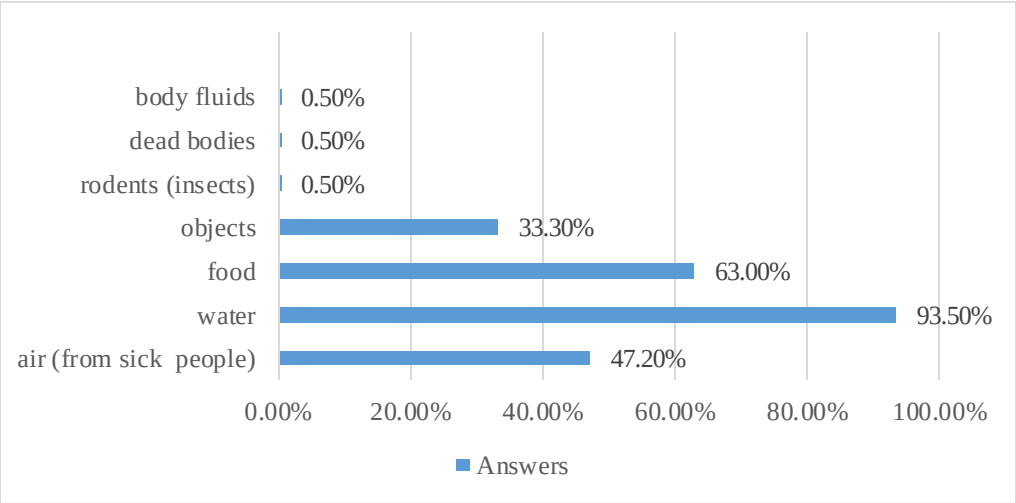
Figure 12. "For how long maximum can the tightening dressing stay in case of arterial bleeding?" - verifying question to the English - speaking respondents.



To the question, "What are the possible paths for post-flood epidemic outbreak?" the responses given by the respondents are very heterogeneous. Almost all participants in the study know that post-flood epidemics are transmitted by water - 93.50% and approximately 2/3 (63.00%) - by food, about half of them (47.20%) – by air from sick people, only 1/3 (33.30%) - objects and an insignificant number of 0.50% answer rodents and insects, dead bodies and body fluids.

We evaluate their knowledge - "water and food danger" as good and lower for the other possibilities of contamination. (Figure 13)

Fig. 13 Answers by the English - speaking respondents to a question: "Are you aware of which pathways a post-flood epidemic outbreak may occur?"



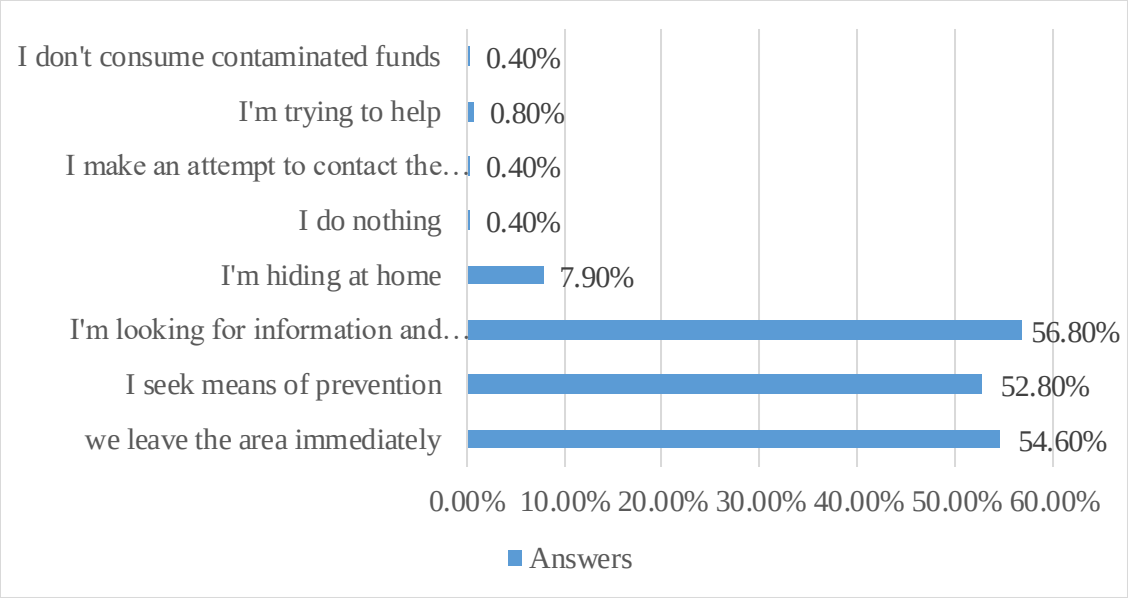
According to R. Konstantinov (2018), the incidence of intestinal infections in Varna region for 2005-2017 period shows a slight tendency to increase.

Intestinal infectious diseases are mainly due to a faecal-oral transmission mechanism and are the most significant group for the pathology in humans in the Republic of Bulgaria and the world, especially after flooding.

The epidemiological role of the paths of transmission, forming the transmission mechanism, is significant and it is assumed that the social and living conditions, the communal development and the level of the epidemiological health culture, determine the level and the course of the process. (J. Donkov, 2018)

As an extremely low awareness and very little knowledge we evaluate the possible actions of the respondents in case of risk of an epidemic outbreak - 54.60% respond that they will immediately leave the area, which threatens to spread the epidemic and only 7.90% will be hiding at home, which is the best solution. (Figure 14).

Fig. 14 English - speaking respondents' answers to the question: "What are you going to do if there is a danger of an epidemic outbreak in your area?"



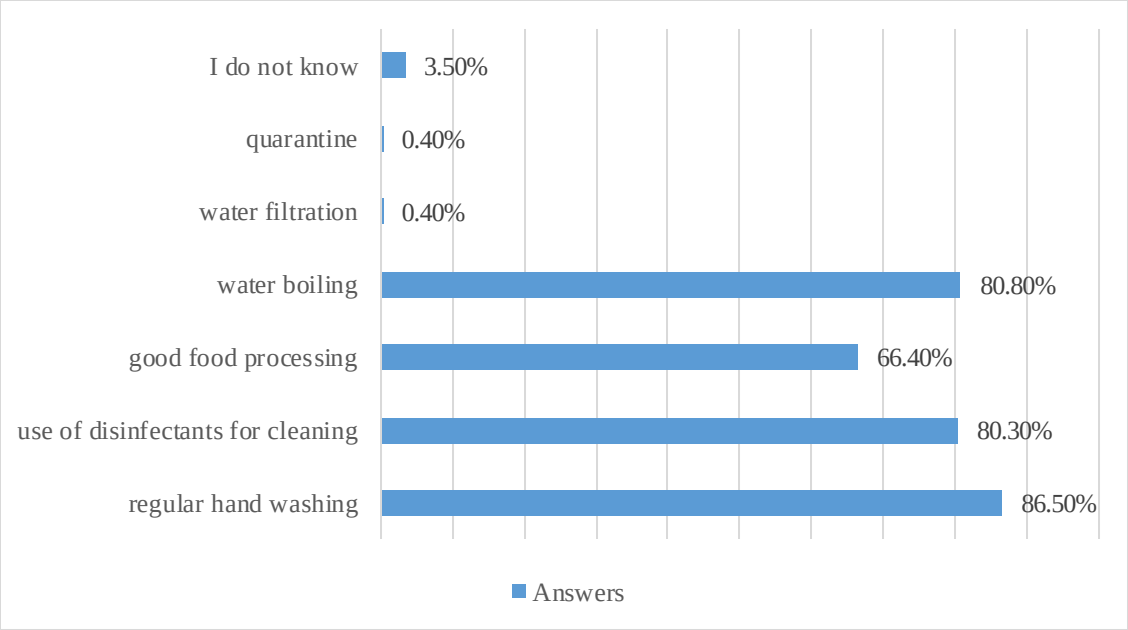
If there's risk of intestinal contagious disease, we consider that a large number of respondents will manage the situation very well - 86.50% will regularly wash their hands, 80.30% - will use disinfectants for cleansing, 80.80% - will boil water, 66.40% will apply treatment food.

Based on this study data, the incidence of intestinal infections is expected to decrease in the coming years in case the Bulgarian citizens' health culture increases.

Still a very small percentage know and will apply the quarantine measure - 0.40%, as well as water filtration - 0.40%, which can seriously endanger their health and life in a real situation. (Figure 15).

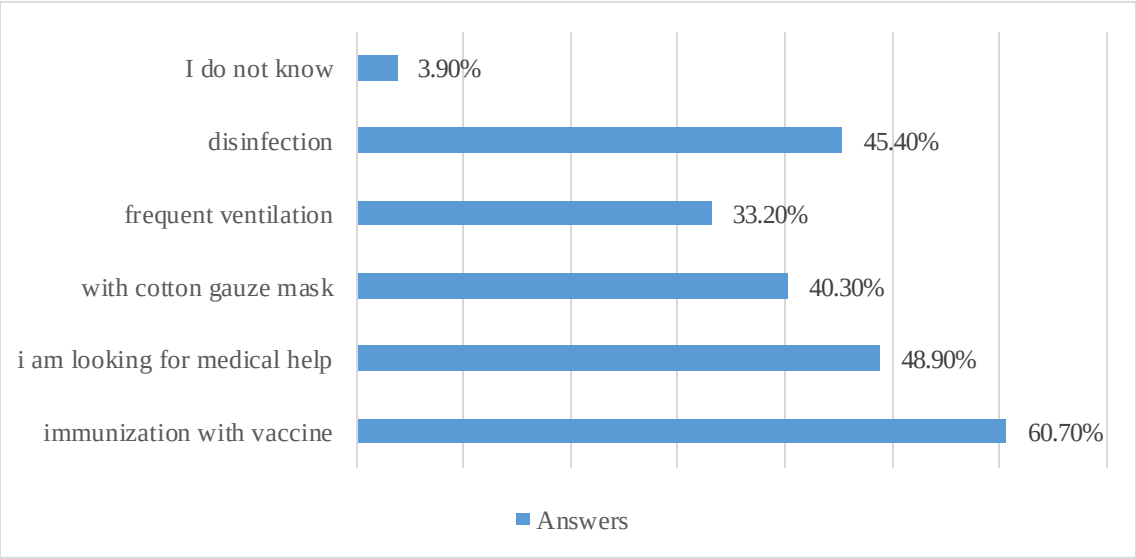
From the analysis of the enterocolitis morbidity data in Varna region for 2005-2017 period, it was found out that the incidence's rates in individual years exceed twice those for the country. The trend that is described is linear and ascending (R. Konstantinov, 2018)

Fig. 15 English - speaking respondents' answers to a question: "If there's risk of intestinal contagious disease, how can you protect yourself?"



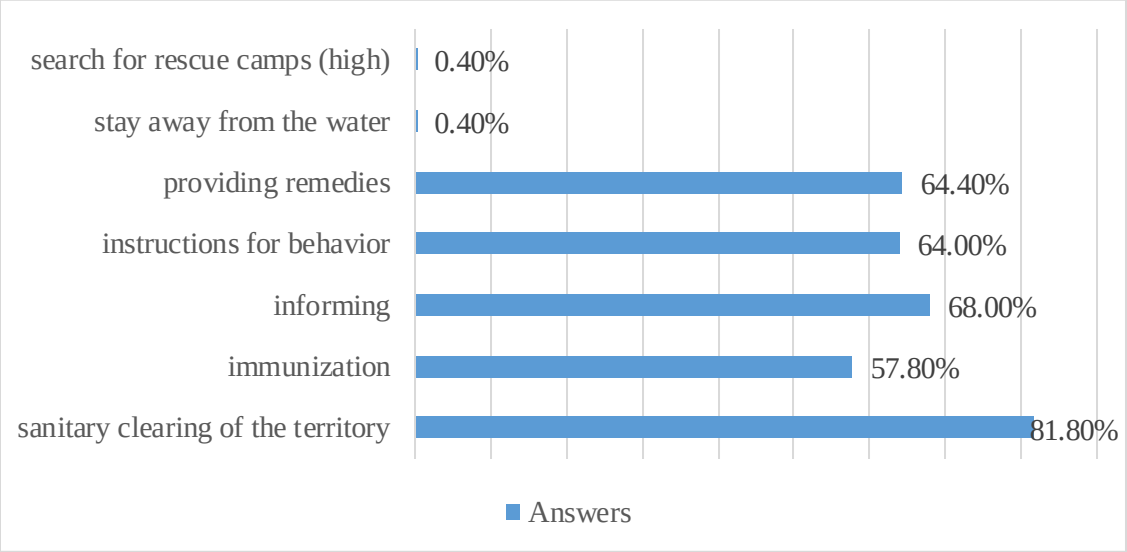
We evaluate as good but lower the awareness and readiness for proper action to protect against airborne infections and the risk of an epidemic outbreak. Immunizations will be applied by 60.70% vaccine, medical help will seek - 48.90%, a cotton-mask will use - 40.30%, often will ventilate the premises - 33.20% and disinfection will be applied by 45.40%, only 3.90% did not answer. (Figure 16).

Fig. 16 The English - speaking respondents answers to the question: "Do you know how to protect yourself against airborne infections when there's risk of an epidemic outbreak?"



The respondents have also a good knowledge of the preventive measures against epidemic outbreak after the flood: 81.80% know that sanitation is needed in the territory, 57.80% - immunization; 68.00% - information; 64.00% - guidelines for correct behaviour and 64.40% - remedies. (Figure 17).

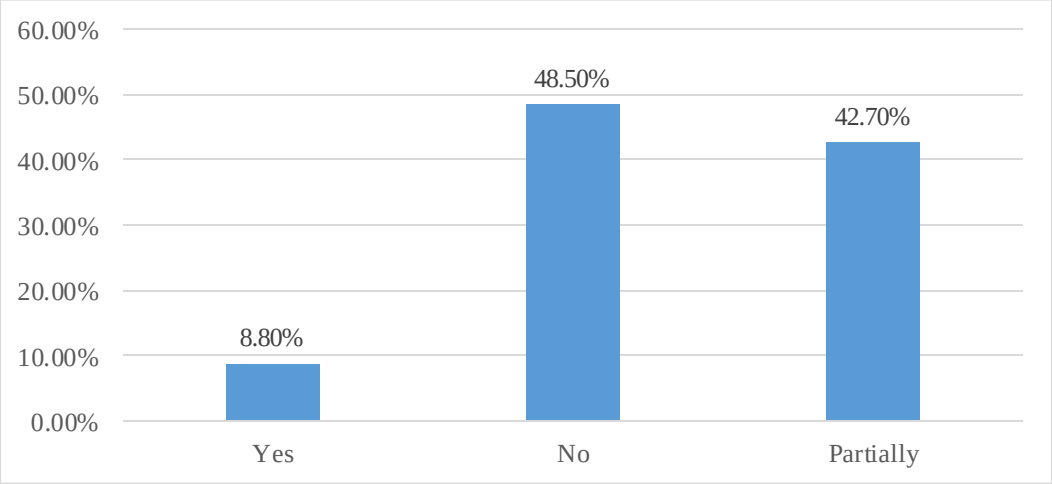
Fig. 17 The English - speaking respondents answers to a question: "Do you know what measures are to prevent an outbreak after a flood?"



It was found out that the self-confidence of the studied group on flood protection was quite low.

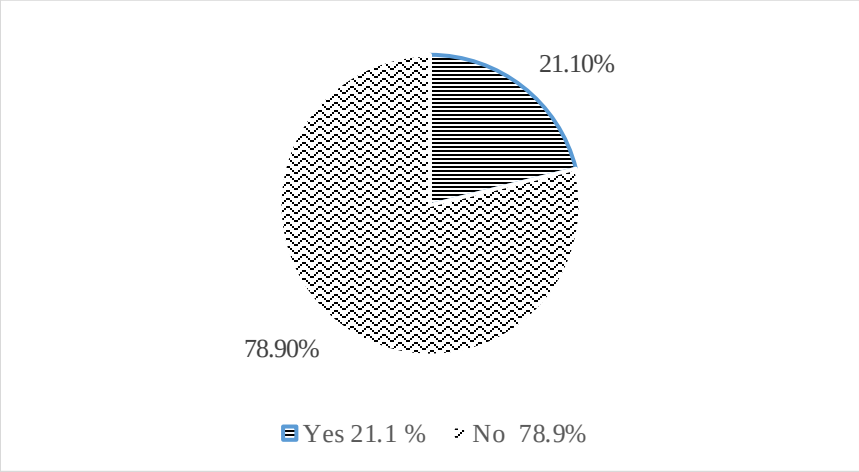
To the question, "Do you think you have enough knowledge to protect yourselves against floods?", 48.50% responded negatively, and 42.70% - partially. (Figure 18).

Fig. 18 Answers to a Question: "Do you think you have enough knowledge to protect yourselves against floods?"



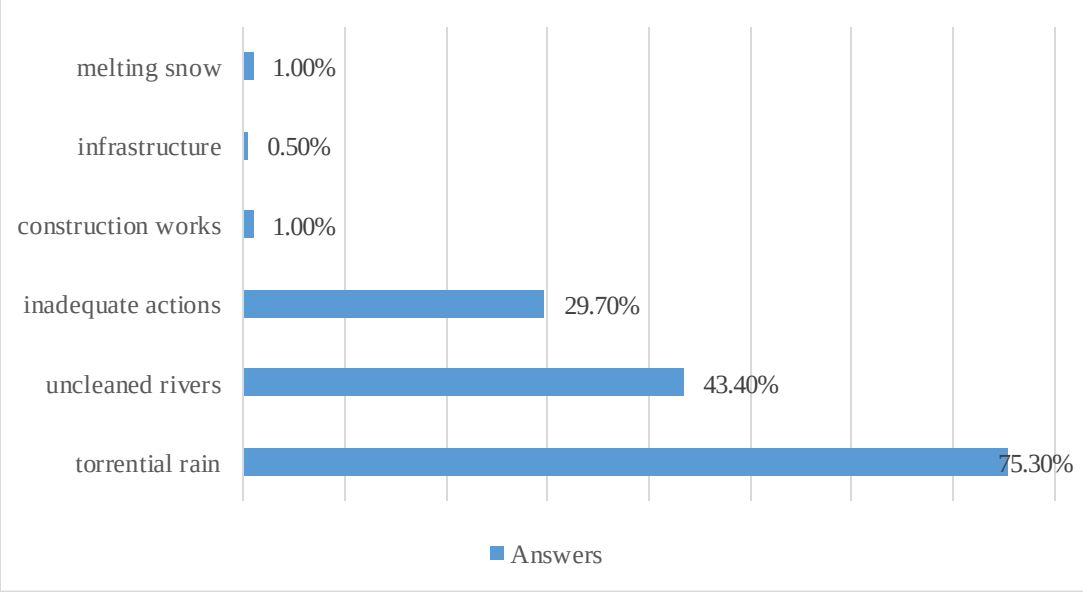
The self-confidence of the respondents of their knowledge for other disasters protection is also very low: only 21.10% - affirmative and 78.90% - negative. (Figure 19).

Fig. 19 English - speaking respondents' answers to a question: "Do you think you have enough knowledge to protect yourselves from other disasters?"



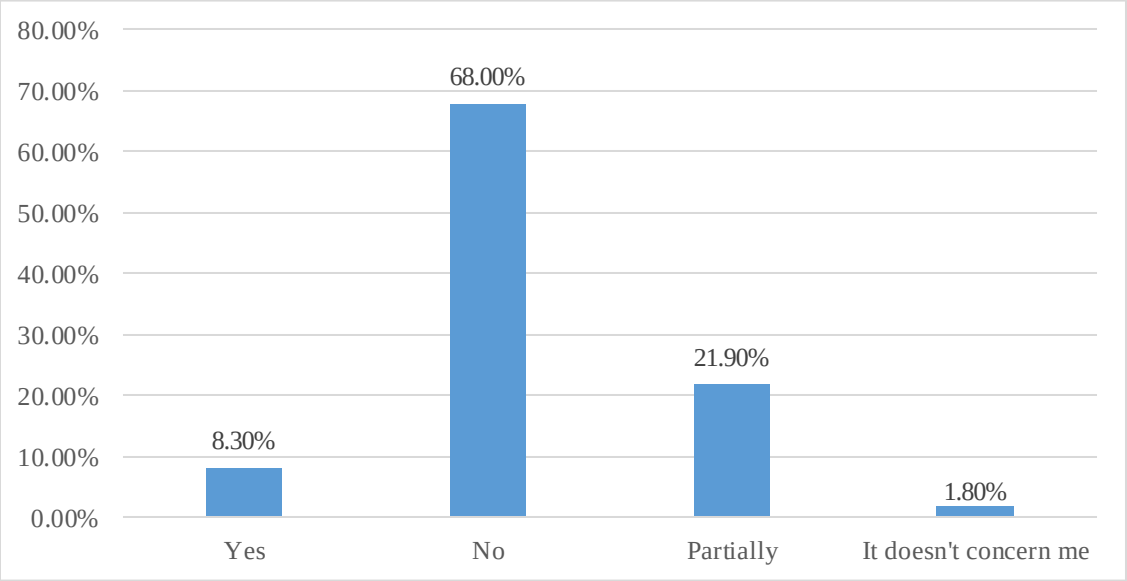
Respondents are well aware of the main cause of the floods: 75.30% - indicate heavy rains, 43.40% - unclean rivers, and 29.70% - indicate inadequate action. (Figure 20).

