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High Mortality Rates from Road Traffic Accidents in the Russian Federation: Possible Causes and Ways to Overcome Challenges

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ABSTRACT

Road traffic accidents cause enormous material and moral damage both to the society as a whole and to individual citizens. According to the data, the Russian Federation is among countries with highest road traffic mortality rates within European Region of the World Health Organization.

The objective of the study was to attempt to identify possible causes of high mortality rates from traffic accidents on the roads of the Russian Federation and to reveal ways to reduce those rates.

To that purpose a survey of citizens of the Russian Federation who are driver's license owners and who are experienced drivers was conducted in different regions of the country. The results identified low medical literacy in terms of provision of first aid to the injured persons as one of the causes.

Other factors, potentially capable to reduce the number of fatalities in road traffic accidents, once their performance indicators improve, have also been considered. Those indicators comprise time of arrival of ambulance crews at the site of an accident with enough medical equipment and medicines, interaction of emergency services, growth of efficiency of training in providing primary medical care at driving schools.

Keywords: *road transport, traffic accident, road traffic mortality, first aid, injuries.*

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Introduction. Thousands of people die every day as a result of bodily injuries, and per each person deceased there are several thousand injured, many of whom will suffer the effects of injury throughout their lives. At the same time, almost a quarter (22,8 %) of those who died in the world following injuries, were victims of road traffic accidents (Pic. 1) [1, p. 38].

The *objective* of the authors is to identify possible causes and ways to reduce high mortality rates from road accidents in the Russian Federation.

The authors used general scientific *methods*, comparative analysis, evaluation approach, statistical data analysis, surveys data and own social study and survey.

Results.

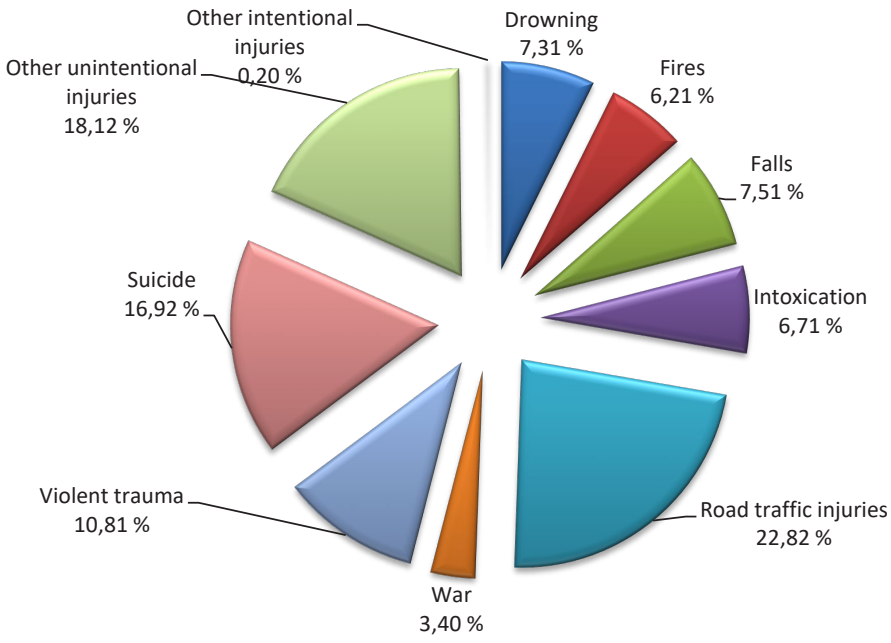
Mortality rates from injuries resulting from road traffic accidents vary significantly throughout the world. In the WHO European Region, the lowest mortality rates are observed in Western European countries, such as Sweden and the United Kingdom, and the highest rates are in the CIS countries (Pic. 2) [2, p. 2].

The Russian Federation, according to data for 2015, is one of the first places in terms of road traffic mortality among the countries of the European Region of the World Health Organization [2, p. 3].

