Review of global menace of road traffic accidents with special reference to Macedonia - a economic and health perspective

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Abstract

No human activity has improved so much well-being and life standard contributing most to the development of civilization, as well as "traffic convenience", along with the alphabet and the printing. But at the same time no human activity has taken as many human lives in peace-time conditions, as traffic.

According to reports from the World Health Organization, traffic accidents on the roads are among the leading causes of death globally, taking the eighth place on the list of causes of death, but in the first place as the main cause of the deaths of the population aged 15-29 . They are not only an appropriate personal tragedy for the families themselves, but also have a major impact on the productivity of the population as a whole, the amount of economic expenditures and appropriate implications in the health sector. Estimates of traffic accidents globally range from about 1.2 million fatalities, from 20-50 million injured or disabled persons and about $ 518 billion a year to material damage. Traffic road accidents in low- and middle-income countries are particularly high, where they range between 1% and 2% of their gross national product - more than the total development aid received in these countries.

The magnitude of this important social problem has forced numerous international institutions and bodies, including the United Nations, to pay special attention to the conditions and consequences of traffic. Following the European Union Road Traffic Safety Program, the National Strategy of the Republic of Macedonia envisages reducing the number of victims in traffic accidents because the security conditions in the road traffic in the Republic of Macedonia are quite serious and the situation is really worrying. If we make an analysis of the causes of traffic accidents, we will see that in 95% of cases, the human factor is the cause most of all.
For these reasons, as an imperative and one of the very high priorities of each country, the causes and measures of road safety are set as a major issue in each country's public policies.

Key words: **road traffic, traffic accidents, human losses, material damages, prevention**

1. Introduction

The United Nations and almost all international institutions and bodies devote special attention to the conditions and consequences of traffic. Traffic is an inevitable prerequisite for the exchange of goods, passengers on any point of the globe. It is a prerequisite and a major factor in global developments. In other words, traffic is not just the choice of the individual, but a basic bloodstream without which the functioning of all social activities in the modern state cannot be imagined.

The strong growth in the development of traffic, especially the need for fast, safe and flowing transport and transportation, besides the huge benefits, has certain negative consequences for mankind. From the negative consequences in the policies of global developments, traffic safety is especially emphasized. In that direction, in relation to the current traffic patterns with the current transport activities, there is a certain consensus among the states regarding the strengthening of the traffic safety, sustainable development of the environment, both on a local and global level.

No human activity has improved so much well-being and life standard contributing most to the development of civilization, as well as "traffic convenience", along with the alphabet and the printing. But at the same time no human activity has taken as many human lives in peace-time conditions, as traffic. With its functional features, traffic can speed up all business flows, but at the same time, if not developed, it will be their brake.

On the agenda of all international conferences, the basic principles for improving the safety of traffic, environmental protection, rational use of energy and the initiation of these standards are constantly proclaimed as high as possible. In future commitments, the primary priority of global development will be to reduce greenhouse gas emissions that are the product of vehicle expansion and greenhouse effect as the main causes of global climate change.

Traffic "accidents" are not "accidents", i.e. traffic injuries are not accidental, but the result is systemic mistakes and reluctance. Any traffic accident, especially those with serious bodily injuries and deaths, is an appropriate personal tragedy and have a major impact on the productivity of the population as a whole, the amount of economic costs and the corresponding implications in the health sector.

2. Global traffic safety conditions

Every day in the world, more than 3400 people die from various injuries received as participants in road traffic. Road traffic injuries are among the three leading causes of death for people between 5 and 44 years of age. Unless immediate and effective action is taken, road traffic injuries are predicted to become the fifth leading cause of death in the world, resulting in an estimated. The economic costs of accidents are estimated at 1% of gross national product (GNP) in low-income countries, 1.5% for cumulative income countries and 2% for high-income countries. Generally taken, the economic consequences of motor vehicle crashes have been estimated between $ 518 billion a year, caused by damage to traffic accidents.

From the aspect of traffic safety, three groups of countries can be identified: **[1]**

1. Countries that have accepted that traffic safety can be managed, whereby they have built up a well-organized system for protection and successful implementation of management in practice, continuously reducing the number of victims (UK, Sweden, the Netherlands, Norway etc.);
2. States that in principle accept the idea of reducing the number of road traffic accidents, but do not have a strong security system built and fail to manage traffic safety, thus

registering large oscillations in the number of victims (Serbia, Croatia, Macedonia, Montenegro Gora, Bosnia and Herzegovina, Romania, Bulgaria etc.), and

3. Countries that have not yet accepted the idea of traffic safety management (most countries from the African continent, India, etc.).