Fig. 20 The English - speaking respondents' answers the question: "What do you think are the causes of past floods in the settlement?"



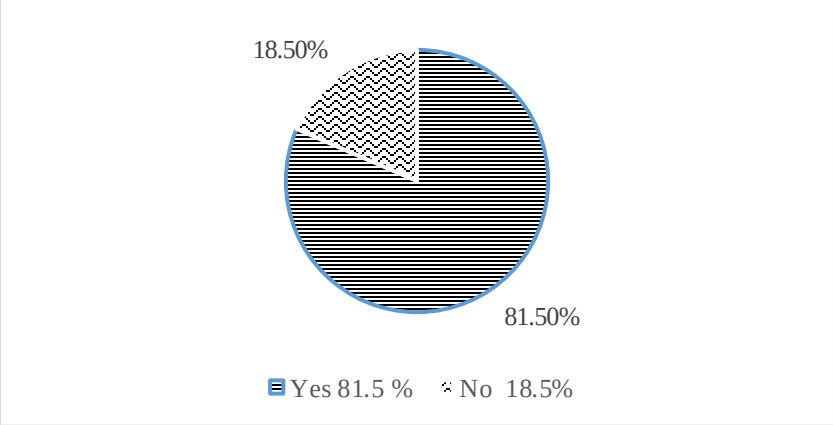
Extremely high is the percentage of those who are not familiar with the flood protection plan in the municipality where they live - 68.00%. (Figure 21).

Fig. 21 Answers to the question: "Are you familiar with the flood protection plan in your municipality?"



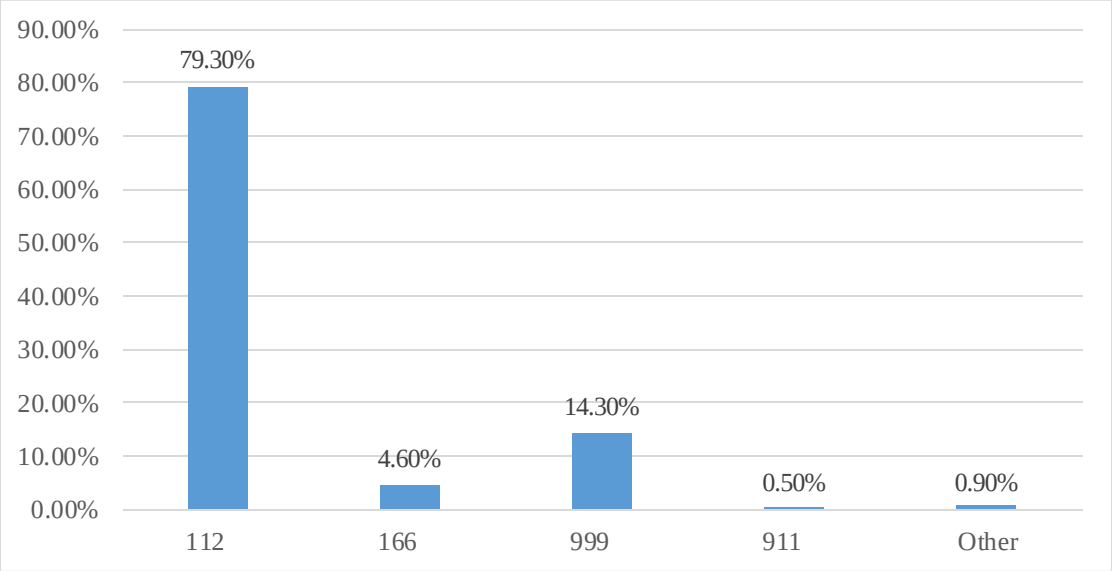
We highly evaluate the study group for knowing how to swim - 81.50%, which will help in a real situation to save their lives. (Figure 22).

Fig. 22 English - speaking respondents' answers to a question: "Can you swim?"



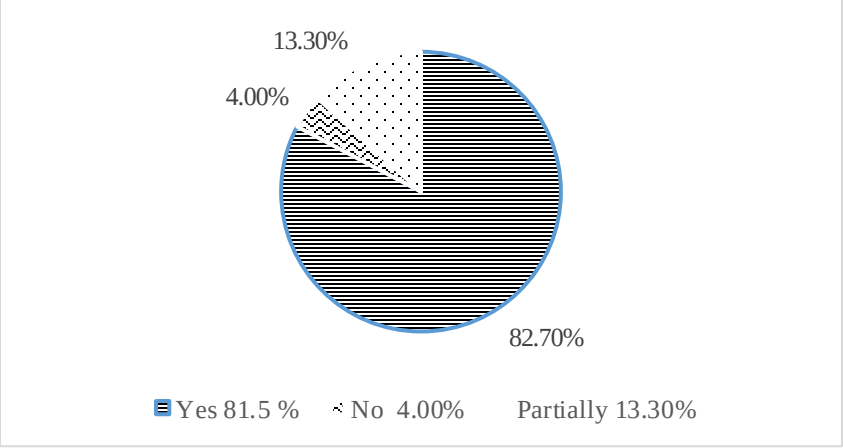
We evaluate the awareness and knowledge of the respondents what number to dial up (phone number 112) as very good - 79.30%. (Figure 23).

Fig. 23 Answered by English - speaking respondents to a question: "Do you know which phone to dial up in flood?"



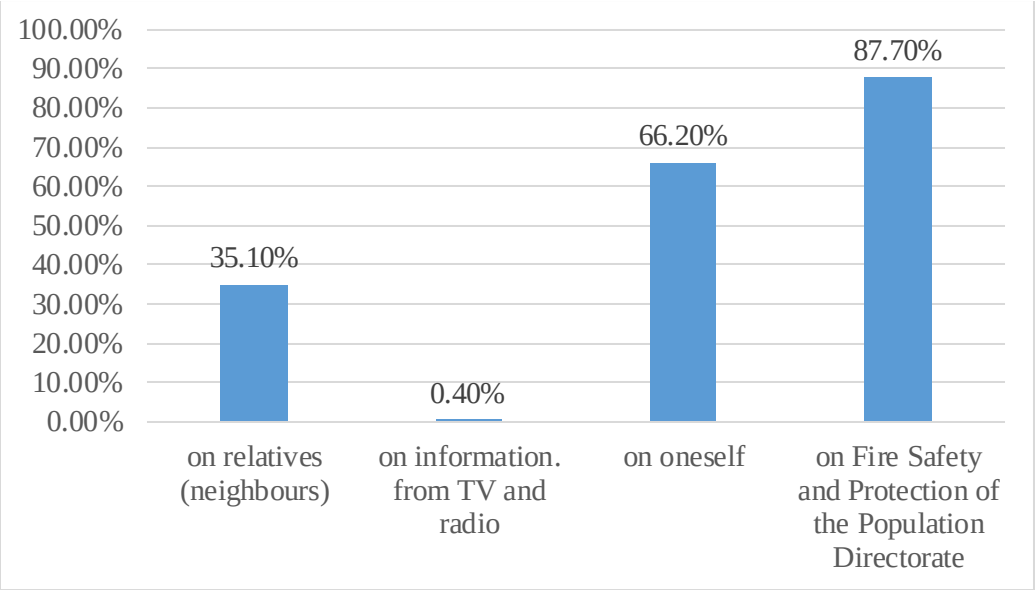
Extremely high is the percentage - 81.50% of those who believe that the knowledge about flood protection needs to be increased, which confirms our hypothesis that the knowledge of the population (including the temporary residents) should be increased. (Figure 24).

Fig. 24 English - speaking respondents' answers to a question: "Do you think you need to raise your knowledge of flood protection?"



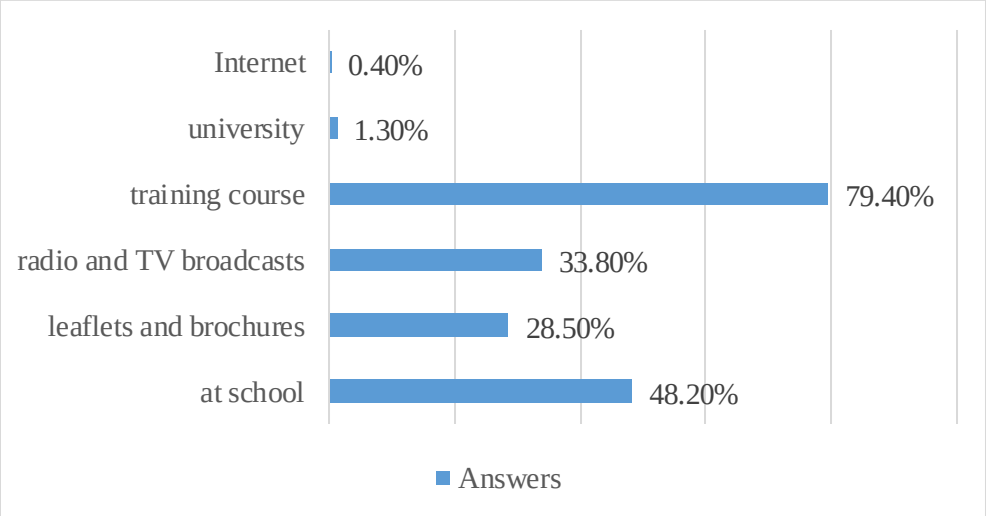
The study group's thrust on the "Fire safety and protection of the population" Directorate is high - 87.70% will rely on them, but 66.20% will rely on themselves. (Figure 25).

Fig. 25 English - speaking respondents' answers to a question: "Whom will you rely on during a flood?"



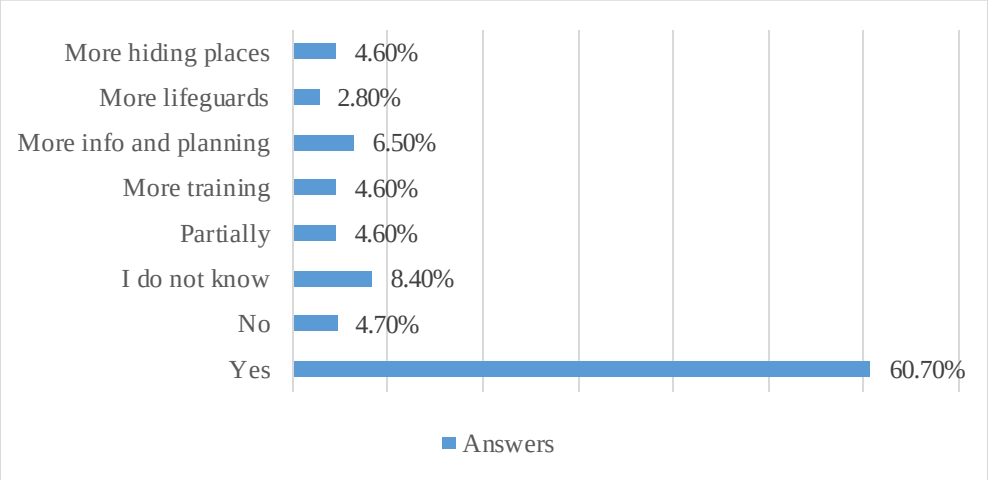
The largest percentage of respondents prefer to attend a training course - 79.40%, more knowledge at school - 48.20%, media broadcasts - 33.80%. (Figure 26).

Fig. 26 English - speaking respondents' answers to a question: "How do you prefer to get more knowledge?"



More than half of the young people - 60.70% - are satisfied with the measures that are applied to rescue and protect the population in disaster situations (including floods), but most likely this applies to the countries where they come from. (Figure 27).

Fig. 27 Answers to a Question: "Are you satisfied with the measures that are applied for rescue and protection in disaster situations (including floods)? If Not, please make suggestions! "



No differences related to education, sex and place of residence were registered. ($p < 0.05$).

CONCLUSIONS

1. A high percentage of respondents have experienced a flood (42.00%).

2. The majority of respondents (64.60%) have not been informed whether they live in a flood area.

3. Self-assessment of respondents for first aid in floods is high (75.00%), but overall disaster preparedness is low because 78.90% of respondents considered themselves unprepared.

4. It is found that the self-confidence of the studied group on flood protection is quite low: 48.50% consider that they have insufficient knowledge and 42.70% - only partial.

5. We highly evaluate the knowledge of the study group how to swim - 81.50%, which will help in a real situation to save their lives.

6. Evaluation of the awareness and readiness of the study group of 230 young foreigners, temporarily residing in Varna for:

- very good in giving first aid to an injured people without breathing and heart activity;

- good knowledge on the main paths of spreading infections in a post-flood epidemic outbreak, most (approximately 80.00%) will take effective measures against the risk of intestinal contagious disease;

- lower is the preparation for wound dressings and arterial bleeding (close to 40.00%), the mechanisms of transmission of infections by means of objects (33.30%), the use of disinfectants in epidemic situation (45.40%);

- very poor readiness for rapid evacuation in flood and other disaster (only 5.30% have evacuation bag);

- wrong behavior due to lack of sufficient knowledge - 54.60% will leave the area in an epidemic that will result in spreading of the epidemic and serious danger to the health of the majority of the population.

- a very small percentage will apply the quarantine measure - 0.40% and water filtration - 0.40%, which seriously endangers the health and life of the community in a real situation and will lead to the spreading of the epidemic.

7. More than half of the young people - 60.70% - are satisfied with the protection and rescue measures in disaster situations (including floods), but this is most probably the case for the countries they are coming from.

8. Extremely high is the percentage - 81.50% of those who believe that the knowledge on flood protection should be increased, which confirms our hypothesis that the knowledge of the population (including the temporary residents) should be increased.

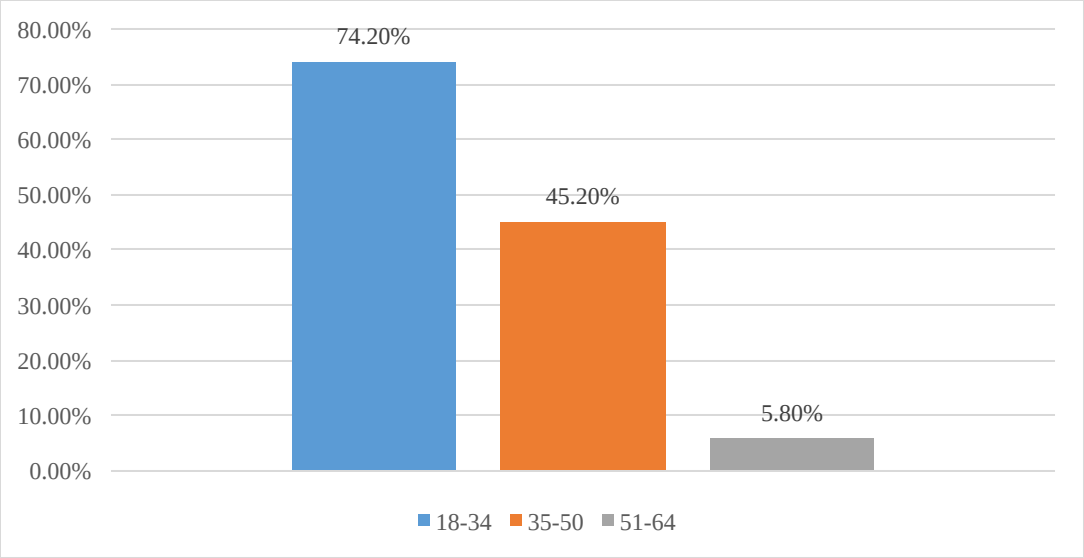
9. The largest percentage of respondents prefer to increase their knowledge by attending a training course - 79.40%, to get more knowledge at school offer 48.20%, media broadcasts - 33.80% and leaflets and brochures - 28.50%.

10. No differences related to education, sex and place of residence were registered. ($p < 0.05$).

5.2. Research and assessment on the flood preparation of population aged 18 and over residing permanently in Varna Region (Bulgarian citizens -BG)

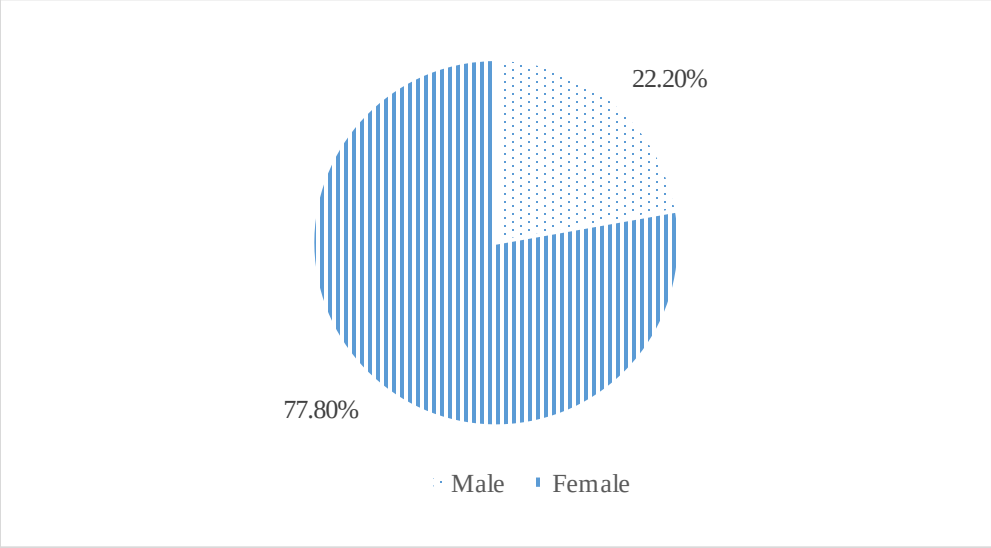
The highest percentage of respondents - 74.20% are in the age group 18-34, 45.20% - 35-50 years and 5.80% are aged 51-64 (Figure 28)

Fig. Age of BG (participants in the study).



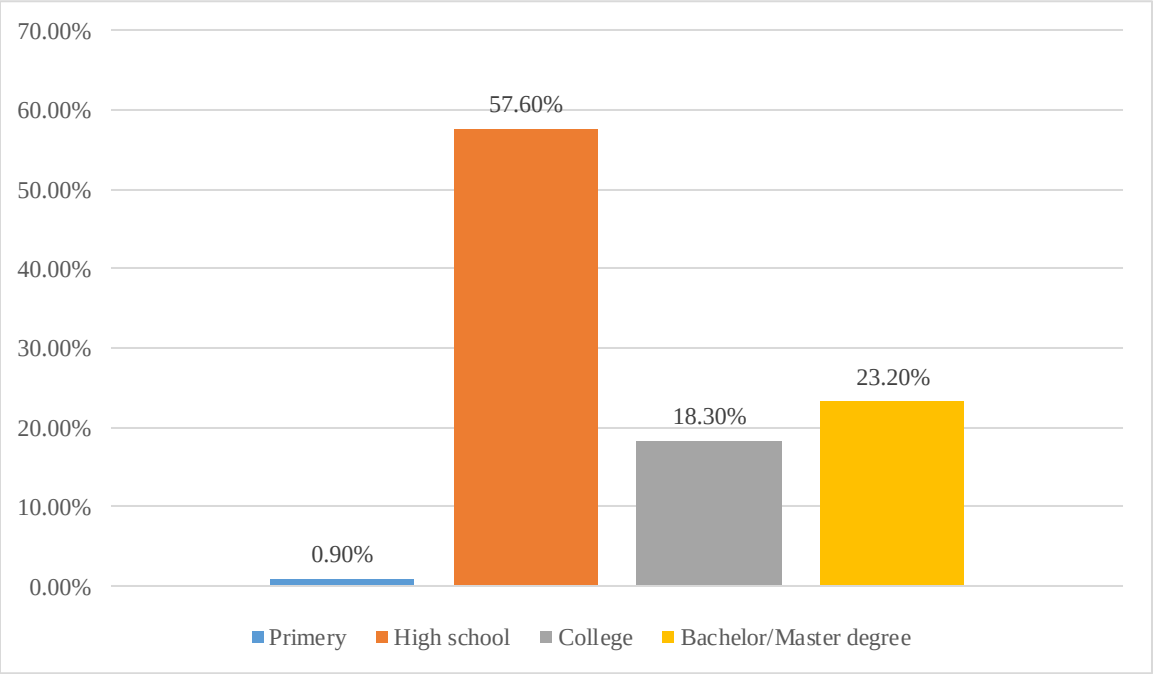
The distribution of the study group by gender is 77.80% female and 22.20% male. (Figure 29)

Fig. 29 Gender of the participants in the BG study.