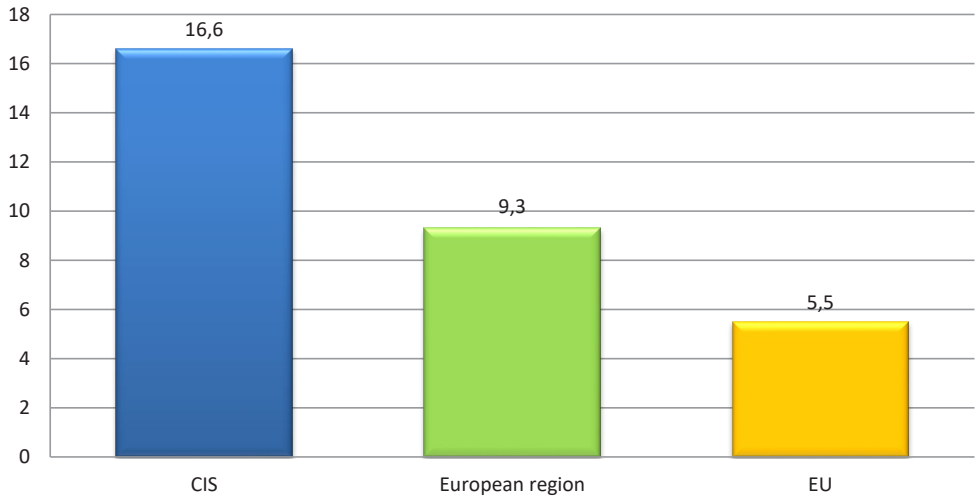
The overwhelming majority of those died from road traffic accidents in the Russian Federation (57 %) are drivers and passengers of cars (Pic. 3) [3, p. 36]. One third of those died from road accidents are people of the most active working age (26–40 years old). The country's annual economic losses from road accidents make about 2 % of gross domestic product and are comparable in absolute terms to the gross regional product of such federal territorial entities of the Russian Federation as Krasnodar region or the Republic of Tatarstan [4, p. 4].

Victims of road traffic accidents receive injuries of various types and severity. We can identify main types of injuries in case of a road traffic accident:

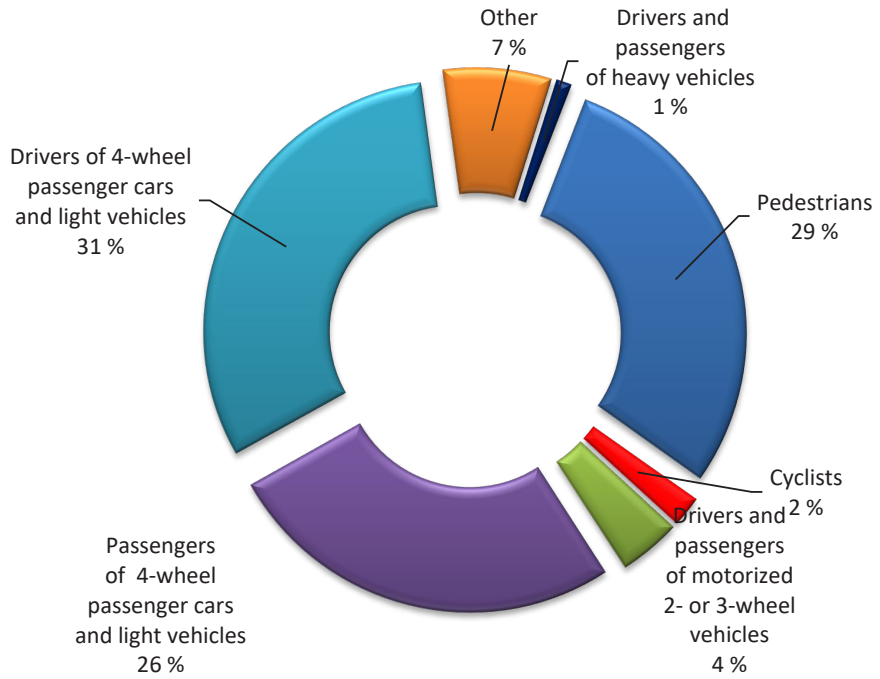
- for pedestrians: soft tissue injuries, fractures of skull bones, brain injuries, chest injuries (fractures of the skeleton and injuries of the chest cavity), fractures of the pelvis, spine, clavicle, fractures of the lower extremities (injuries of the femurs prevail) [5, p. 3];
- for those who were in the car cabin: soft tissue damage, fractures of skull bones, particularly of the facial skeleton, damage to internal organs (bruises, breaks, crush and tear), chest damage, brain injury [5, p. 4];
- about a quarter of those hospitalized as a result of an accident receive brain injury; 10 % get open wounds, for example, deep cuts and almost 20 % have fractures of the lower extremities [6].