Given the unacceptable suffering and damage to traffic and the huge differences between countries, and accepting the view that traffic safety can be a well-modified activity, the UN General Assembly has adopted several security traffic resolutions. Special emphasis is given to the resolution on enhancing road traffic safety (A / RES / 64/255), adopted in May 2010 **[2].** With this resolution, the period from 2011 to 2020 is proclaimed as a decade for action in traffic safety, in order to stabilize, and then halve the number of people killed in traffic accidents. That would mean that for a period of 10 years, the number of deaths would be reduced by 5 million and the number of injured by 50 million. This strategy should be implemented by consistently implementing the overall scientific and professional knowledge, laws and principles through various activities at the national, regional and global level.

3. Traffic accidents and recommendations from the World Health Organization

According to reports from the World Health Organization **[3]** road accidents are among the leading causes of death globally (in eighth place - Table 1), and the main cause of the death of the population aged 15-29 years (first place - Table 2).

Table 1 Ten main reasons for the death of the population - 2016

Cause reasons for the death	in 1000	Rate of mortality of 100.000 persons
1. Ischaemic heart disease	9.433	126
2. Stroke	5781	77
3. Chronic obstructive pulmonary disease	3041	41
4. Lower respiratory infections	2957	40
5. Alzheimer disease and other dementias	1992	27
6. Trachea, bronchus, lung cancers	1708	23
7. Diabetes mellitius	1599	21
8. Road injury	**1402**	**19**
9. Diarrhoeal diseases	1383	19
10. Tuberculosis	1293	17

Извор: Global Health Observatory (GHO) data
http://www.who.int/gho/mortality_burden_disease/causes_death/top_10/en/

Table 2 Ten cause reasons for the death of the population aged 15-29 years - 2016

Cause reasons for the death	in 1000	Rate of mortality of 100.000 persons
1. Road injury	***372.3***	***21***
2. Self-harm	212.7	12
3. Interpersonal violence	198.8	11
4. Maternel conditions	152.3	8
5. HIV / AIDS	142.8	8
6. Tuberculosis	135.0	7
7. Diarrhoeal deseases	85.2	5
8. Lower respiratory desease	76.3	4
9. Collective violence and legal intervention	74.9	4
10. Ischaemic heart disease	63.6	4

Извор: Global Health Observatory (GHO) data
http://www.who.int/gho/mortality_burden_disease/causes_death/top_10/en/

This situation is due to the increased number of road traffic injuries, that is, traffic accidents in the road transport.

In this direction, intensive negotiations and activities are being conducted to reduce such harmful consequences caused by traffic accidents. The Global Action called "The Decade of Action for Road Safety (2011-2020)" calls on countries to implement internationally recognized measures to make their roads safer. The UN General Assembly invited the WHO to monitor progress through its Global Status Report and Road Safety Recommendations. This report is the third in the series and provides insights into the state of the road safety at the global level, emphasizing the gaps, thus encouraging the need for countries and the international community to foster more action and act faster in this field.