The level education is dominated by those with secondary - 57.60%, college - 18.30% and higher - 23.20%. (Figure 30)

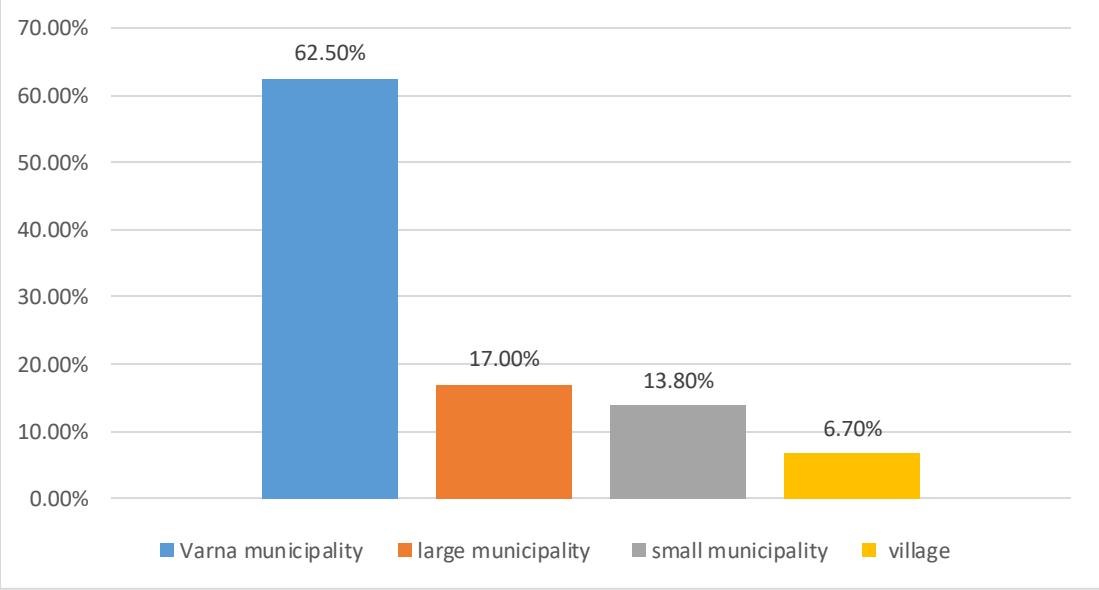
Fig. 30 Education of BG



We believe that the study group is a part of the intellectuals, well educated people and we hope to be well prepared for disaster situations, including floods.

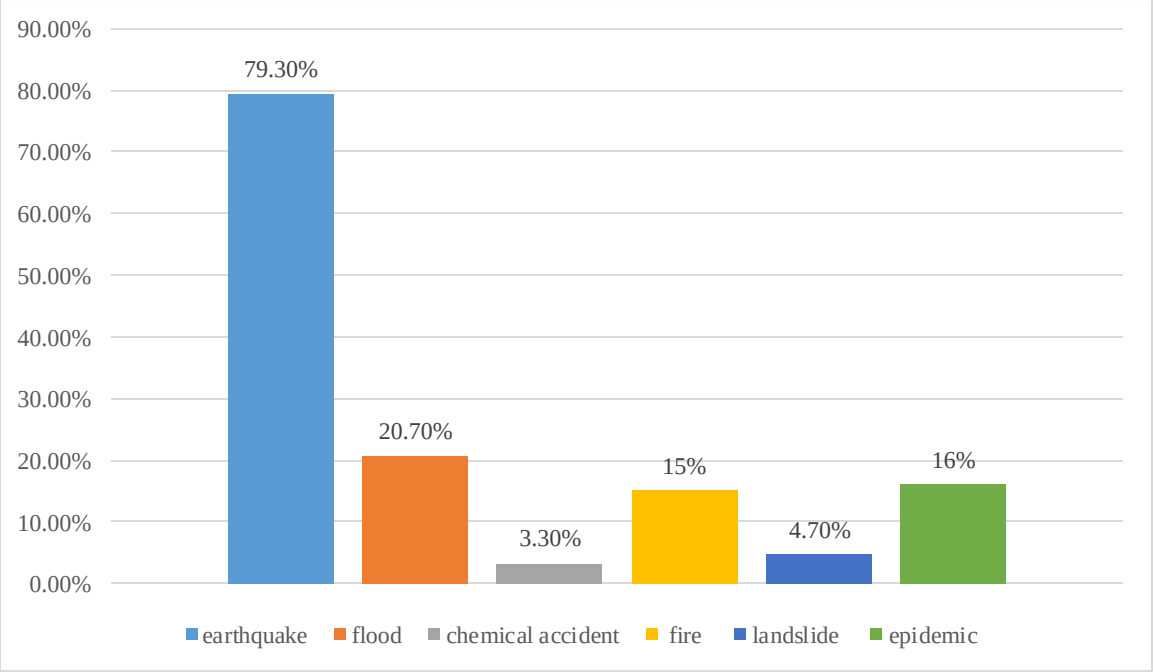
By residence, most residents live in Varna - 62.40%, 17.00% - in a large municipality, 13.80% - in a small municipality and 6.70% - in a village. (Figure 31)

Fig. 31 Location of BG.



To the question, Which of these disasters have you ever experienced?, the answers are as follows: 79.30% - an earthquake; 15.00% - fire and 16.00% - epidemic. (Figure 32)

Fig. 32 Answers to BG Question: "Which of these disasters have you ever experienced?"



Compared to the answers of the foreign respondents, temporarily living in Varna, we register very large differences. ($p > 0.05$) (Figure 33)

Fig. 33 Comparative answers of BG and English-speaking respondents to the question: "Which of these disasters have you ever experienced?"

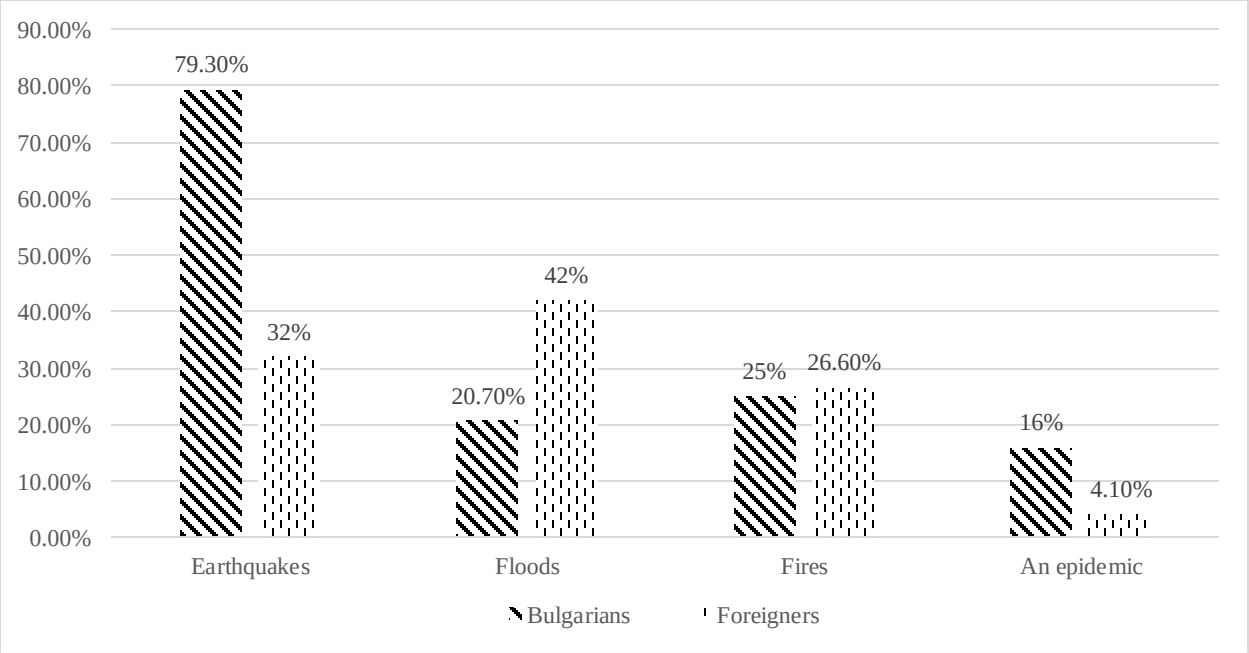
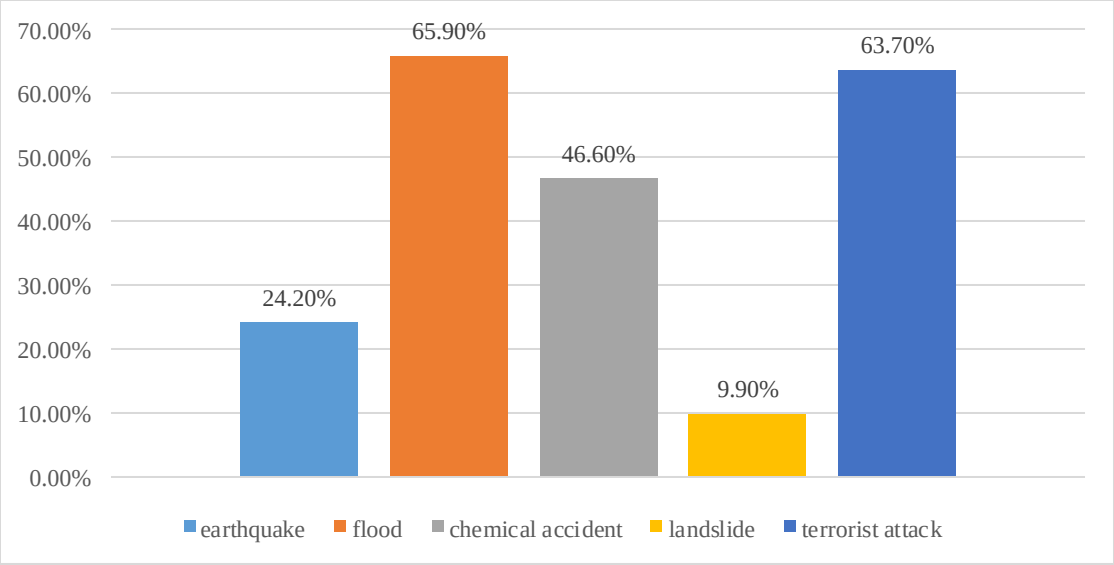


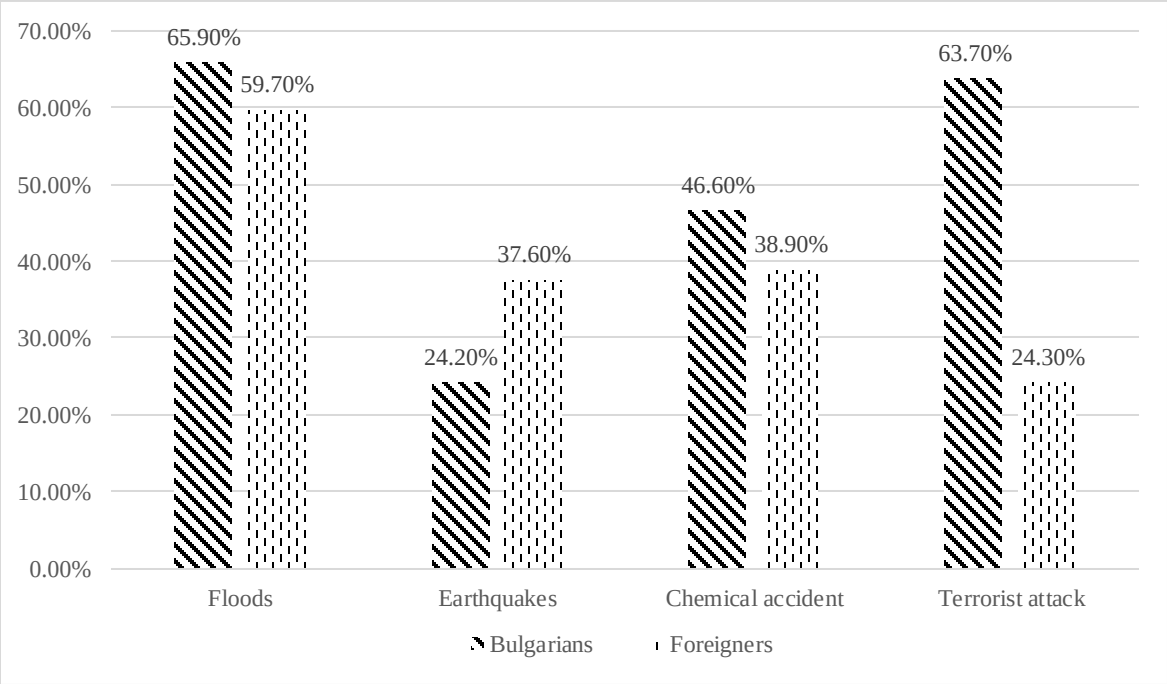
Figure 34 gives the answers to the question: "Which of the disasters do you think pose greatest risk of an epidemic outbreak?": 65.90% indicate the floods and 63.70% a terrorist attack, most likely fearing of bioterrorism.

Fig. 34 Responses of BG to the question: "Which of the above disasters do you think pose greatest risk of an epidemic outbreak?"



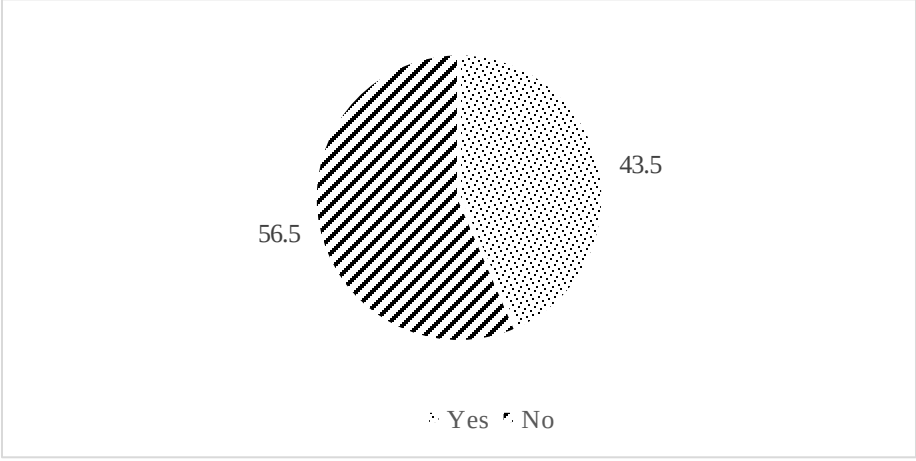
When comparing the two surveys, we see a certain similarity in terms of flood, earthquake and chemical hazard, but quite a difference in terrorist attack. ($p > 0.05$) (Figure 35)

Fig. 35 Comparative answers of the two surveyed groups to the question: "Which of the above disasters do you consider to be the greatest possible danger of an epidemic outbreak?"



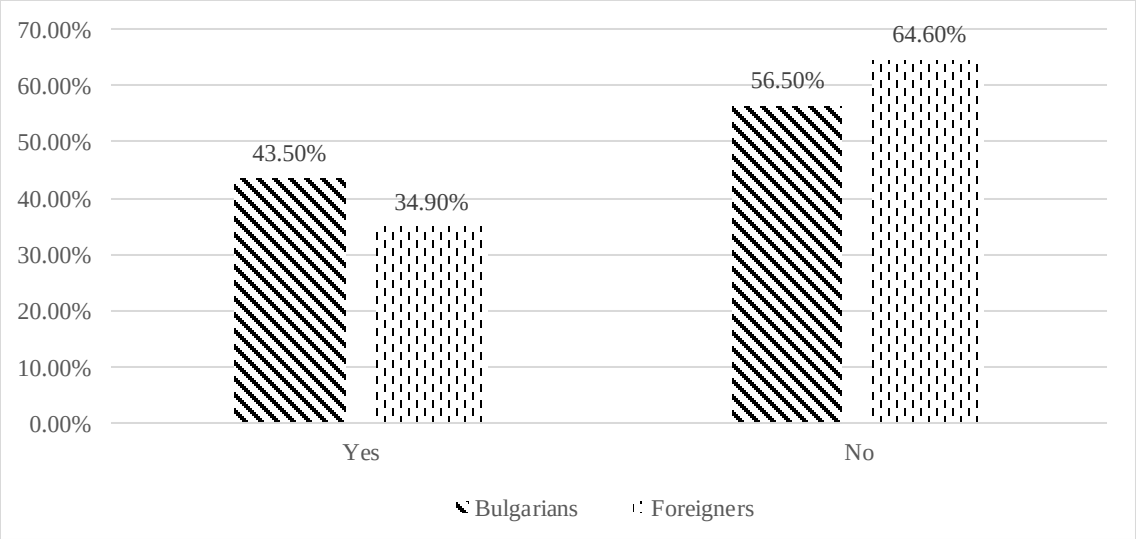
Less than the half of the respondents (43.50%) are informed whether they fall into a flood-prone area. ($p > 0.05$) (Figure 36)

Fig. 36 Answers from BG to a question: "Are you informed if you are in a flood-prone area?"



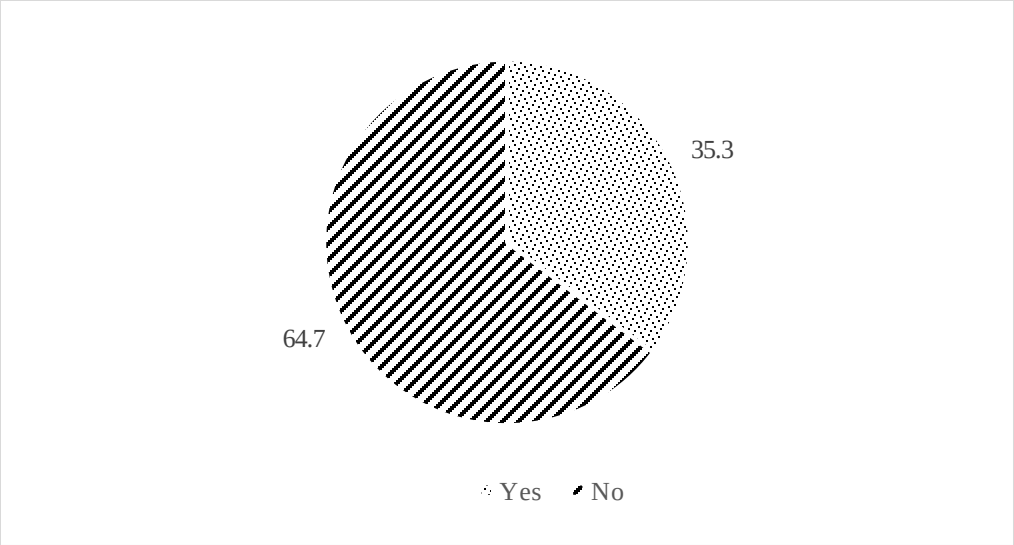
When comparing data from both studies, the answers are quite similar. However, there is an impression that Bulgarians are more interested in foreign citizens. ($p > 0.05$) (Figure 37)

Fig. 37 Comparative answers to the question: "Have you been informed if you are in a flood -prone area?"