Pic. 1. Distribution of global mortality due to injury depending on various causes [1, p. 38].



Pic. 2. Road traffic mortality rates per 100 000 population in the countries of the Commonwealth of Independent States (CIS), the WHO European Region (ER) and the European Union (EU) in 2013.

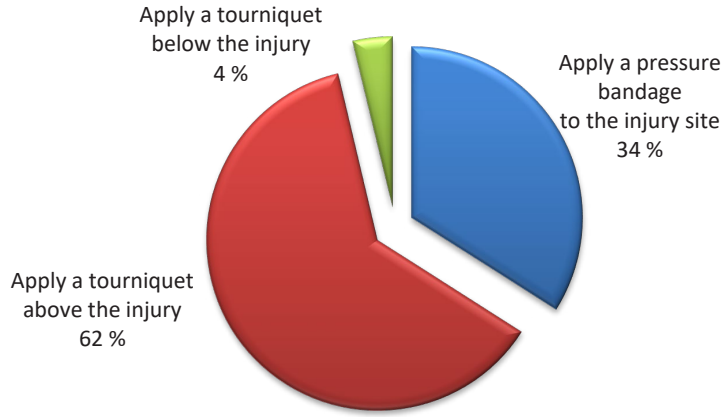


Pic. 3. Mortality as a result of road accidents, depending on the category of the road traffic participants in the Russian Federation [3, p. 36].

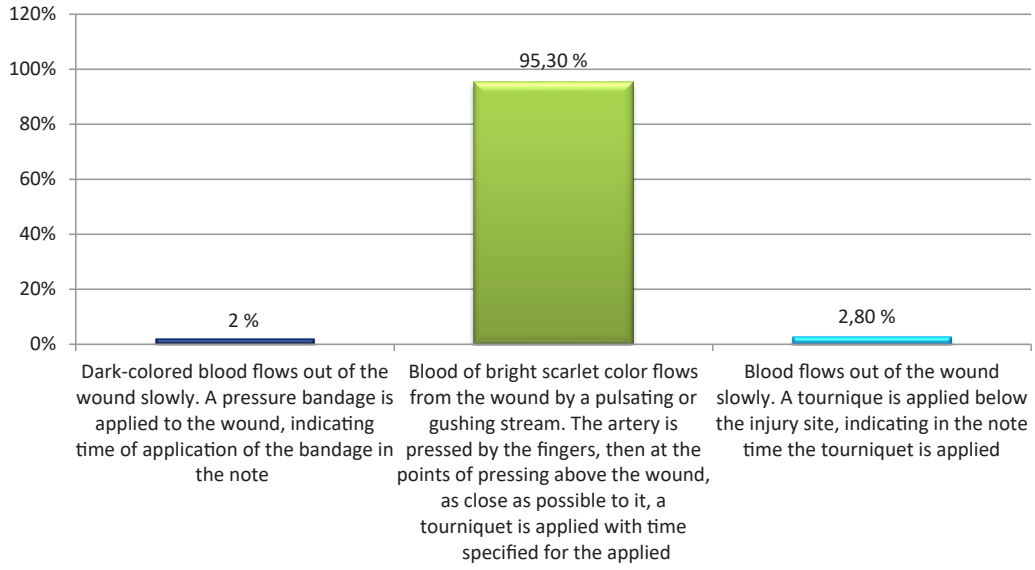
Many deaths occurred following respiratory failure or bleeding might be prevented by ordinary accident's witnesses if they are trained to provide first aid [7, p. 659].