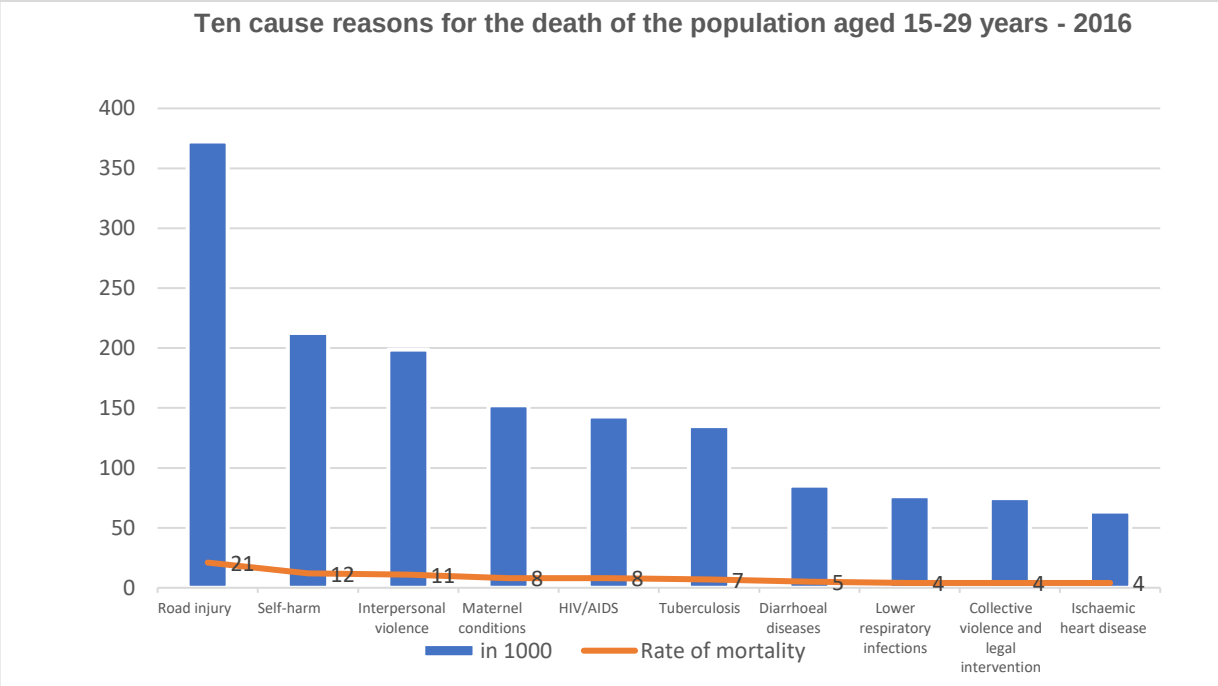

Figure 1 Ten cause reasons for the death of the population aged 15-29 years – 2016

Source: Global Health Observatory (GHO) data
http://www.who.int/gho/mortality_burden_disease/causes_death/top_10/en/

According to this report, 68 countries noted an increase in the number of traffic deaths since 2010, of which 84% are low and medium-income countries. Seventy-nine countries have seen a fall in the absolute number of deaths, of which 56% are low and middle income. However, low-income countries have twice more victims than those in high-income countries and have a proportional number of deaths in terms of the level of motorization of these countries: 90% of traffic deaths occur in low-income countries with a medium income, yet these countries have only 54% of the world's vehicles.

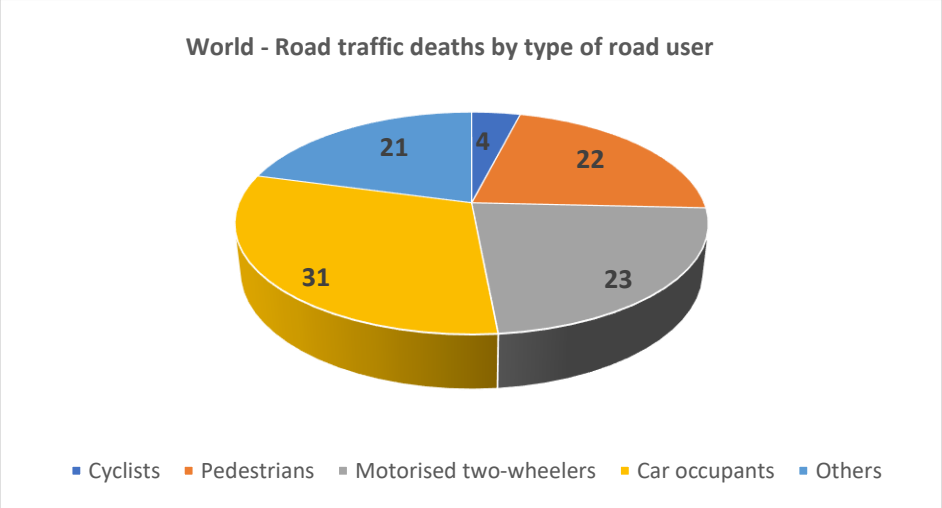

Figure 3 World - Road traffic deaths by type of road user

Injuries caused by road accidents are a matter of concern for public health and in some countries remain a growing problem. Numerous analyzes made by traffic participants on the causes of death show that almost half of all deaths on world roads are among the least protected - motorcyclists (23%), pedestrians (22%) and cyclists (4%).