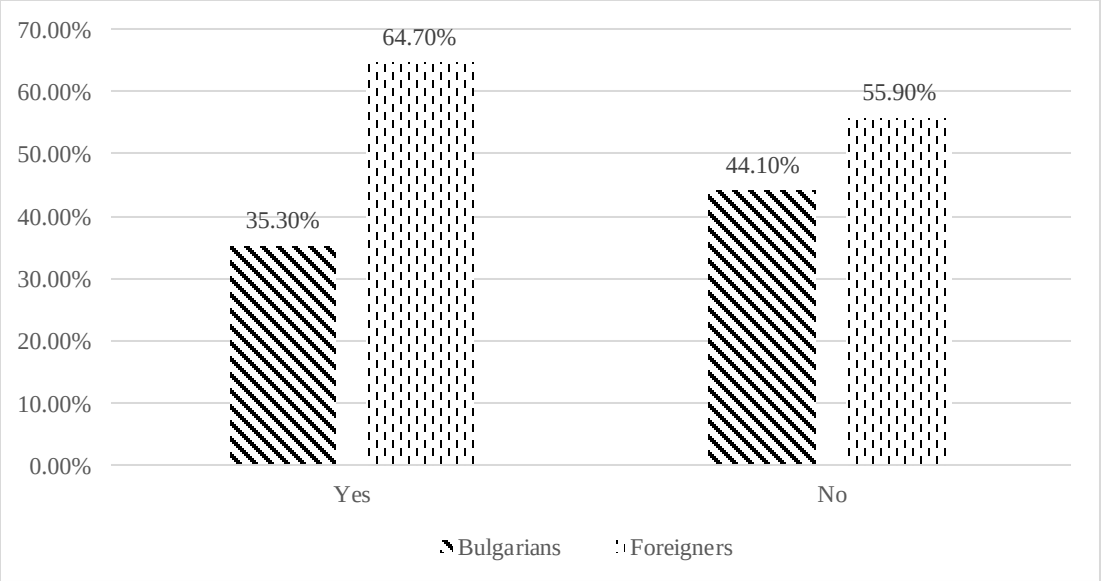
To the question "Do you have property insurance in case of disasters (including floods)?" Bulgarian citizens respond in a very high percentage - 64.70% that they do not. (p> 0.05) (Figure 38)

Fig. 38 Responses of BG to a question: "Do you have property insurance for disasters (including floods)?"



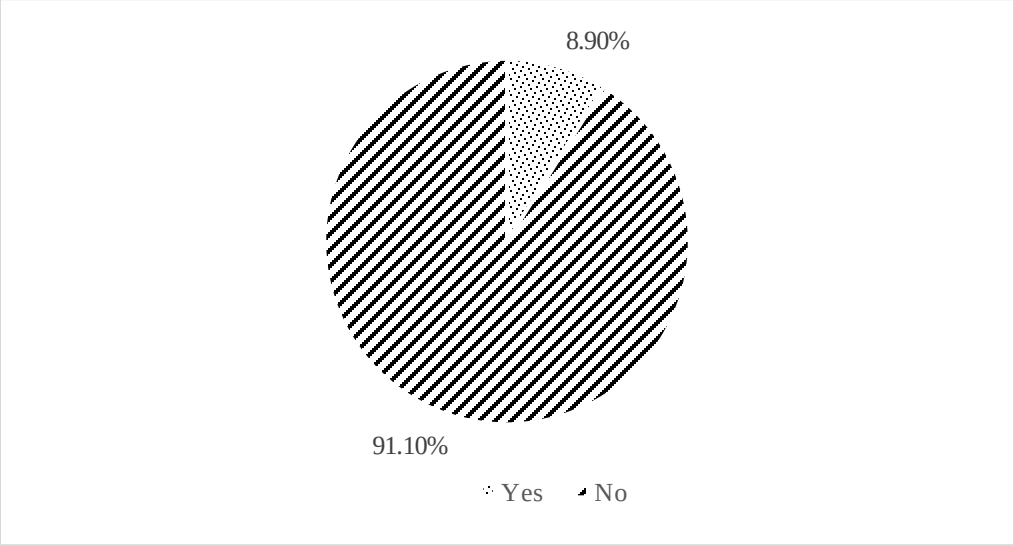
Approximately 2 times more foreign citizens, compared to Bulgarians, have an insurance on their property. (p> 0.05) (Figure 39)

Fig. 39 Comparing the answers of BG and English-speaking respondents to the question: "Do you have property insurance for disasters (including floods)?"



Extremely low percentage of Bulgarians - 8.90% are ready for evacuation in disasters (including floods). (Figure 40)

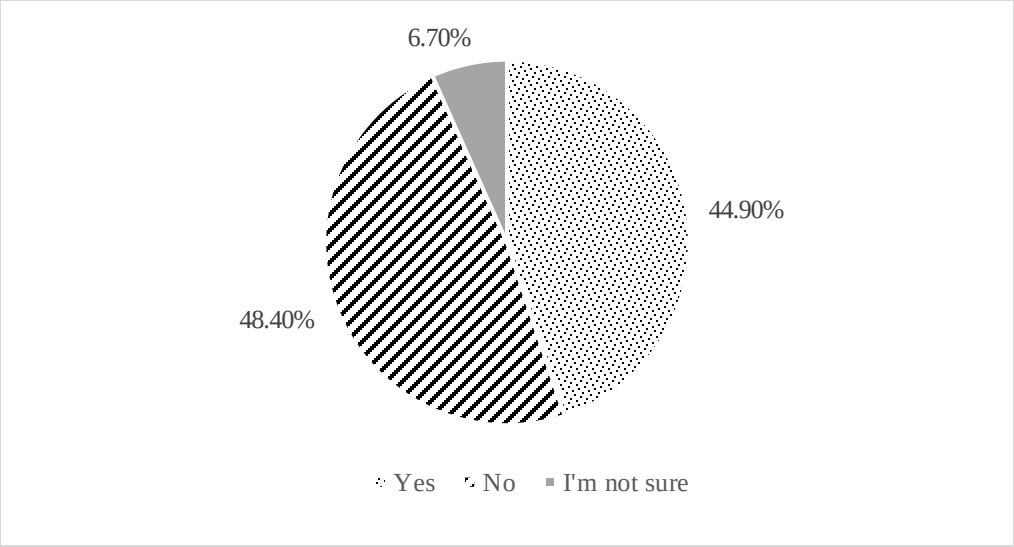
Fig. 40 Answers to BG: "Do you have a prepared bag of documents and food, and readiness to evacuate in disasters (including floods)?"



Foreign nationals are also poorly prepared for evacuation - only 5.30% have a prepared bag of food and documents to serve them in a real situation.

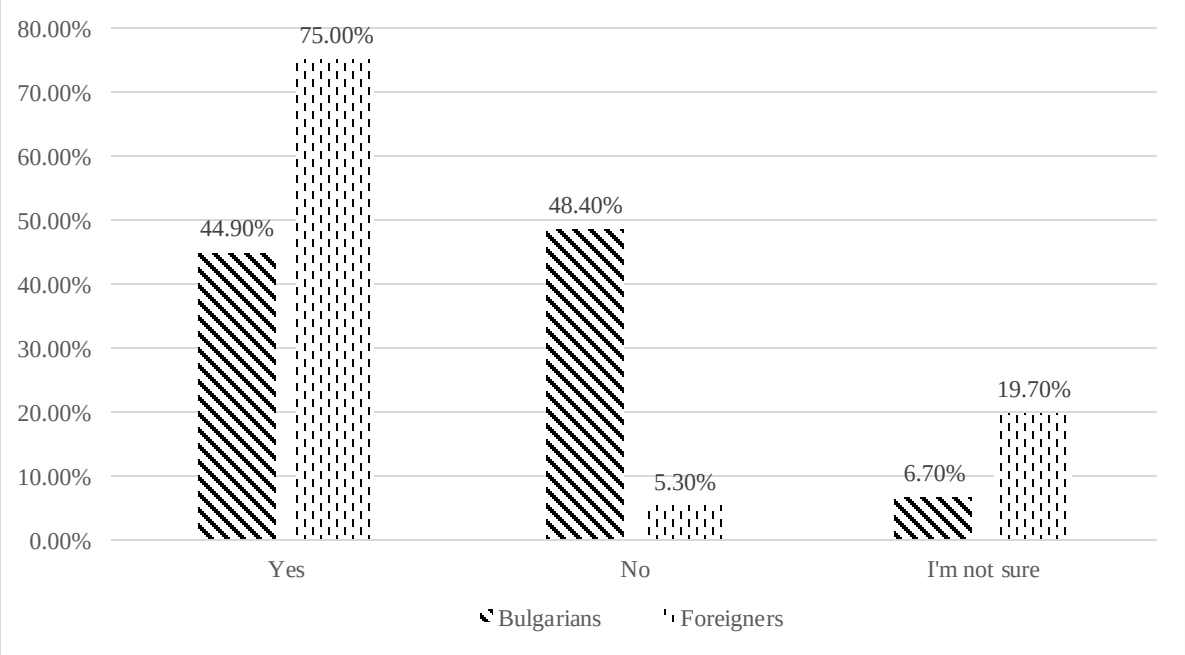
The self-assessment of Bulgarians for first aid is quite low: only 44.90% consider themselves ready. (Figure 41).

Fig. 41 Bulgarians' responds to the question: "Do you know how to give first aid (respiration resuscitation and indirect heart massage of a victim)?"



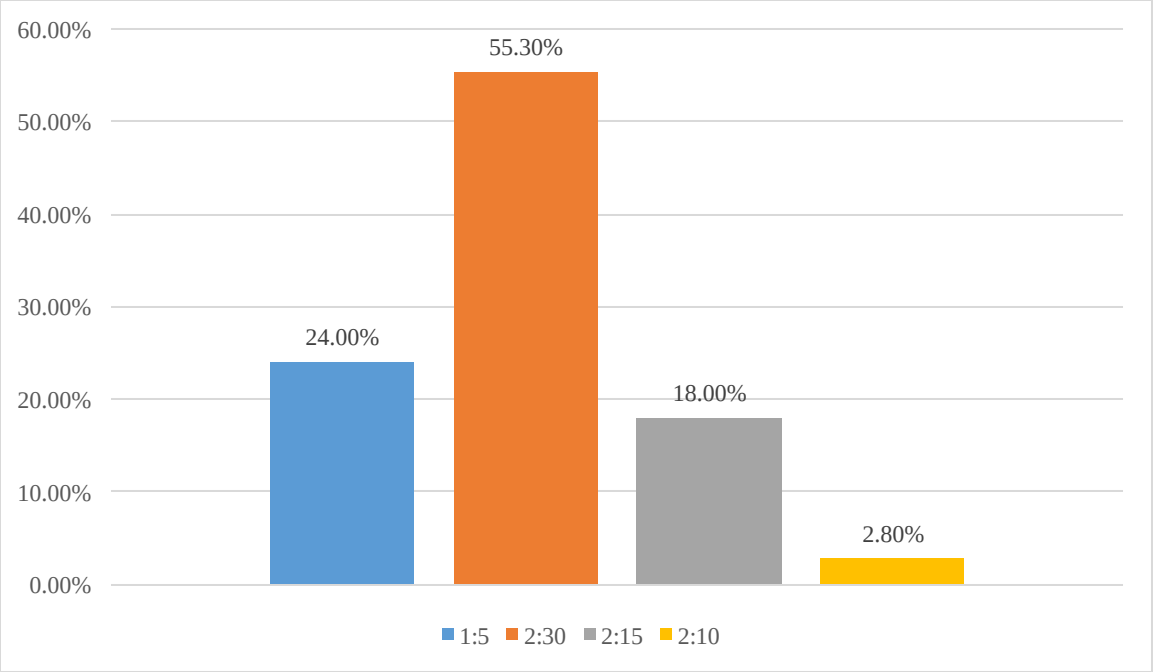
There is an impression that the foreigners have a much higher self-esteem: 75.00% - give a positive answer. (p> 0.05) (Figure 42)

Fig. 42 Answers of BG and English-speaking respondents to the question: "Do you know how to give first aid (respiration resuscitation and indirect cardiac massage to a victim)?"



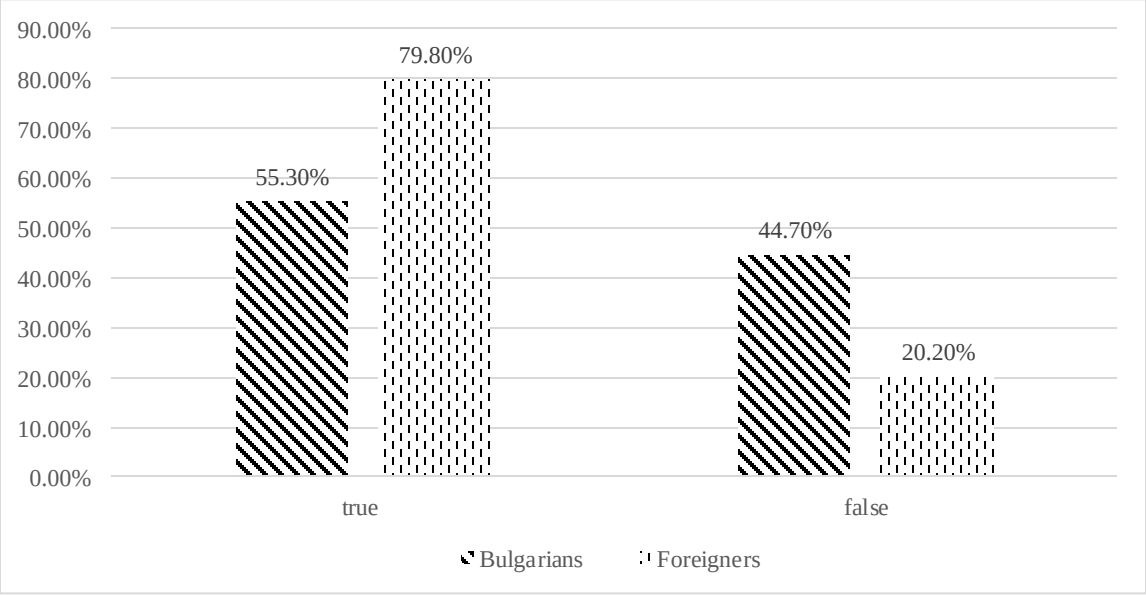
To the control question, "In what proportion do you do the ventilation and the chest compressions?", we find out that 55.30% give a true answer. (Figure 43).

Fig. 43 Answers to the question: "In what proportion will you ventilate and do chest compressions?"



The correct true answers for Bulgarian and foreign citizens are presented in Fig. 44.

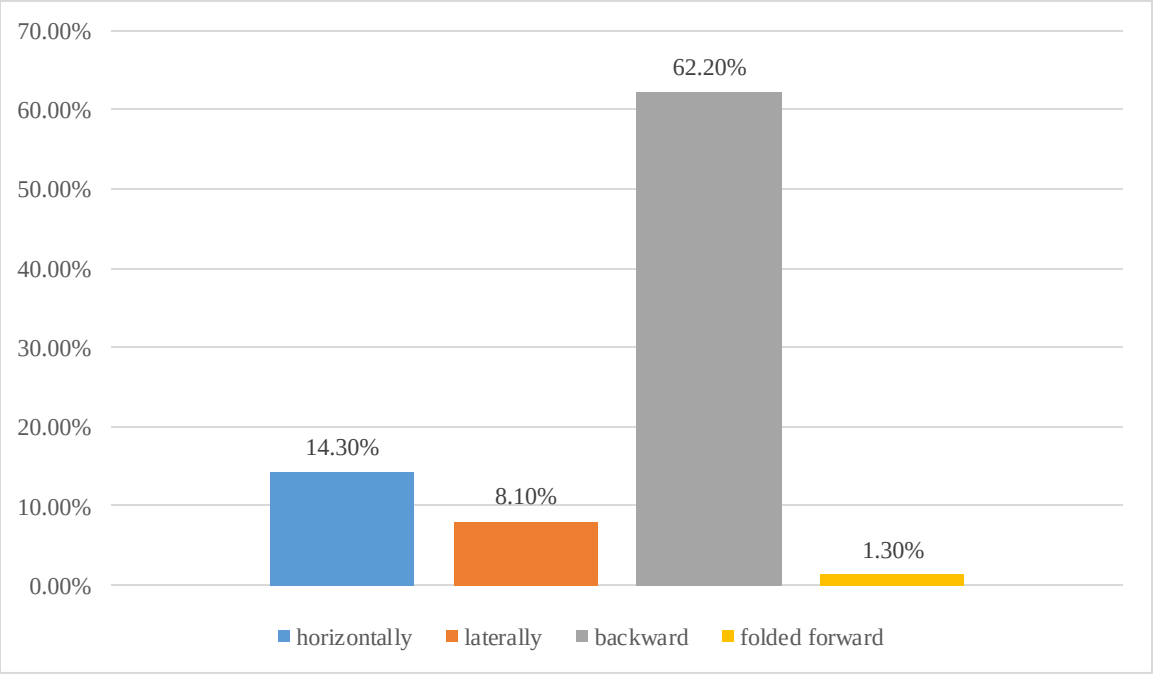
Fig. 44 Comparing the answers of the two study groups to the question: "In what proportion will you ventilate and do chest compressions?"



Foreigners are much better prepared than the Bulgarians. The difference in the responses is significant ($p > 0.05$) Their evaluation is very good, and the Bulgarian citizens is good.

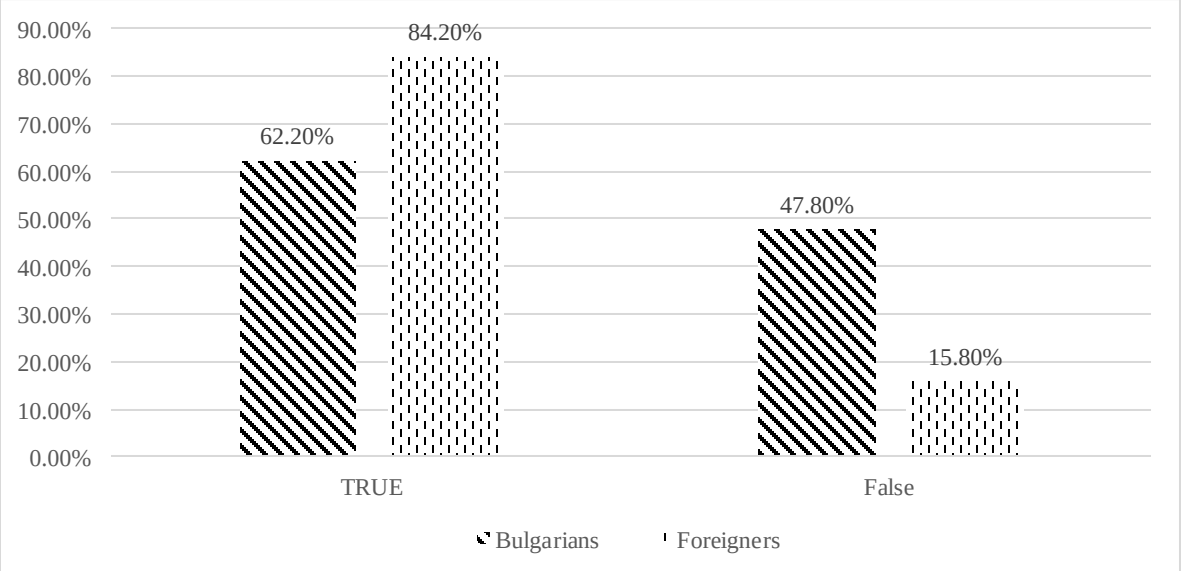
The question-re-examining question, "What should be the head of the victim in the resuscitation of breathing?" Have answered 62.20%. (Figure 45).

Fig. 45 Responses of BG to the question: "In what position should be placed the head of the victim during the resuscitation of breathing?"



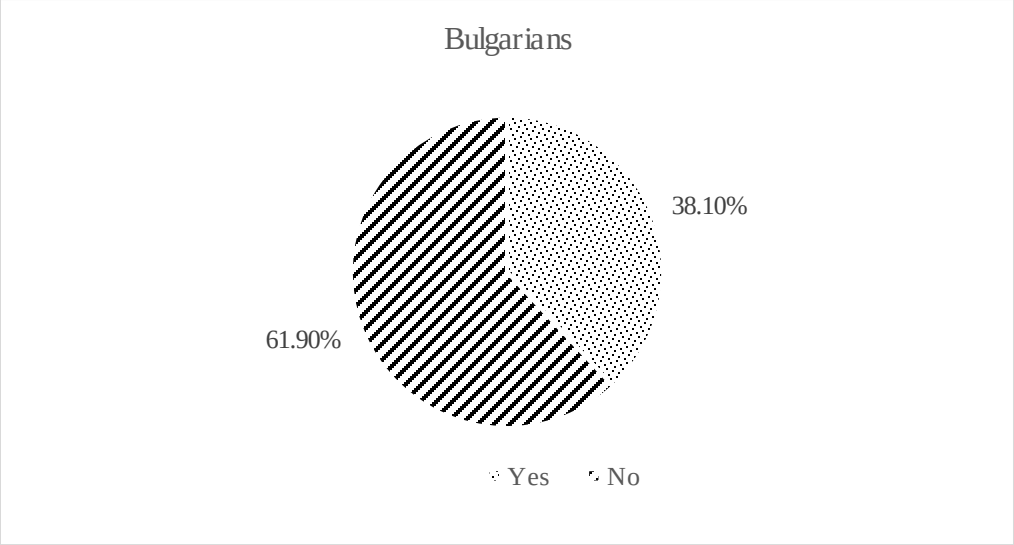
Comparing the answers of the Bulgarians and the foreigners, again better is the preparation of the foreign citizens. ($p > 0.05$) (Figure 46)

Fig. 46 Comparative answers of BG and English-speaking respondents to the question: " In what position should be placed the head of the victim during the resuscitation of breathing?"