Providing an effective and high-quality medical care can also improve the outcome and ensure survival of victims of road traffic accidents. Inequality in the rates of road traffic mortality can be partly explained by the fact that in several countries the victims are provided with better ambulance and emergency trauma care, as well as with better first aid at the scene of the accident.

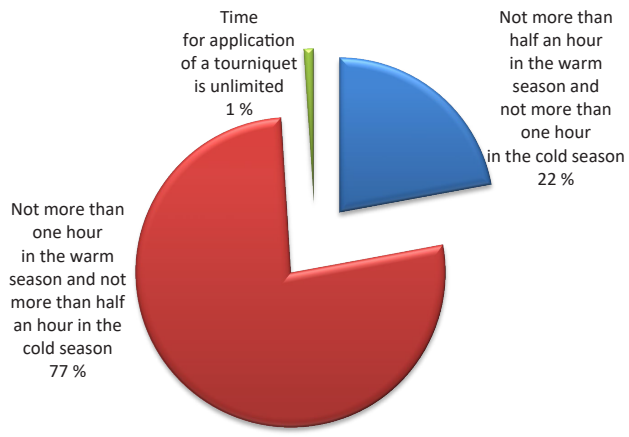
Very often, time factor (delayed arrival of ambulance crews) and the low level of police members' training, as well as of drivers who



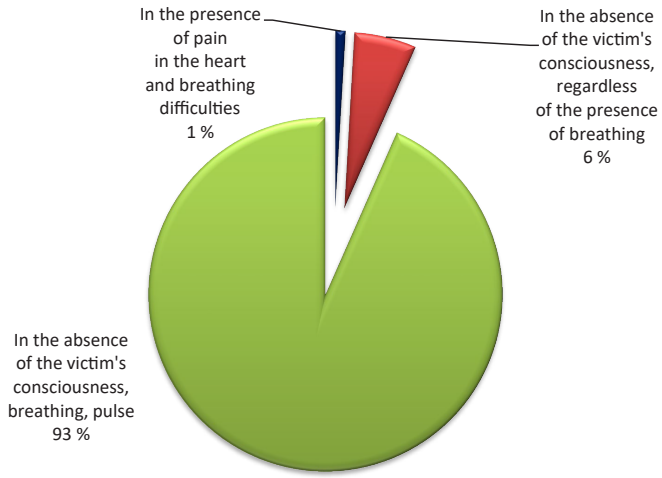
Pic. 4. Distribution of answers to the question «How to stop bleeding when a vein and small arteries are wounded?».



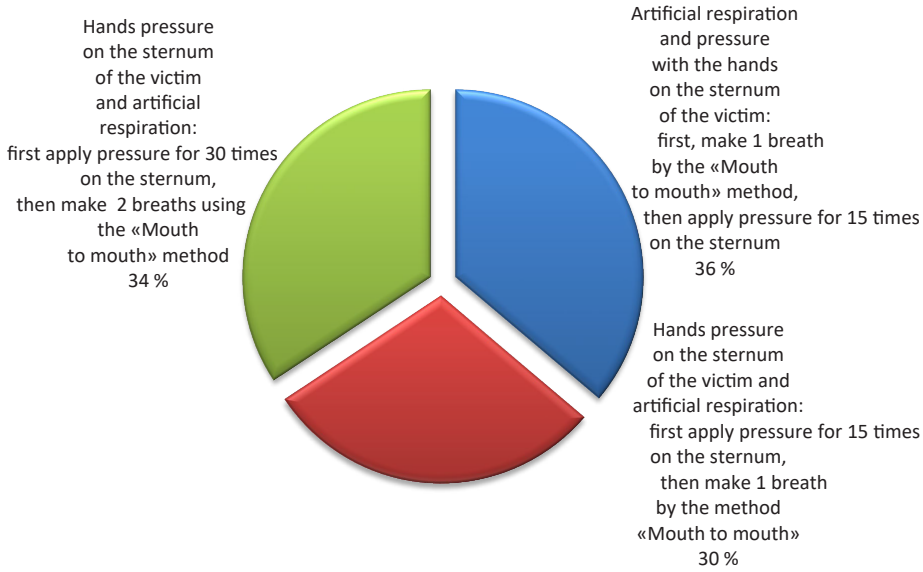
Pic. 5. Distribution of answers to the question «What are the signs of bleeding from a large artery and how does first aid begin when it is injured?».