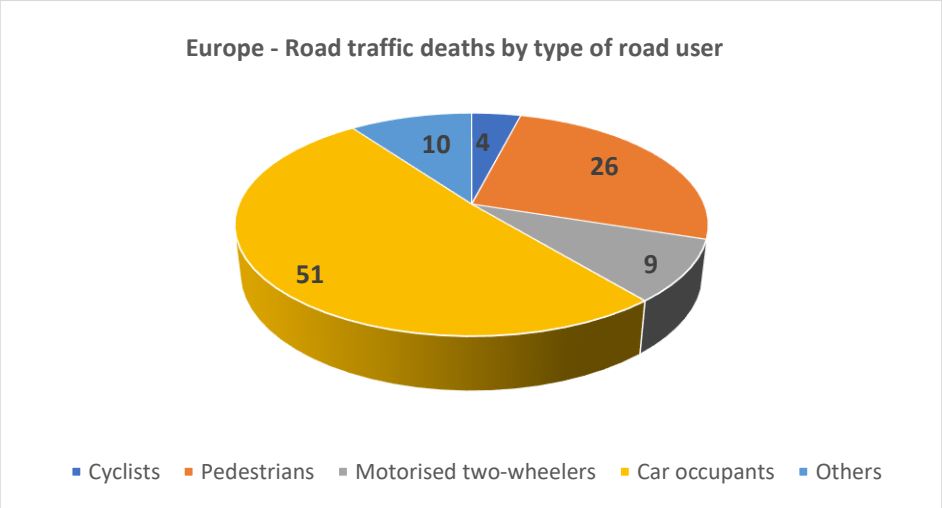

Figure 4 Europe - Road traffic deaths by type of road user

One of the most common causes of traffic accidents is the driver's fatigue. Buses and trucks account for 20 to 30 per cent **[4]** of all traffic accidents. These types of accidents result in about 50 per cent greater likelihood of death or serious injury as a consequence of the size of the mass and the volume of the involved vehicles and because the driver has fallen asleep, cannot stall or overturn to avoid or reduce the impact of the collision. While it is not possible to calculate the exact number of accidents related to fatigue, studies have shown that driver fatigue can be a factor contributing to 20 percent of all traffic accidents, and up to a quarter of all fatal and serious accidents.

In order to overcome the problem of the large number of traffic accidents, efforts are being made to tighten the Law on Traffic Safety. Through such measures, there has been an improvement in the behavior of traffic participants and a significant reduction in road accidents, injuries and deaths - in particular laws relating to the five key risk factors for road safety - speed, drinking, using motorcycles, helmets, seat belts and child restraints. Progress has been made in 17 countries (encompassing 409 million people) to amend laws that address one or more of these risk factors over the past 3 years and align with best practices.

Setting national speed limits is an important step in reducing speed. Maximum urban speed limits should be lower than or equal to 50 km/h, in line with best practice. In addition, local authorities should have the legislative power to reduce speed limits, allowing them to take into account local circumstances such as schools or high concentrations of vulnerable road users. However, only 47 countries (representing 13% of the world's population) **[5]**, meet both legislative criteria for best practice on urban speed management – a national urban maximum speed limit of 50 km/h, and local authority power to reduce this limit to ensure safe speeds locally.

The most positive changes in passenger behavior occur when road safety legislation is supported by strong and sustainable application and public awareness, education and a traffic safety campaign.

4. Conditions of traffic safety in the Republic of Macedonia

The situation with the level of road safety and the number of traffic accidents is alarming. Statistical data (for the period of 1998-2015) indicate that in the Republic of Macedonia, about 3140 traffic accidents occur, in which 4869 people are suffering and their lives are lost by 158 persons. The safety conditions in the road traffic in the Republic of Macedonia are quite serious and the situation is really worrying. If we make an analysis of the causes of traffic accidents, we will see that the human factor is the cause most of all. In 2015, as much as 94.8% of the drivers' mistakes are present, the share of pedestrian errors is 4.17%, while the remaining reasons are very low in representation.

Table 3 Killed and injured in traffic accidents, by years
Загинати и повредени лица во сообраќајни незгоди, по години

Traffic accidents involving casualties[1)]
Сообраќајни незгоди со настрадани лица[1)]

	Сообраќајни незгоди	Настрадани лица / Road accident casualties					Потешко и полесно повредени лица
		вкупно	загинати лица / killed				
	Traffic accidents	total	cé	возачи	патници	пешаци и други	Seriously and slightly injured
			all	drivers	passengers	pedestrians and others	
2010	4 223	6 537	162	80	50	32	6 375
2011	4 462	7 025	172	79	54	39	6 853
2012	4 108	6 281	132	61	33	38	6 149
2013	4 230	6 682	198	90	63	45	6 484
2014	3 852	6 186	130	59	35	36	6 056
2015	3 854	6 061	148	66	33	49	5 913

Source: State statistical office of the republic of Macedonia: transport and other services, 2015. = Statistical review: Transport, tourism and other services. 8.4.16.02 / 858.**[8]**

The irresponsible behavior of traffic participants is largely due to the low level of social awareness. Regarding the negative occurrences in traffic, insufficient social individual awareness of the magnitude of the dangers and damages that arise with irresponsible behavior in traffic is still noticed. **[6]** Precisely because of this fact, it can be said that more attention should be paid to strengthening the awareness for full compliance with the legislation in all traffic participants.