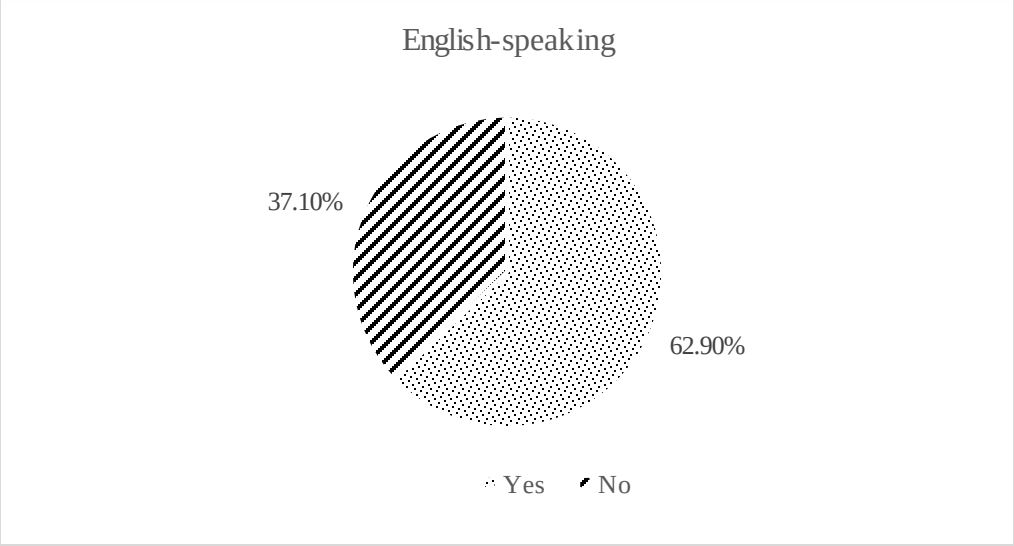
To the question "Have you been trained in first aid in an accident area?" only one third of Bulgarians respond positively - 38.10%, which is a rather low percentage. (Figure 47)

Fig. 47 Answers to BG Question: "Have you been trained in first aid in an accident area?"



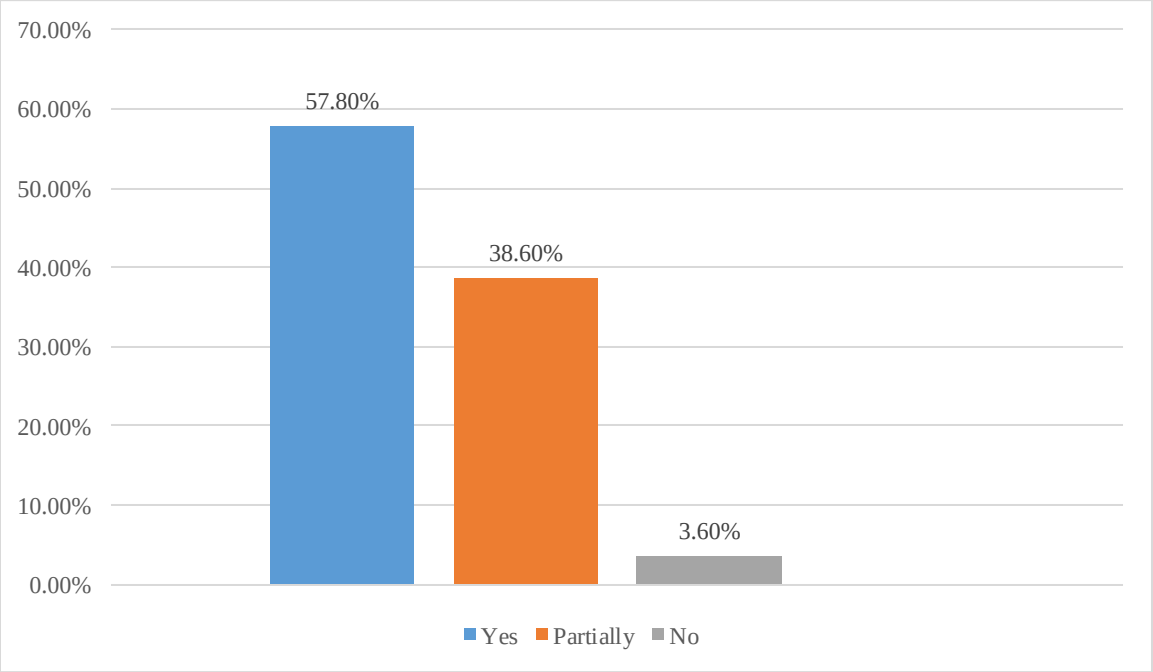
Compared to foreign citizens, it was found out that nearly twice as much as Bulgarians were trained. ($p > 0.05$) We offer again the answers of the English-speaking respondents for comparison with BG. (Figure 48).

Fig. 48 Answers of the English-speaking respondents to the question: "Have you been trained in first aid in an accident area?"



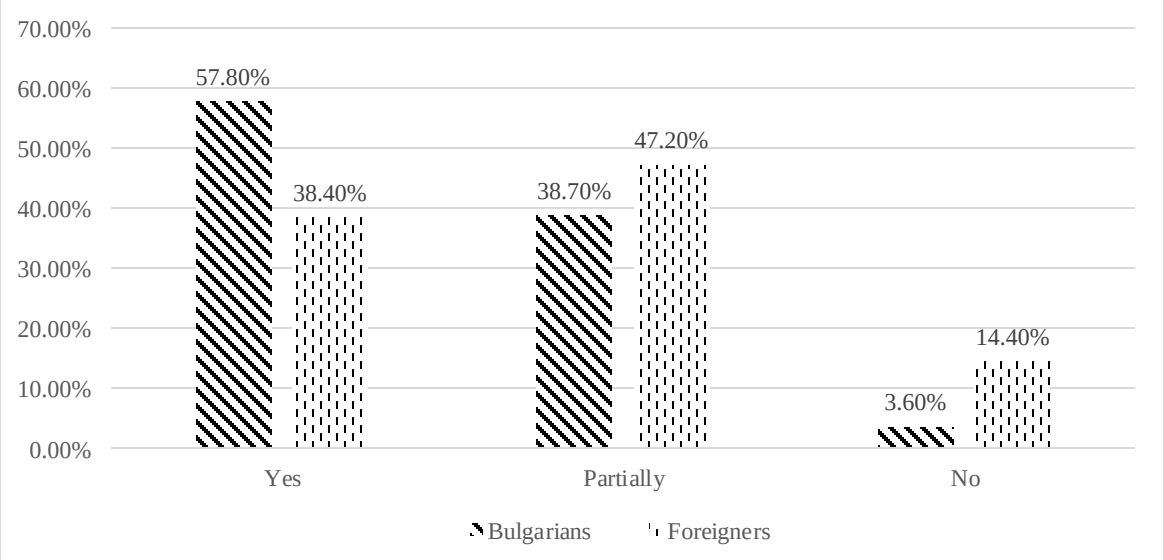
When asked whether they can make a wound dressing, the Bulgarians' self-esteem is good - 57.80% respond positively. (Figure 49)

Fig. 49 Answers of the BG to the Question: "Can you make a wound dressing?"



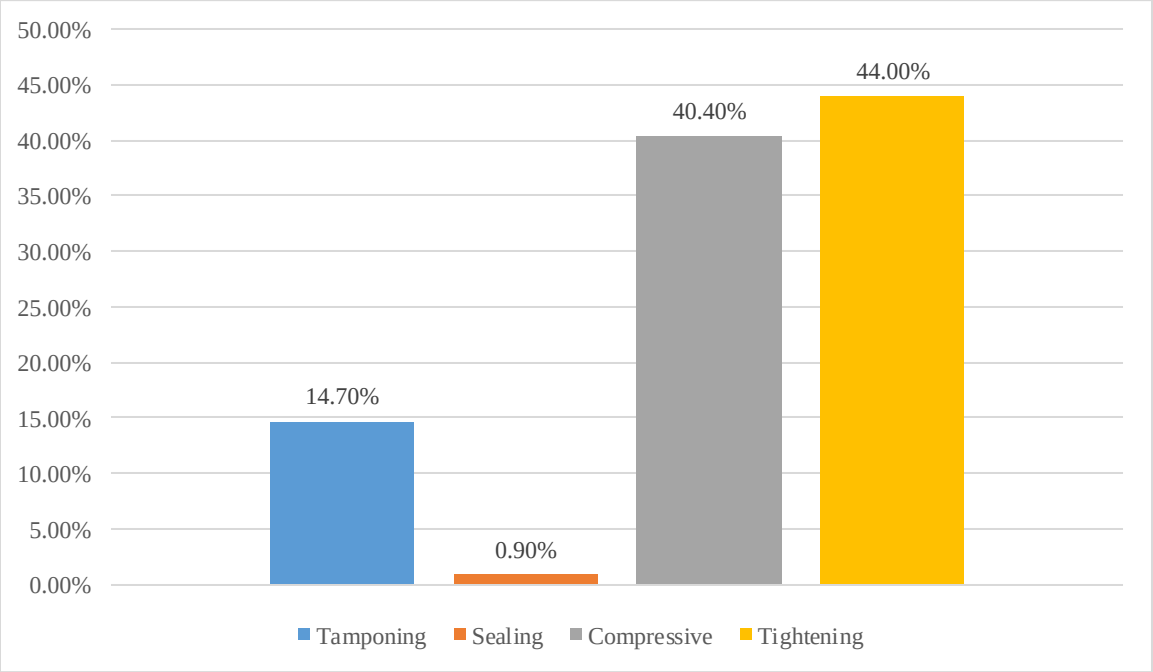
Compared to the foreigners' replies, their lower self-esteem is impressive. Only 38.40% respond positively. (Figure 50).

Fig. 50 Compared answers of BG and English-speaking respondents to the question: "Can you make a dressing of a wound?"



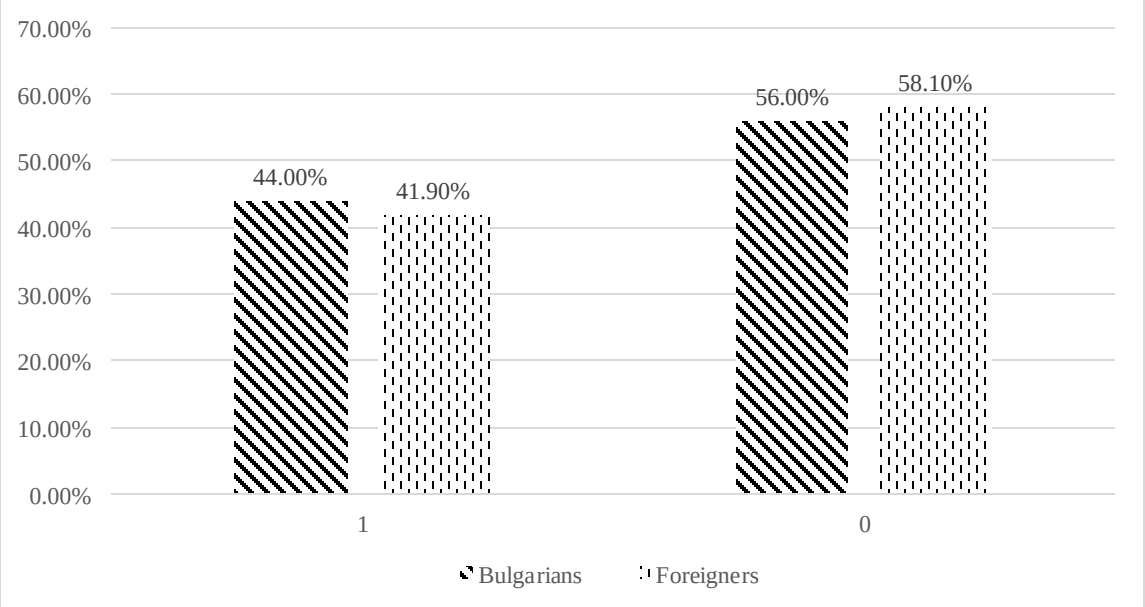
To the verifying question, what dressing should be done in arterial bleeding, true answer is given by only (44.00% - tightening), which does not correspond to their higher self-esteem. (Figure 51).

Fig. 51 Responses of BG - "In case of arterial bleeding the following dressing should be made:"



It is noteworthy that the percentage of correct answers of the foreigners is quite close to that of the Bulgarians - 41.90%. (Figure 52).

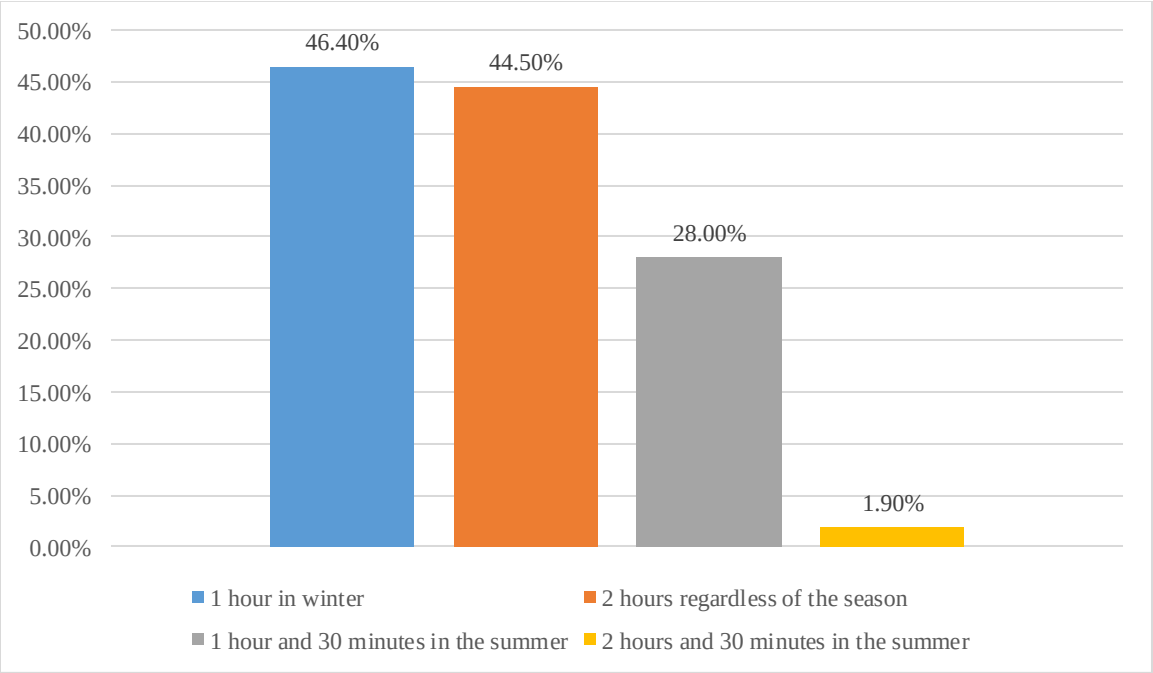
Fig. 52 Comparable answers of BG and English-speaking respondents - "In case of arterial bleeding the following dressing should be made:"



We evaluate the preparedness of both studied groups as equally good. ($p < 0.05$)

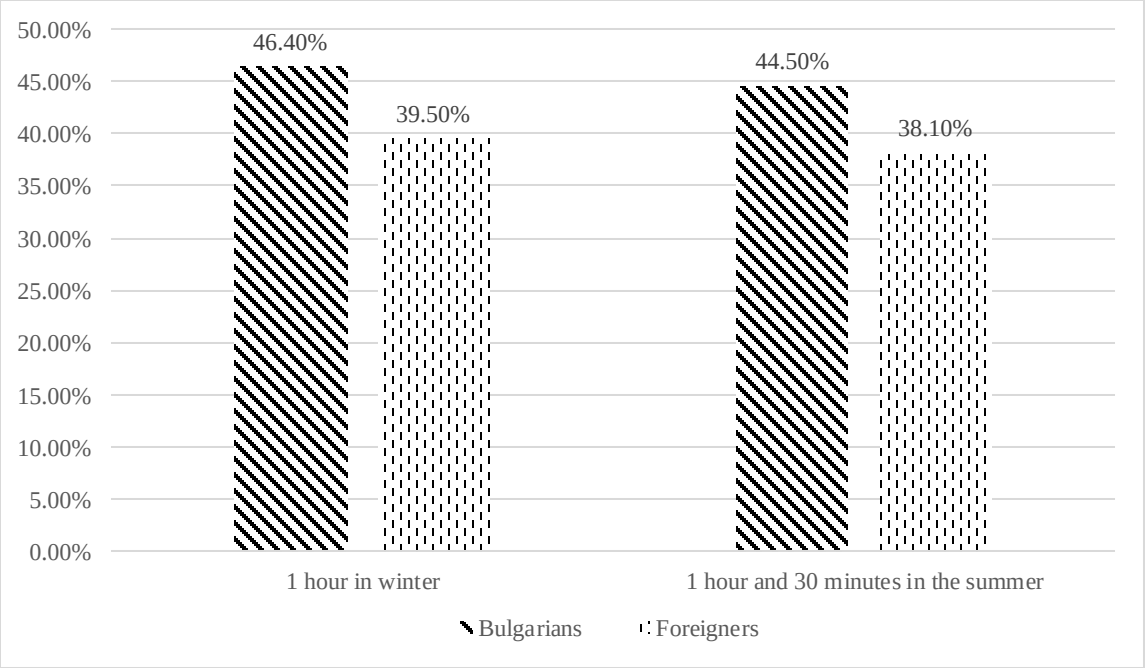
On the re-examination question regarding the maximum time of the haemostatic dressing, the correct answers are 46.40% and 44.50%. (Figure 53)

Fig. 53 Answers to BG Question: "How long can the haemostatic dressing stay in arterial bleeding?"



The answers of the Bulgarians and the foreigners are very similar. ($p < 0.05$) (Figure 54).

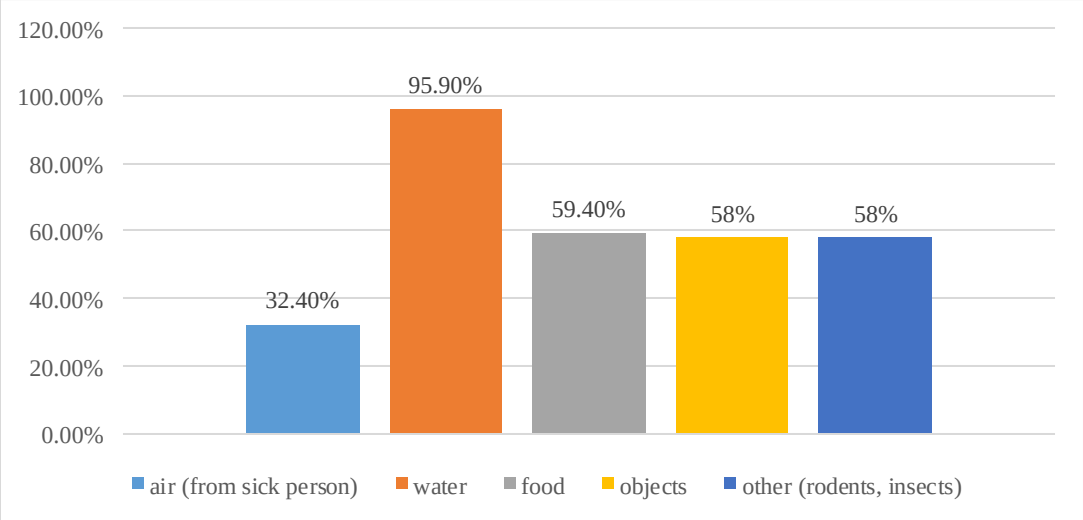
Fig. 54 Compared answers of BG and English-speaking respondents to the question: " How long can the haemostatic dressing stay in arterial bleeding?"



We evaluate the knowledge of the two study groups as good for first aid dressings. ($p < 0.05$)

To the question, "Are you aware of the paths that a post-flood epidemic outbreak may occur?" The highest percentage - 95.90% indicates water, 32.40% - air, 50.40% - food, 58% - objects; 58% - rodents and others. (Fig.55)

Fig.55 Responses of BG to a question: "Are you aware of the paths that a post-flood epidemic outbreak might occur?"