Pic. 6. Distribution of answers to the question «For how long can a styptic tourniquet be applied?».



Pic. 7. Distribution of answers to the question «In what cases should the cardiopulmonary resuscitation of an injured person be started?».



Pic. 8. Distribution of answers to the question «How is the cardiopulmonary resuscitation of the victim carried out?».

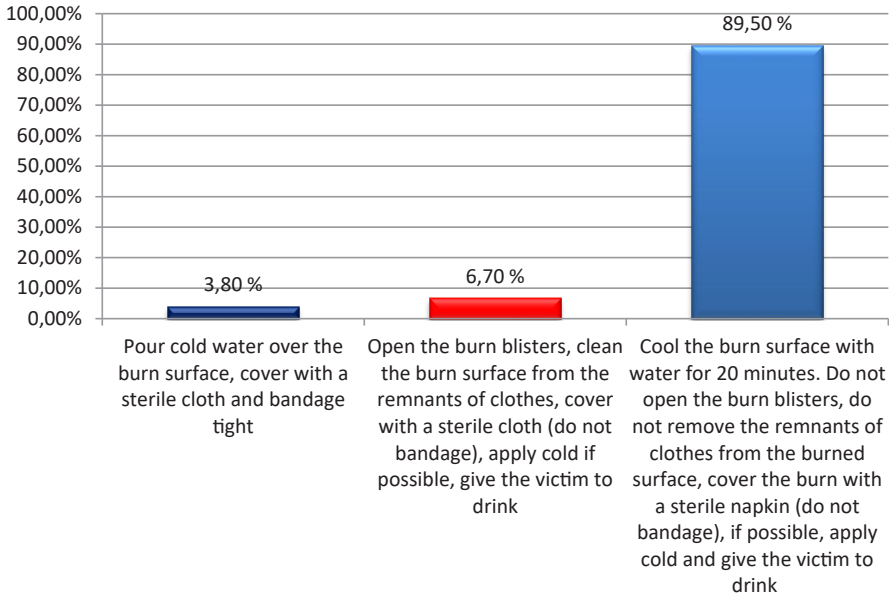
sometimes cannot and do not understand how to render first aid to the injured person, are causes why lethal cases are not prevented [8].

In this regard, among the reasons explaining high mortality rate on the roads of the Russian Federation, we can single out the road users' own attitude to safety, including low medical literacy and lack of readiness due to the lack of appropriate skills to provide first aid to victims.

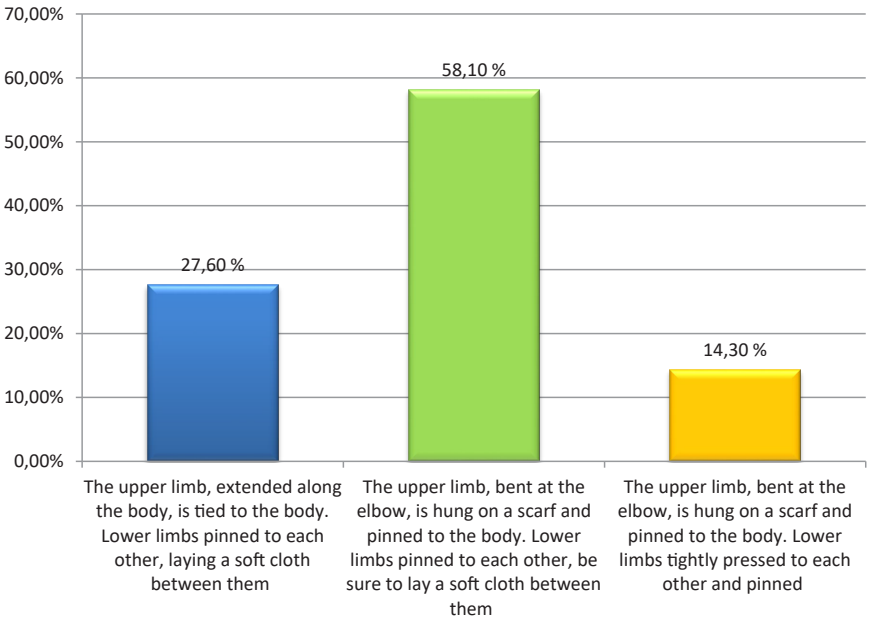
As part of our study, this reason was considered in more detail, particularly through conducting a survey of citizens of the Russian Federation who have a driver's license and driving experience in different regions of the country (107 people in total: 67 men and 40 women). The survey was conducted by the authors from May to September 2018 through a direct questioning of drivers and via the platform https://docs.google.com/forms, with the help of communities of drivers in social networks.