Table 4 Traffic accidents according to the errors of traffic participans[1)]
Сообраќајни незгоди според грешките на учесниците во сообраќајот[1)]

	2011	2012	2013	2014	2015	
Број на констатирани грешки	**4 462**	**4 108**	**4 230**	**3 852**	**3 854**	**Number of established errors**
Возачи	4 195	3 865	3 997	3 633	3 656	Drivers
Пешаци, јавачи и терачи на добиток	227	200	189	168	161	Pedestrians, riders and cattle herders
Патници	11	15	10	9	7	Passengers
Возила	3	1	-	-	1	Vehicles
Патишта	6	19	20	9	8	Roads
Други причини	20	8	14	33	21	Other reasons

[1)] Не се опфатени незгодите со материјална штета

[1)] Accidents with material damage are not covered

Source: State statistical office of the republic of Macedonia: transport and other services, 2015. = Statistical review: Transport, tourism and other services. 8.4.16.02 / 858.**[8]**

There is a significant correlation between the number of traffic accidents and their consequences with the quality, construction and visibility of the roads. Field research on the causes of traffic accidents also includes the configuration of the terrain with the quality and the choice of the substrate, the visibility, the position and the sharpness of the curvature, the width of the road, lighting, signaling, weather conditions, etc. Certain sections of the road network in the Republic of Macedonia for a longer period of time represent potentially dangerous places for the life of the participants in the traffic. The State Council for Road Traffic Safety emphasizes to such drivers or so-called "Black spots" (places) where traffic accidents on the roads in the Republic of Macedonia are most commonly occurring and where the most attention should be paid. Legal regulation and technical standards do not precisely define the term "black spot" on the roads, but generally the prevailing assumption is that the "black spot" is a designated place on the road for which four or more traffic accidents occurred within a year.

Depending on the applied methodology for defining the black spots, data on the number of such dangerous places, black spots in the traffic of the Republic of Macedonia are different. According to Professor Andreevski **[7],** there are a total of 250 dangerous places, of which 150 are on open roads, and 10 in urban areas (city and village). In general, all hazardous places are influenced by the geographical configuration of the area and possess the attributes of risk, difficult conditions, necessity of attention, need for additional measures, precise legal aspects (whether with specific acts and documents), geographical disadvantages (mountainous area subjected to slope, freezing, drifts, rainbows, etc.).

Therefore, the collection of data, as well as their statistical processing, is an important element for recognizing and classifying the factors that led to traffic accidents. It is therefore necessary to build a system for quality assessment of the occurrence of traffic accidents based on the obtained data as well as the use of the same for the education of the participants in the traffic.

5. Conclusions

The strong growth in the development of traffic, especially in fast, safe and flowing transport, besides the huge benefits, has certain negative consequences on humanity. From the negative consequences in the policies of global developments, traffic safety is highlighted.

Bearing in mind the unacceptable suffering and damage to traffic and the huge differences between countries and accepting the view that traffic safety can be managed, the UN General Assembly adopted several safety traffic resolutions in order to stabilize and then halve the number of dead people in traffic accidents.

The fact that more than 3400 people die every day in the world, from various injuries received as participants in road traffic. The economic costs of accidents are estimated at 1% of gross national product (GNP) in low-income countries, 1.5% for cumulative income countries and 2% for high-income countries. Generally taken, global estimates are about $ 518 billion a year, caused by damage to traffic accidents.

The irresponsible behavior of traffic participants is largely due to the low level of social awareness. Regarding the negative occurrences in traffic, insufficient social individual awareness of the magnitude of the dangers and damages that arise with irresponsible behavior in traffic is still noticed. Precisely because of this fact, it can be said that more attention should be paid to strengthening the awareness for full compliance with the legislation in all traffic participants.

For these reasons, as an imperative in each country, the importance and the policy of road safety are being raised as a matter of public health. The healthcare sector will greatly benefit from better prevention of traffic injuries in terms of fewer interventions and hospital admissions, a reduced rate of injuries among the population, and in particular the mortality rate, less absenteeism due to hospital treatment and less financial expenses for incurred damages. Also, it would be the health sector profits if a better traffic policy is pursued in all spheres of society, for accepting responsibility as participants in the traffic.

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