The foreign citizens gave similar responses to the same question. ($p < 0.05$)

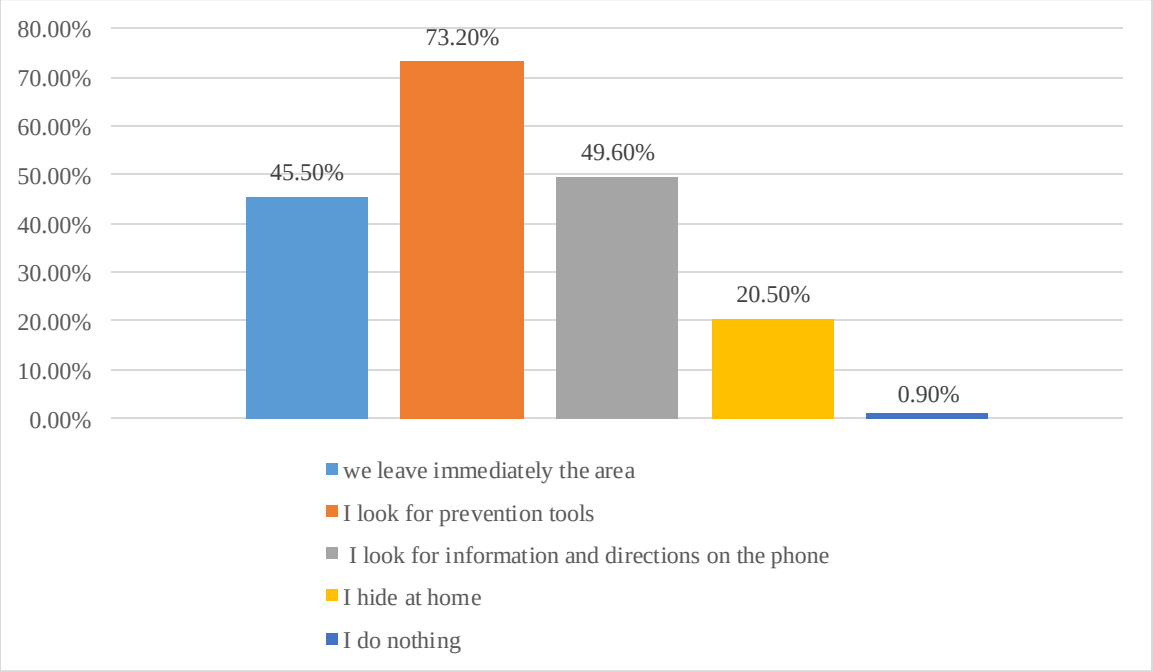
We evaluate the knowledge of both groups respondents as good - for pathways like water, food, and most of the other opportunities for contamination.

According to R. Konstantinov (2018), coli-etherites are becoming more and more prevalent causes of intestinal infections in the modern world.

These causative agents give rise to emergency phenomena in the epidemiological space of intestinal infections in humans and animals. They have a very robust epidemiological potential and, according to the country's data for the 1976-2015 period, are at a constant epidemic level.

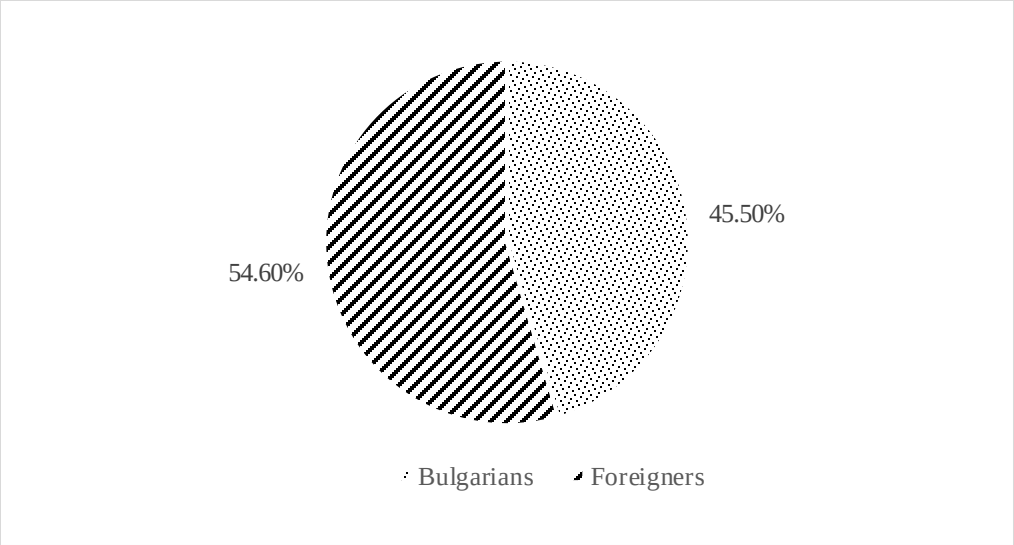
Asked ,,If in the area where you are staying there is a danger of an epidemic outbreak, what are you going to do? "quite wrongly 45.50% will leave the area, which will create serious risk of rapid spread of the epidemic (Figure 56)

Fig. 56 Answers of BG to the question: "If there is a risk of an epidemic outbreak in the area where you are, what will you do?"



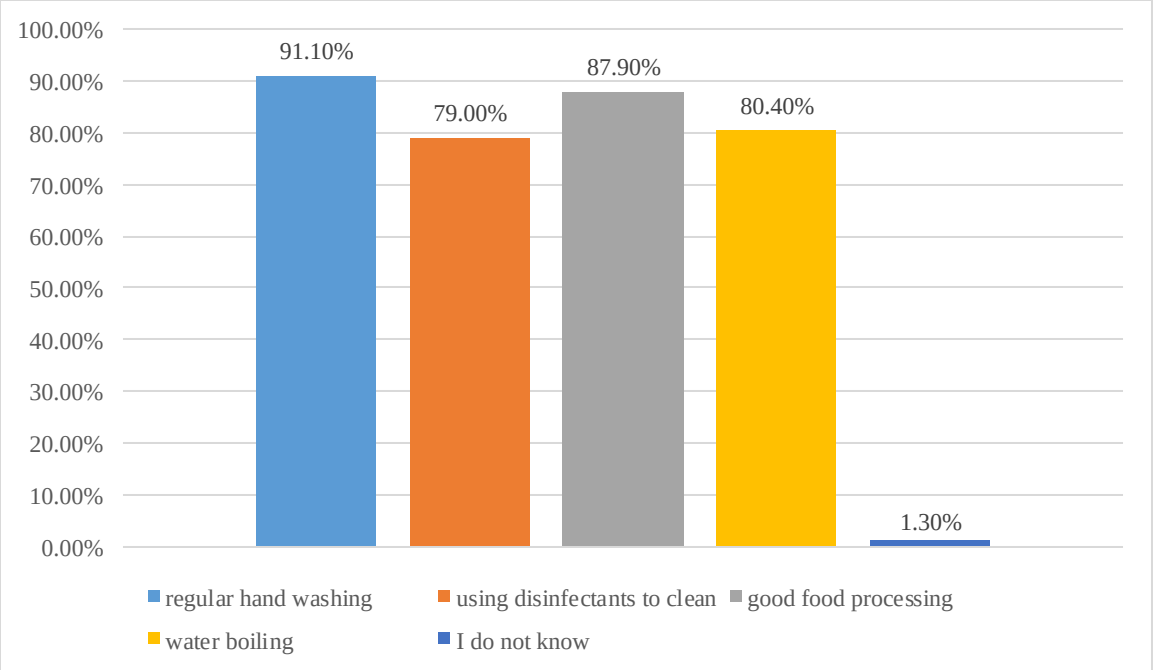
With even less awareness and little knowledge, the possible actions of the foreigners in case of risk of an epidemic - 54.60% - will leave the area, which will lead to a rapid spread of the epidemic ($p > 0.05$) (Figure 57).

Fig. 57 Compared answers of BG and English-speaking respondents to the question: “If there is a risk of an epidemic outbreak in the area where you are, what will you do?"



To the question "If there's risk of intestinal contagious disease, how can you protect yourself?" respondents give very good answers (80,40% - up to 91,10%), which means they are very likely to keep their health in a real situation . (Figure 58)

Fig. 58 Answers to BG Question: "If there's risk of intestinal contagious disease, how can you protect yourself?"



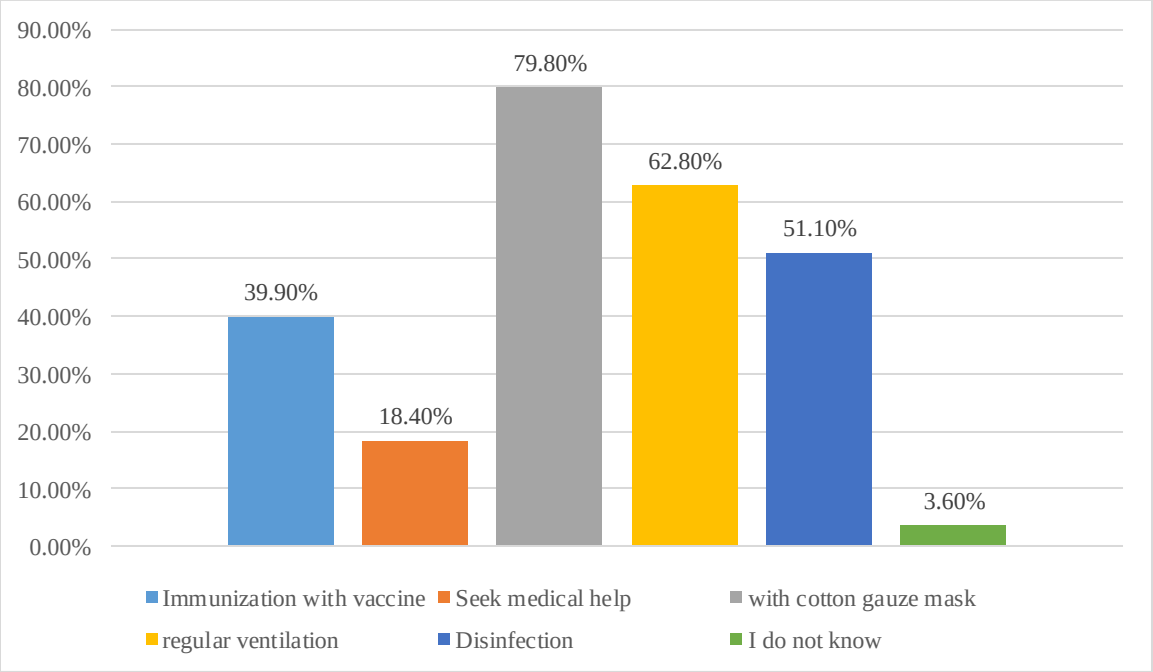
Compared to the answers of the foreigners, the good knowledge of both groups is confirmed. There were no significant differences in the population, sex and education of the respondents ($p < 0.05$)

The awareness and knowledge of the respondents on the question "Do you know how to protect yourself from airborne infections in case of an epidemic risk?" are lower. Only 39.90% will be vaccinated, and even fewer (18.40%) will often ventilate the premises where they are staying in. (Figure 59).

Incidence of airborne infections has a leading role in the structure of infectious pathology in the Varna region. Since 1975, only in the years 1977, 1978, 1990, 1991, and 1994 with higher numbers were the intestinal diseases. (R. Konstantinov, 2011)

According to a number of authors, good public awareness and the right actions, especially after floods (compliance with quarantine, immunizations and other prophylactic measures), may have beneficial effects on the reduction of morbidity.

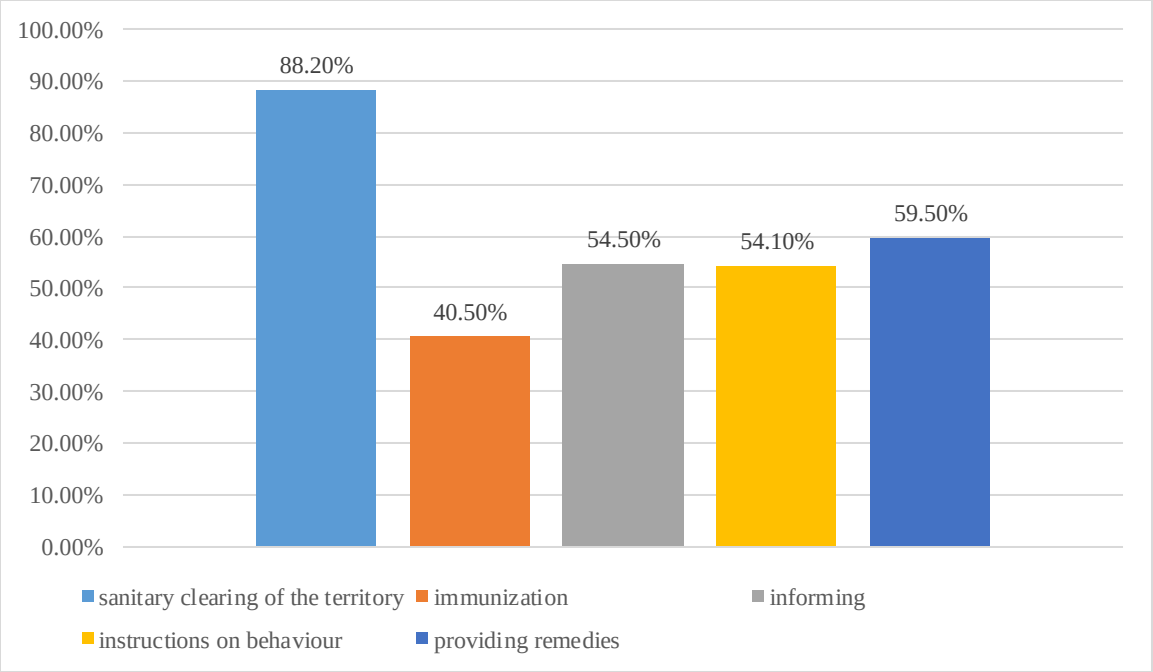
Fig. 59 Answers of BG to the question: "Do you know how to protect yourself from airborne infections in case of an epidemic risk?"



Foreigners will rely on medical assistance through immunizations in significantly higher percentage (60.70%) and 33.20% will often ventilate the premises, but a cotton-mask will use 11% less than the Bulgarians. ($p > 0.05$)

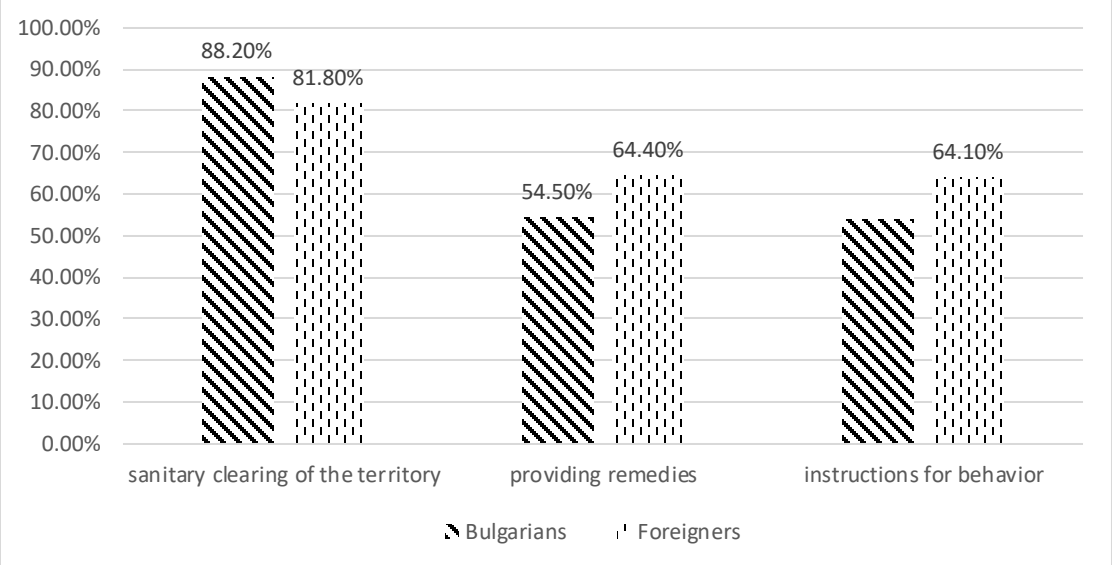
The Bulgarians' knowledge of the measures to prevent an epidemic after flooding is relatively good. Nearly two-thirds rely on sanitation of the territory, and ½ will provide means of protection, apply vaccines and seek for guidelines for proper behaviour. (Figure 60).

Fig. 60 Responses of BG to the question: "Do you know what the measures to prevent post-flood epidemic outbreak are?"



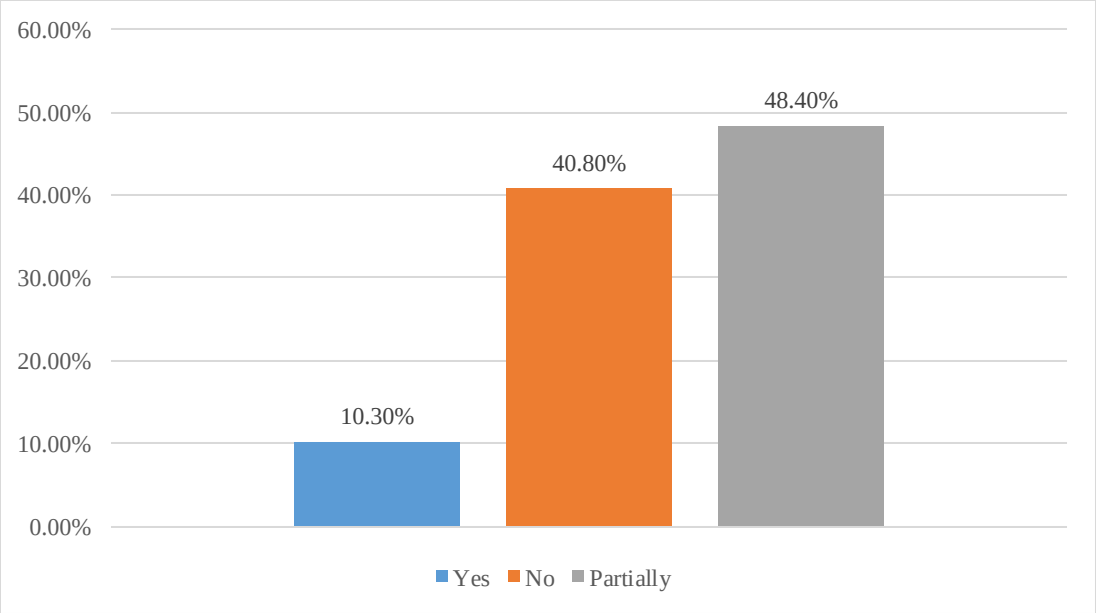
The awareness of foreign citizens is very close to that of the surveyed Bulgarian group. ($p < 0.05$) (Figure 61)

Fig. 61 Compared answers of BG and English-speaking respondents to the question: "Do you know what the measures to prevent an epidemic outbreak after a flood are?"



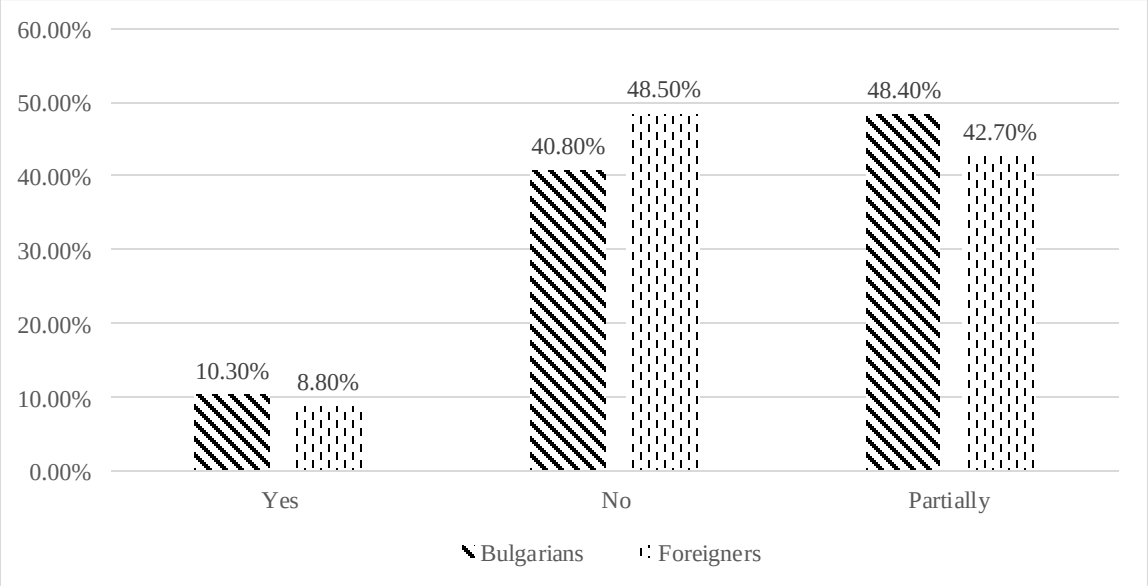
The self-assessment of Bulgarians for sufficient knowledge of flood protection is low (10,30%) and partial (48,40%), which corresponds to the examination questions. (Figure 62).