Respondents were asked to answer questions about medical training in driving schools, involvement in road traffic accidents, first aid techniques.

Most of the respondents had first-aid training in a driving school conducted by a driving school employee, and a quarter of the respondents did not have such classes at all. 80 % did not have practical training on first aid using dummies.



Pic. 9. Distribution of answers to the question «What is first aid in case of a superficial thermal burn?».



Pic. 10. Distribution of answers to the question «How is first aid provided in case of fractures of extremities, if there are no transport tires, neither available tools to make them?».

10 % faced the situation when it was necessary to provide the first aid and they provided it, while other 10 % faced such situations but could not provide assistance because of fear of harming the injured and of stressful environment.

The results of answers to questions about first aid techniques are presented in the form of diagrams.

Only 34 % of respondents know the rules for stopping bleeding from damaged vein or small arteries (to apply a pressure bandage) (Pic. 4).

95,3 % of respondents can identify signs of bleeding from a large artery and know how to start first aid when large artery is injured (Pic. 5).

76,9 % of respondents know about maximum time of application of a tourniquet (Pic. 6).

Signs for the onset of cardiopulmonary resuscitation may be called by 93,4 % of the respondents, while only 34,3 % are able to render it correctly (Pic. 7, 8).

89,5 % of respondents are capable to provide first aid in case of burns (Pic. 9).

58,1 % of respondents will be able to provide correct aid for limb fractures (Pic. 10).

Although the results were not as bad as might have been expected (given the quality of training provided to amateur drivers in driving schools on this issue), there are significant gaps in first-aid knowledge. Given that in addition to theoretical knowledge of how to assist, a person should be able to apply this knowledge, not to panic and not to be afraid at seeing the blood, the percentage of those who can actually provide assistance will be even lower.

Significantly lower mortality from road traffic accidents in the EU countries compared to the Russian Federation may be associated, first of all, with the minimum time of arrival of emergency medical assistance teams and of transportation of the injured to a medical institution (including air transport). It is also possible that an important role is played by the equipment of the ambulance brigade with drugs and medical devices, as well as by the qualifications of medical personnel and other emergency services personnel (police members, firefighters), often arriving at the accident scene before ambulance staff. The rapid intervention of firefighters, rescuers and police officers is extremely important in cases when people find themselves locked in a car, especially if the car is on fire or under water. Therefore, both firefighters and the police officers must be trained in the basics of life sustaining of the injured persons.

Conclusions. The experience of European countries, toughening penalties for serious violations of traffic rules, improving the quality of training in driving schools, reducing time of arrival of ambulance, applied together, will result in a significant reduction in both the total number of accidents and their serious consequences. Such measures and approaches in Russia are being consistently implemented [4], but such a process should be constantly in the focus of attention and be developed tirelessly.

In our opinion, conducting medical classes in driving schools should be mandatory, and they should be held with involvement of medical personnel as instructors and tutors. At the same time, more attention should be paid to first aid training in educational institutions (preschool institutions (for example, using gamification), schools, educational organizations of secondary vocational education and higher education).

Besides, it would be advisable to train drivers of commercial vehicles to provide first aid to victims of road traffic accidents.

First aid training provided to ordinary citizens should follow the principles established by the World Health Organization [1, p. 169].

Implementation of the existing and introduction of new suggested approaches will reduce the number of deaths caused by road traffic accidents.

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