Fig. 62 Self-Assessment of BG to a Question: "Do you believe that you have sufficient knowledge of flood protection?"



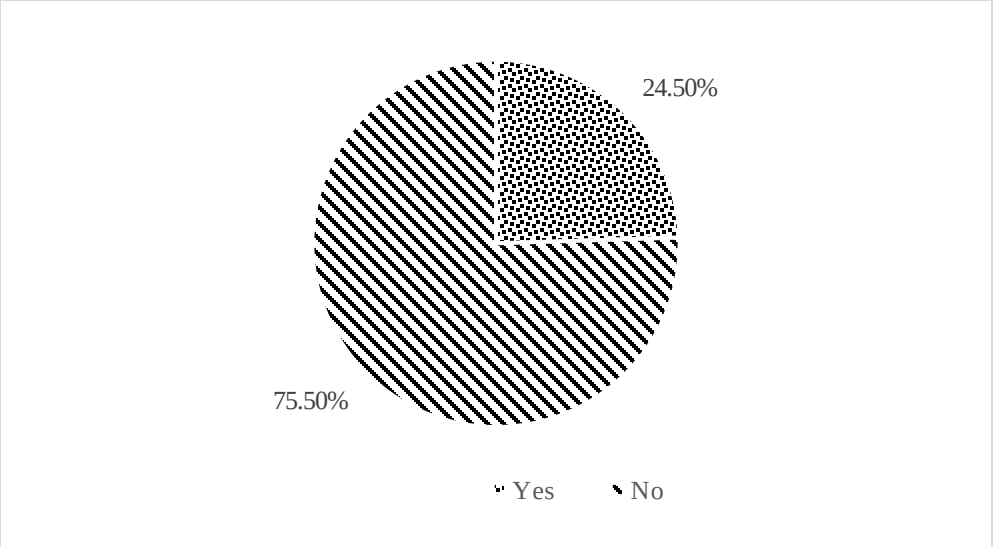
Compared the results of Bulgarians and foreigners almost completely match. ($p < 0.05$) (Figure 63).

Fig. 63 Compared answers of BG and English-speaking respondents to the question: "Do you consider that you have sufficient knowledge of flood protection?"



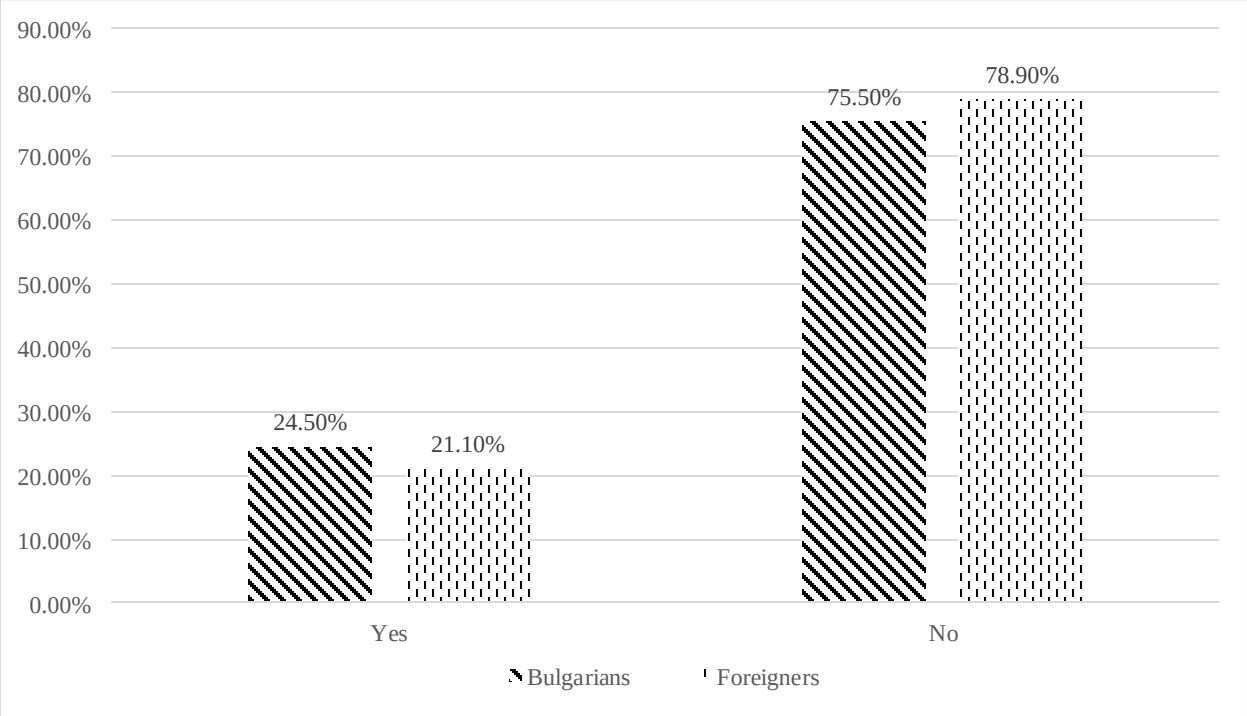
Respondents also recognize the lack of sufficient knowledge regarding protection against other disasters. (Figure 64).

Fig. 64 Answers of BG to the question: "Do you think you have enough knowledge to protect yourselves from other disasters?"



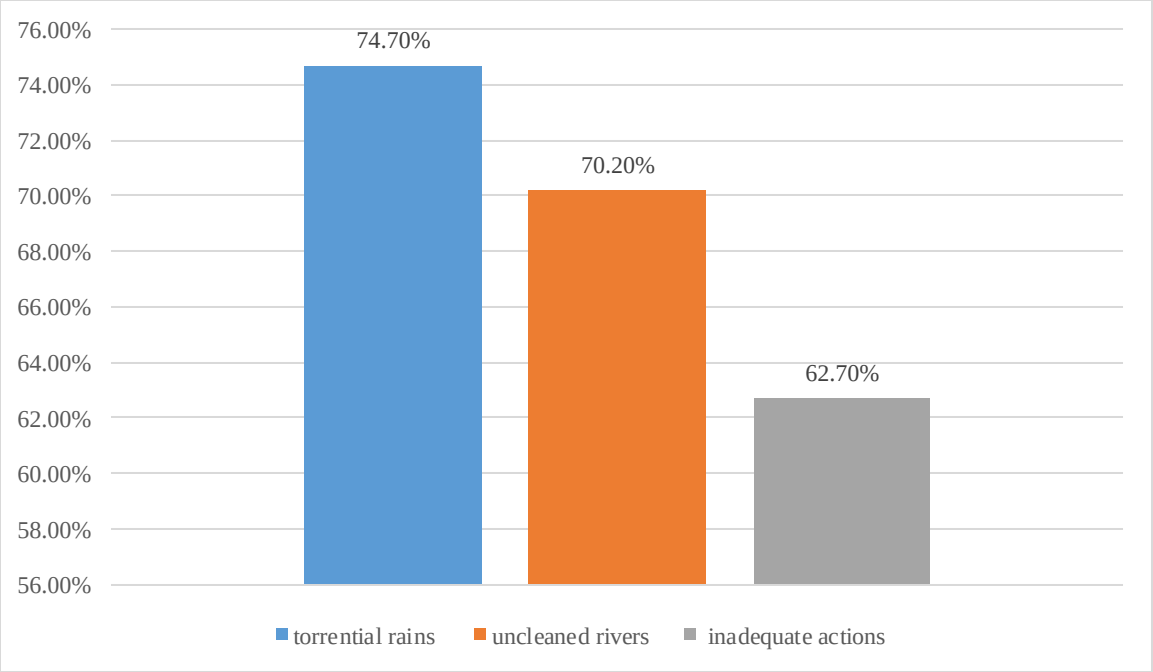
Quite close are the results of this query for the both study groups. ($p < 0.05$) (Figure 65).

Fig. 65 Results of BG and English-speaking respondents correlated answers to the question: "Do you think you have enough knowledge to protect yourselves from other disasters?"



Well-known to the respondents are the reasons for floods. (Figure 66)

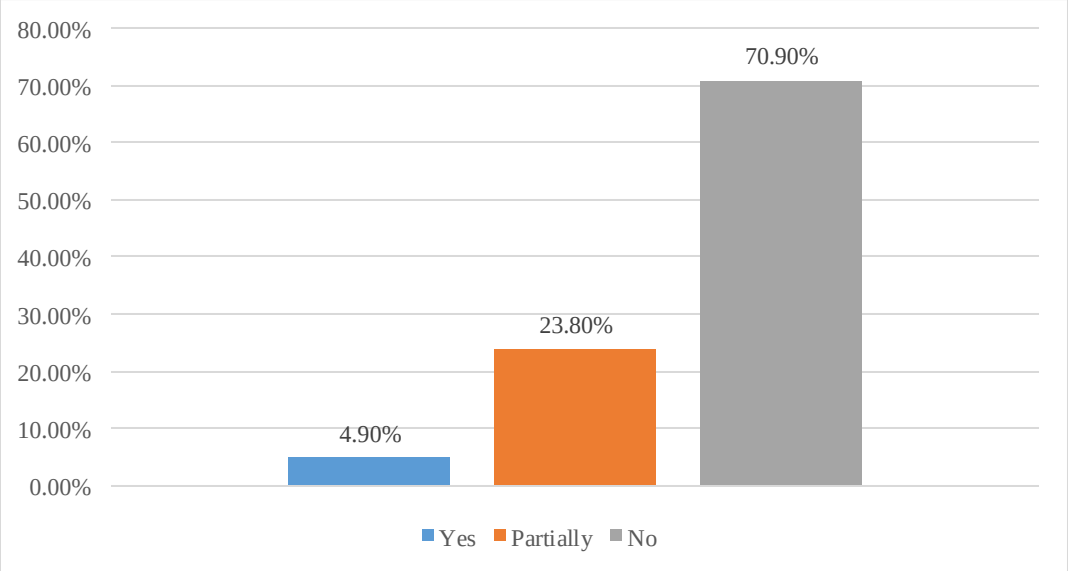
Fig. 66 Responses of BG to the question: "What do you think are the causes of past floods in the settlement?"



According to foreigners, inadequate actions as reason for flooding in their countries are twice as low (29.70%) (p> 0.05)

Extremely high is the percentage of those unfamiliar with the flood protection plan (70.90%). (Figure 67)

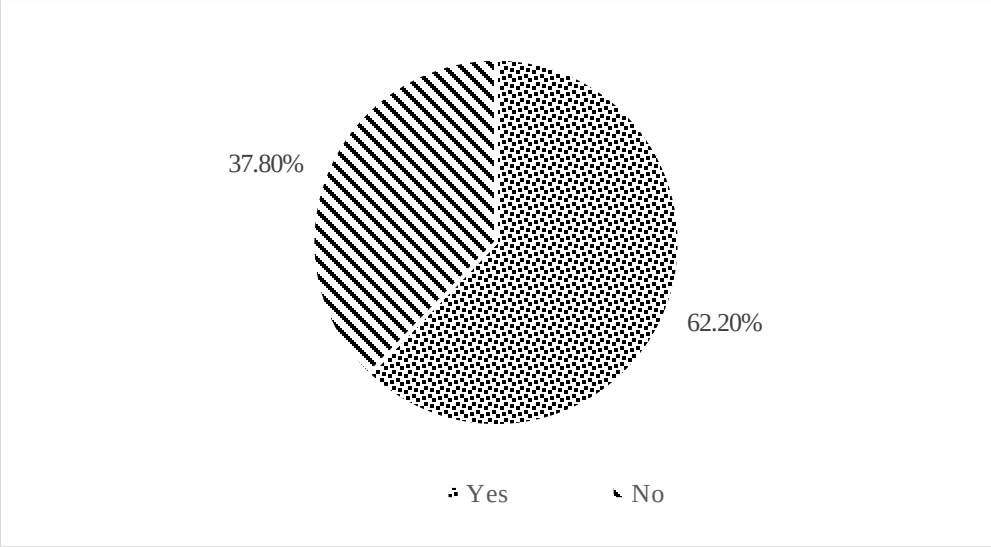
Fig. 67 BG answers to the question: "Are you familiar with the flood protection plan in your municipality?"



Almost no interest is noted in the flood plan among foreigners too (68.00%) (p <0.05)

The ability to swim will be life-saving in floods, but only 37.80% of Bulgarians can swim. (Figure 68)

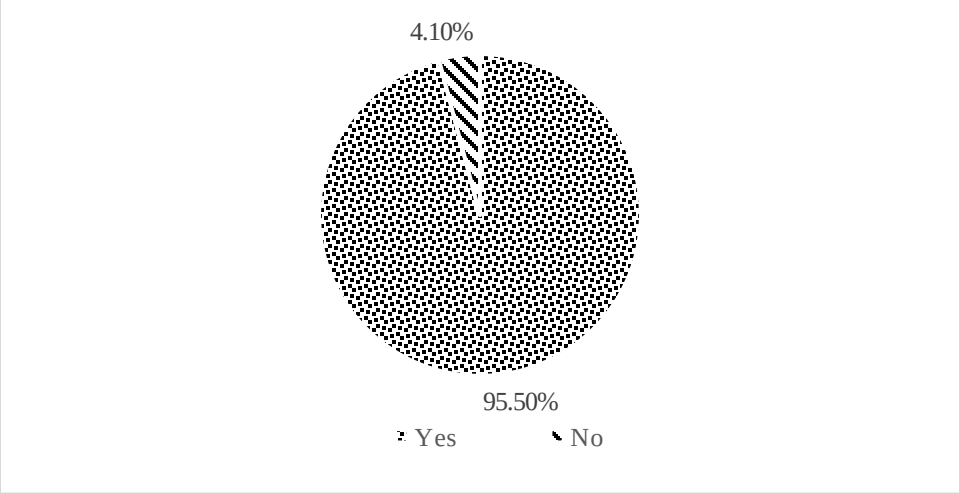
Fig. 68 BG answers the question: "Can you swim?"



Twice as many foreigners can swim (81.50%). (P> 0.05)

Regarding the knowledge of the 112 (emergency telephone number), 95.50% of the Bulgarians remembered it very well. (Figure 69)

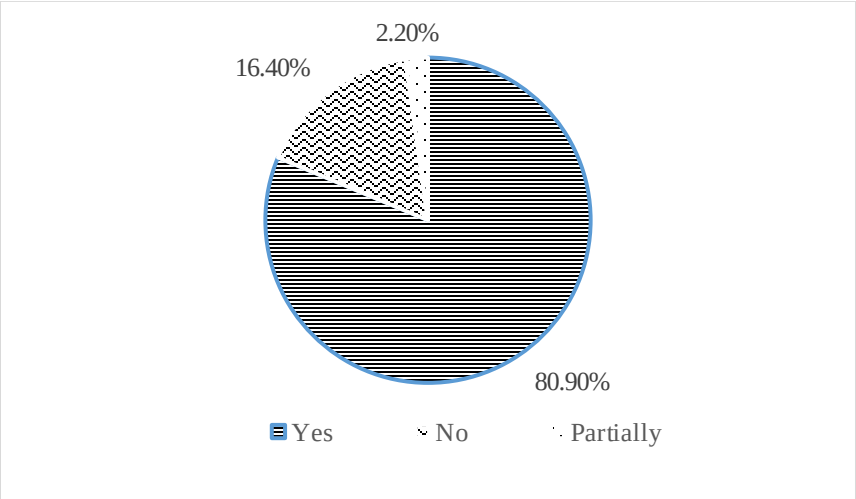
Fig. 69 Answers BG to the question: "Do you know which phone to call in flood?"



The awareness of foreigners is lower, only 79.30% know the phone in Bulgaria, but the rest probably think they are asked about the phone in their countries and have indicated other phone numbers. (p> 0.05)

Very high is the percentage of those who want to gain more knowledge about flood protection (80.90%). (Figure 70)

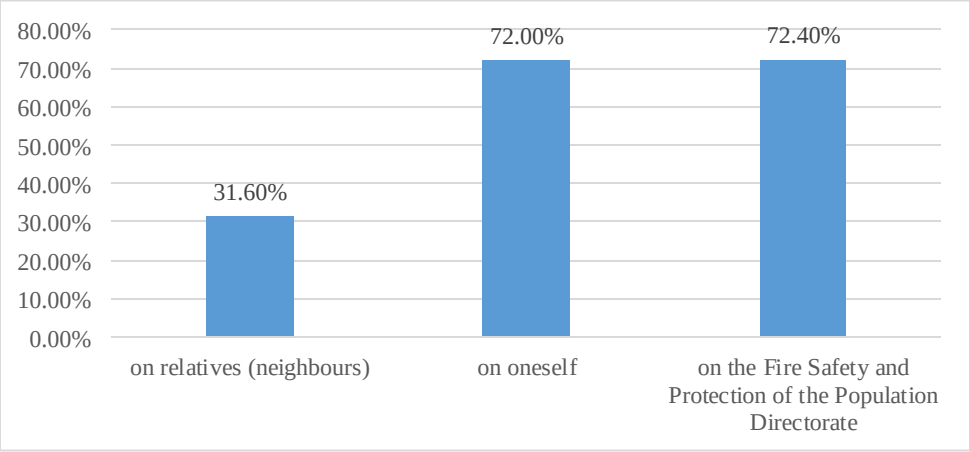
Fig. 70 Answers of BG to the question: "Do you think you need to raise your knowledge of flood protection?"



Almost the same high percentage (82.70%) was obtained for foreigners. ($p < 0.05$)

The highest percentage of BG respondents will rely on themselves (72.00%) and Fire Safety and Protection of the Population Directorate (72.40%). (Figure 71)

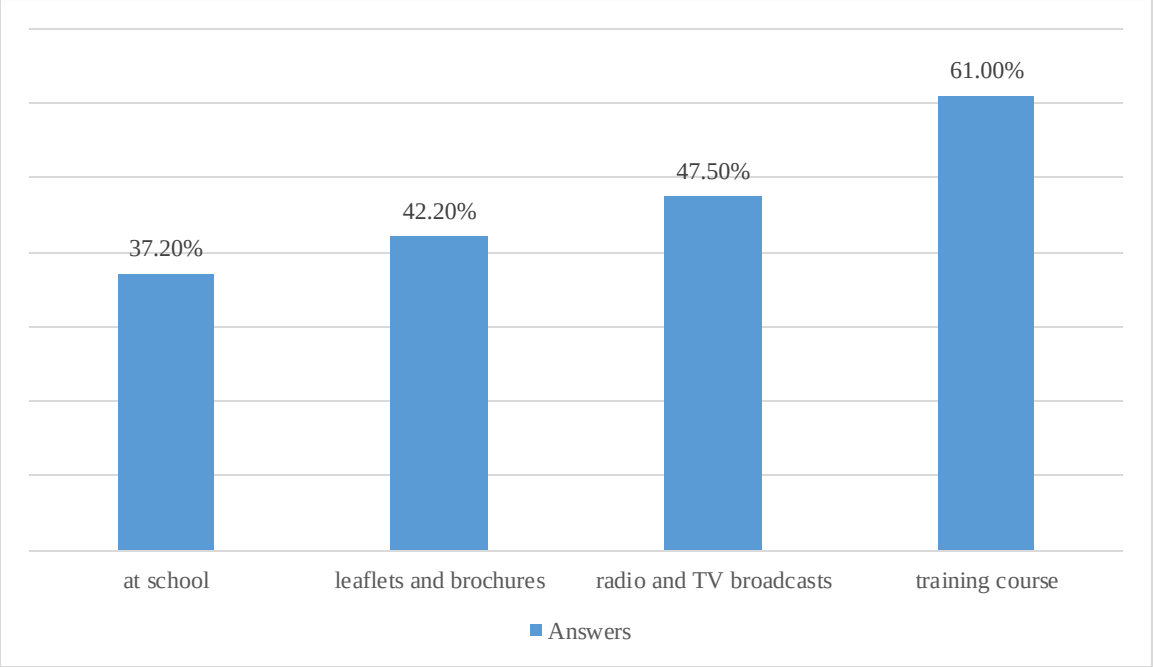
Fig. 71 Responses of BG to a Question: "Who will you rely on during a flood?"



Foreigners have higher confidence in Fire Safety and Protection of the Population Directorate (87.7%) than the Bulgarians. ($p > 0.05$)

Regarding the ways of obtaining more knowledge, the highest percentage of Bulgarians (61%) want to attend a training course. (Figure 72)

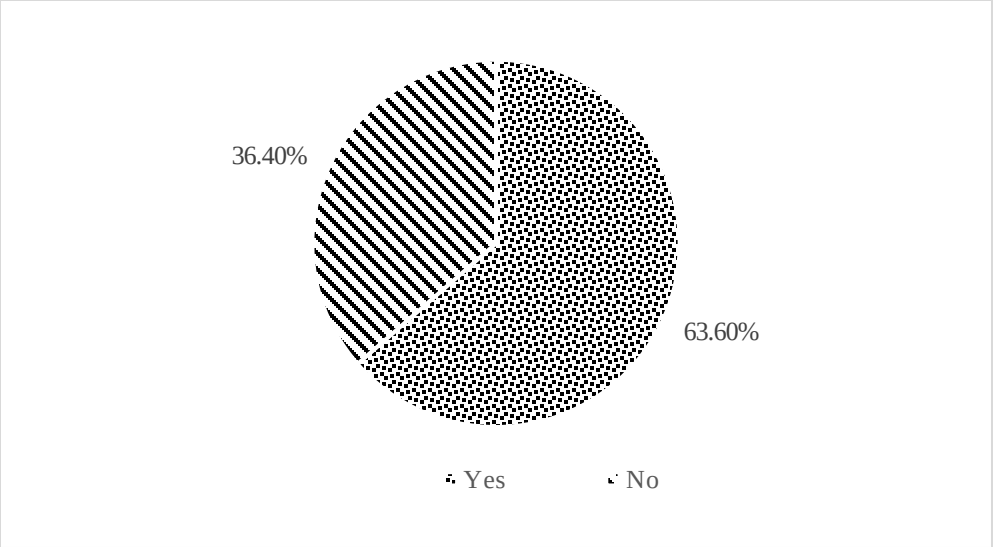
Fig. 72 Answers of BG to the question: "How do you prefer to get more knowledge?"



Even more foreigners would like to attend a training course (79.40%) and also a higher percentage (48.20%) would like to do it in school. ($p > 0.05$)

When asked whether they are satisfied with disaster protection measures (including floods), 63.60% of Bulgarians are affirmative, and 10.30% offer more training and 8.80% more collective means of protection. (Figure 73)

Fig. 73 Responses of BG to the question: "Are you satisfied with the measures that are applied for protection and rescue in disaster situations (including floods)?"



Satisfied with the measures are 60.70% foreign citizens and more training want another 40.60%.

We found differences in more of the Bulgarian respondents' answers to the control questions depending on education ($p > 0.05$).

Those with higher education (college or higher) have significantly greater knowledge and better information, yet they still want to be trained to a higher degree.

No differences related to education, sex and place of residence were registered. ($p < 0.05$).

CONCLUSIONS

1. A high percentage of the surveyed groups survived an earthquake (79.30%) of Bulgarians and floods - (65.90%) of foreign citizens.

2. Most of the studied (56.50%) Bulgarians and 64.60% foreigners are not informed whether they live in a flood prone area.

3. Relatively small is the percentage (37,80%) of the Bulgarians who can swim, which can seriously endanger their lives during floods. Twice as many foreign citizens will be saved because (81.50%) can swim.

4. Approximately 2 times more foreign citizens, compared to Bulgarians, make insurance of their property.

5. Very little is the awareness of both studied groups regarding the flood protection plan (4.90% BG and 8.30% English-speaking respondents).

6. Regarding First Aid - Resuscitation of Breathing and Heart Activity: foreign citizens, they are found to have higher self-esteem and have been trained almost twice as much as the Bulgarians which is registered by giving 2 times better answers than the Bulgarians.

7. We evaluate the knowledge of the two studied groups as average -for Bulgarians and good for foreigners with regard to giving first aid by making dressings.

8. Both studied groups have poor preparedness for evacuation - only 5.30% of the English-speaking respondents and 8.90% of BG.

9. In case of risk of intestinal infections, a significant percentage will use the basic methods of protection - both English-speaking respondents and BG (79,00% - 91,10%).

10. In case of danger of airborne infections, Bulgarians and foreigners will be able to protect themselves at a lower rate (60.00% -80.00%).

11. Due to ignorance that they should not leave the region at risk of an epidemic outbreak, 54.60% of the foreigners and 45.50% of the Bulgarians will lead to worsening of the epidemic situation.

12. The awareness of foreign citizens is very close to that of Bulgarians and is good in terms of measures to prevent post-flood epidemics. The compared results of Bulgarians and foreigners almost corresponds.

13. According to foreigners, inadequate actions for flooding in their countries are twice as low (29.70%) compared to BG (62.70%).

14. The self-assessment of Bulgarian respondents for disaster protection is low, which corresponds to the control questions - they consider that they do not have sufficient knowledge on disasters (75,00%).

15. Only 10.30% of BG consider that they have sufficient knowledge on flood protection.

16. The self-assessment of the flood protection of the English-speaking respondents is very low, only 8,80% consider that they have sufficient knowledge.

17. A high percentage of Bulgarians and foreigners (72,00% BG - 66,20% AE) have confidence in themselves and the Fire Safety and Protection of the Population Directorate (72,40% BG - 87,70% AE).

18. Almost all respondents from both groups want to get more knowledge and prefer (61,00% BG - 79,40% English-speaking respondents) - a training course.

6. Elaboration of a Training flood prevention and risk reduction strategy for the population.

Institutions and authorities play a key role in determining the risk, managing and organizing of all actions to prepare and carry out flood rescue activities. Involvement of volunteers and non-governmental organizations may provide additional assistance.

It is particularly important to develop a Training flood prevention and risk reduction strategy for the population, which is to complement and help to improve the public's preparedness to meet and manage a possible severe flood situation.

I propose the following Training prevention and risk reduction strategy for the population in disaster situations (especially for floods):

1. Enhancing the preparedness through teaching in schools and universities:

To recommend to secondary school and university students to learn about ways to reduce the impact of flooding (or other possible disasters) on the population by:

- Collecting more information on the Internet or other sources about the negative effects of a possible disaster (including flooding).

- Discussion at school, in college and family.

- Increasing the general physical training - athletics and swimming.

- Organizing a Personal Group for Help and Mutual Assistance that one can rely on.

- Preparing of a notebook with names, addresses and phone numbers of friends (from the Personal Group for Help and Mutual Assistance) living outside the possible flood-prone areas;

- Preparation of a Personal Assessment for the needs of everyone during the disaster and the evacuation and a Plan for the behaviour of individual members of the team and the family;

- Make the home and the place of the student safer in disaster (e.g. the warehousing of fire-hazardous, poisonous substances, etc. in tightly closed containers and locked cabinets, to have free entrance to the dwelling and the school, etc.);

- Prepare basic food and water reserves and the most important personal documents and items that everyone will need during or after the disaster.

- Prepare for possible evacuation.

2. Developed and disseminated are leaflets for self-training and education of secondary school and university students, general population (working and non-employed) and trainees with the rescue teams of the Municipality of Varna and BRC, including the following questions:

- General recommendations for the population at risk of floods.

- Major Flood Risks.

- Protection and proper behaviour in the flood zone.

- Guidelines for providing first aid to victims of floods.

Health recommendations after flooding.

- Important knowledge for everyone in the flood zone.

- Prophylactic measures at home and in the office after flooding.

3. A Conceptual Model for Population Monitoring has been set up to assess the awareness, preparation and knowledge of first aid for floods

4. Suggestions for contents of a "Flood or Other Disaster Travel Bag " contained in a one's car/vehicle:

- spare clothes (underwear, socks, hat, gloves, etc.);

- bottle of clean water 2 l;

- a package of dry food (rusks, biscuits, cans, etc.)

- a rope;

- a flashlight;

- important tools for emergency situations;

- a personal first aid kit according to the 2008 Instruction Manual on the content of motorvehicle's First Aid Kit;

- a backup charger for mobile phone;

- a blanket;

- toiletries, personal hygiene materials, etc.

5. Recommendations for the preparation of a "Personal Evacuation Backpack" (stored in the home) containing:

- money and small valuable items and an inventory of family values, paintings, etc. valuable objects;

- a copy of a passport and a health booklet;

- birth certificate, marriage certificate, diplomas, etc .;

- recording of bank accounts;

- important property documents and insurance policies;

- dry food - packaged for each person separately;

- clean water - a bottle that changes periodically;

- toiletries, etc.

6. Proposal for the preparation of "Personal Flooding Jacket" (stored at the home)

- Styrofoam strips are sewn in the jacket of the jacket.

7. *Recommendations for Teaching Team Members or Families on how to use primary and backup escape routes from the house during floods or other emergency situations.*

8. Preparation of Protection Product Reserve in the household;

- water (3 liters per day per person for drinking and at least 3 liters per person for sanitary purposes) for three days;

- food (durable products such as canned food, rusks, biscuits, nuts, dried fruit, chocolate and candy) for three days;

- sanitary materials - for 1 week;

- clothing (one set per family member) protected in polythene bags;

- blanket (1 per family member) protected in polyethylene bags;

- important instruments, paper, pen, match, rope, whistle, lantern, etc.

- the necessary medications, etc. important personal belongings.

9. Proposal for a Medical First Aid Package for injuries and floods (at home, in the office and in the personal evacuation backpack).

7. Basic recommendations and proposals for flood risk reduction:

1. To MES - In order to increase the readiness at school, it is necessary to introduce an additional mandatory discipline Disaster Preparedness (1 hour per week) with an important section - preparation for floods.

2. To MLSP - Compulsory training and information for improving the knowledge of the employees. Recommendations for employers.

- Choosing a person responsible for the staff training for floods and other disaster situations;

- Organizing annual training courses for protection and first aid in various emergency situations;

- Provision of teaching material - a bag filled with bandages and other first aid equipment, a litter, a blood pressure measuring device, etc.

- Providing a spare room and property to help those in need in case of flood risk or other disaster, etc.

3. To MLSP - Family Planning for Disasters - to be included in the tasks of social workers according to the place of residence. Recommendations and explanations to the population for:

- Real estate insurance;

- Preparation of a Travel Bag with spare clothes and other important and necessary items (in one's car);

- Preparation of a personal backpack for evacuation (money, documents, food and water);

- Personal help and assistance group (a notebook with names, addresses, and phones);

- Preparation of a protection food and water reserve in the household;

- Medical First Aid Package for Injuries;

- Training all family members to swim and evacuate quickly from home and the settlement.

4. To the media - Enhancing the personal preparation and awareness of the entire population through the media. Frequent broadcasts, recommendations and explanations for:

- Preparing a personal backpack for evacuation (money, documents, food and water);

- Personal help and assistance group (a notebook with names, addresses, and phones);

- Enhance preparation for flood protection at home or office;

- Enhance preparation for first aid in floods.

5. To the Municipal Administration - to include in the training of the Search and Rescue Team the following issues:

- General recommendations for the population in risk of floods. Protection and proper behaviour in the flood plain. Instructions for providing first aid to flood victims;

- Health recommendations after flooding. Major risks. Important knowledge for everyone in the flood zone. Prophylactic measures at home and in the office.

6. To the local Fire Safety and Protection of the Population Directorate - to include more flood issues in the firefighters' training.

7. To the Bulgarian Red Cross - Compulsory training and awareness raising for the drivers first aid training courses - 8 hours with the BRC by providing leaflets:

- General recommendations for the population in risk of floods. Protection and proper behaviour in the flood zone. Instructions for providing first aid to flood victims;

- Health recommendations after flooding. Major risks. Important knowledge for everyone in the flood zone. Prophylactic measures at home and in the office.

8. To the BRC, the following topics should be included in the lifeguards' training:

- General recommendations for the population in risk of floods. Protection and proper behaviour in the flood plain. Instructions for providing first aid to flood victims;

- Health recommendations after flooding. Major risks. Important knowledge for everyone in the flood zone. Prophylactic measures at home and in the office.

Conclusion

There is high flood risk in our country, which requires a complete electronic information system to be established (similar to the one in Burgas), compliance of certain norms and requirements in the planning, design and construction of hydrotechnical and coastal facilities, business premises, buildings and bridges, dam walls' overflows, leaving undeveloped areas around the river beds and strict control of the adequacy of the constructed facilities and installations.

The problems encountered are solved by a number of state and public structures and specialists at national, regional, district, municipal and field level.

According to the Water Law (2010) art. 14 in Bulgaria, the Basin Directorates have developed maps of the areas under threat and with the risk of flooding. Their updating in relation to climate change is planned once per six years.

Many river beds and water basins are polluted by disposed construction and household waste, which is a serious precondition for flooding. The timely cleaning of riverbeds of waste, shrubs and branches is a good practice that should be promoted and positively commented by the mass media.

The casual deforestation is also an important factor in increasing the risk of floods.

The development of territories close to water bodies is also very risky and should be controlled by the municipalities and the state institutions.

Many preventive measures should be applied in order to reduce the damage and risk of floods. Risk assessment and constant updating is critical to making preliminary decisions and implementing protection measures.

In order to reduce the risk and consequences of floods, the personal responsibility, knowledge, awareness and culture of the population and every person in particular, is extremely important.

The high level of awareness and training of the population has an important role and should not be overlooked. People should be informed about the nature and risk of floods and other disasters, be prepared before the event and should know what to do during and after the disaster.

In the endangered areas, it is necessary to systematically educate the population about proper behaviour and first aid (pre-medical) in the form of self-help and mutual assistance. The media should play an important and essential role in training, not just to broadcast sensational and frightening reports on disasters, including floods.

General conclusions:

1. The flood risk in the Republic of Bulgaria (in particular in Varna District) is real and depends on three factors: those related to the flood risk; human and natural systems exposed to inundated waters and the vulnerability of these systems. The flood risk assessment model is developed in four stages: hazard identification; exposure assessment; vulnerability assessment; risk assessment. It is necessary the strategy on the safety chain (prevention, preparation, response, recovery) to be complemented with more material provision.
2. Out of the 4,390 dams in the Republic of Bulgaria, which were checked up in 2017, over 2000 are found to be "risky" and 81 are in a "pre-disastrous state" and urgent measures and material resources are needed to reduce the risk of floods.
3. The assessment of Flood Risk for Varna District is mainly:
- spill of Kamchia river and Provadiyska River after heavy rains and threatening the nearby municipalities and fields;
- overflow of a dam - Eleshnitsa (due to a ruined overflow in 2015) and flooding of the villages of Grozdevo, Nova Shipka, Dabravino and Venelin (Dolni Chiflik Municipality).
- in torrential rains - the central part of Varna, the railway station area, the Devnya street, "G. Pijachevich" str., “Vl. Varnenchik" Blvd, "Maria Luisa" Blvd., "Tsar Osvoboditel" Blvd., etc., where the lowest points of the catchment are located.
4. The flood protection organization is well structured and refined. The management of the flood protection system is done by: Ministries (departments), Specialized departmental structures and Unified Rescue System (URS) forces.
The URS establishes the organization, coordinates and manages the actions of its constituent parts in their preparation and action in floods and in the conduct of the Rescue and emergency restoration work (RERW). The main constituent parts of the URS are: the Fire Safety and Protection of the Population Directorate, the Ministry of Interior, the CEMA and the BRC.

5. In our country medical, therapeutic and hygiene-anti-epidemic units are being built by the civil health system and a limited number of them by the Bulgarian Red Cross (BRC).
The Bulgarian Red Cross in floods is involved in the provision of material assistance and first aid to the victims through DERBAC and also trains lifeguards and arranges first aid courses for drivers.
6. The flood protection plans provide training for the management staff as well as training on request for the general population, also for sole traders and legal entities to organize training for their workers, in schools for the headmasters to organize training - under a program approved by the Ministry of Education and Science.
7. In Varna, due to the limited nature of the damages and injuries, based on historical data, the medical needs in floods can be controlled by their own medical staff and the available medical provision.
8. From the sociological survey among 230 people aged 18 and over in Varna District in 2018 and 2019 it was found out that the awareness and preparation for protection and first aid of the population in the case of floods is insufficient.
9. From the sociological survey among 230 foreign citizens aged 18 and over in 2018 and 2019 it was found out that their awareness and preparation for flood protection and first aid was generally better than the preparation of Bulgarian citizens.
10. More information and better preparation of the population in Bulgaria is necessary on flood risks and obligatory annual training of the population for proper actions and provision of first medical assistance through the assistance of the Ministry of Education and Science, MLSP, BRC, the media, the municipal authorities, the Fire Safety and Protection of the Population Directorate and the Black Sea Basin Directorate. and the Black Sea Basin Directorate.

CONTRIBUTIONS OF THE THESIS

Scientific-theoretical contributions

1. A summary and analysis of the Flood Risks for Bulgaria (in particular the Varna District) has been made and the factors on which it depends are: the ones related to the flood risk; human and natural systems exposed to inundated waters and the vulnerability of these systems.
2. A model for flood risk assessment has been prepared. Four stages have been analyzed: hazard identification; exposure assessment; vulnerability assessment and risk assessment.
3. Analysis and systematization of the health risks and the medical provision for floods has been carried out.
4. A Training Strategy for the Population Prevention and Protection has been developed.
5. An opinion has been expressed that the Republican strategy on the safety chain (prevention, preparation, response, recovery) should be complemented by larger material provision.
6. In Varna, due to the limited nature of the damages and injuries, based on historical data, it is concluded that the medical needs of floods can be controlled by their own medical staff and the available medical provision.
7. A sociological survey among 230 adult population (over 18 years) from the Varna District in 2018 and 2019 was carried out to study awareness of protection and first aid in floods and it was found that the preparation was not sufficient.

8. From the sociological survey among 230 foreign citizens aged 18 and over in 2018 and 2019 it was found out that their awareness and preparation for flood protection and first aid was generally better than the preparation of Bulgarian citizens.
9. It was proved that there is a need of more information and preparedness of the public in the Republic of Bulgaria for flood risk and obligatory training of the population for the proper actions and the provision of first aid through the assistance of the Ministry of Education and Science, the Ministry of Labor and Social Policy, the BRC, the municipal authorities and the Fire Safety and Protection of the Population Directorate.

Scientifically-applied contributions

1. A leaflet has been developed to raise awareness and knowledge of the population on flood-related issues:

- General recommendations for the population at flood risk. Protection and proper behaviour in the flood plain. Instructions for rendering first (pre-medical) assistance to flood victims.

2. A leaflet has been developed to raise awareness and knowledge of the population on flood-related issues:

- Health recommendations after a flood. Major hazards. Important knowledge for everyone in the flood plain. Preventive measures at the home and in the office.

3. One thousand copies of the leaflets were distributed among participants in the sociological surveys, their relatives, employees of Varna Municipality, Basin Directorate, members of NGOs and citizens.

4. Some leaflets are distributed electronically using social networks, e-mail and more.

5. There was active participation at the organized training seminar on 18th and 19th September 2018 by the MoEW on the problems related to the floods and discussed in the Flood Risk Management Plan for the Black Sea Basin Water Management region in 2016-2021. Flood Health Risk Lectures have been developed and presented to train the competent authorities attending the seminar.

6. A First Aid Medical Package (required for injuries and floods) has been developed and made available to NGOs.

7. For the first time, a Conceptual Model for assessing population preparation for flood risk accidents has been created.

8. A Flood Training Strategy has been developed to raise awareness and knowledge of protection and first aid of the population.

9. The summarized results of the surveys, including the leaflets, have been provided to and could be implemented in practice by the Ministry of Education and Science, MLSP, Ministry of Health,

Varna Municipality, CEMA, Fire Safety and Protection of the Population Directorate, BRC, NGOs and the Black Sea Basin Directorate.

10. Scientific guidance of a doctoral student with a thesis' topic "Floods - Floods - Leading Disasters for Northwest Bulgaria" in 2019.

СНАВР - Спасителни и неотложни аварийно-възстановителни работи - Rescue and emergency restoration work (RERW)

Fire Safety and Protection of the Population Directorate