VIOLENT AND NON-VIOLENT DEATH IN THE CITY OF SOFIA AND SOFIA REGION FOR THE PERIOD 2011-2017 BY MATERIALS OF THE CLINIC OF FORENSIC MEDICINE AT UNIVERSITY HOSPITAL "ALEXANDROVSKA" - SOFIA

Biliana Mileva[1], Alexander Apostolov[1,2], Martin Angelov[1], Teodora Kiryakova[1,2], Veselin Topalov[1]

[1] University Hospital "Aleksandrovska" EAD - Sofia

[2] Department of Forensic Medicine and Deontology, Medical Faculty, Medical University – Sofia

Abstract

Introduction: The subject of the present study are the causes of death for the period 2011-2017, established in the Clinic of Forensic Medicine and Deontology, Sofia, covering cases from Sofia city and Sofia region. All cases are divided into two categories - sudden, non-violent death and violent death /homicide, suicide or accidents/.

Materials and methods: Forensic autopsies were performed according the standard section technique, as well as additional histological and toxicological examinations of blood, urine and internal organ samples. A statistical analysis was carried out.

Results: For the studied period of time, a total of 6614 forensic medical autopsies were performed. In both groups of non-violent sudden death and violent death, the most common causes of death were divided by sex and age.

Discussion: The statistical indicators that take into account the number, type and structure of distribution of the human mortality, represent the ultimate outcome of life as a consequence of changes in the individual's state of health. These findings are a clear and fair indicator of the socio-economic, domestic and socio-political conditions in which people live. The report and analysis of the results on the cause, type and structure of death enables the determination of the level of quality of human life in the society as well as it helps searching, identifying and solving problems, in order to prevent adequately deaths from these diseases.

***Key words**: Forensic medicine, autopsy, violent and non-violent death, medical statistics, prevention.*

Introduction:

Ranking cause of death is a popular method of presenting mortality statistics. This report present final 2011-2017 data on the leading causes of death established in the Clinic of Forensic Medicine and Deontology, Sofia, covering cases from Sofia city and Sofia region. Depending of the reasons that led to death in the forensic medicine practice death is divided into two main groups – violent and non-violent. The sudden, non-violent death is the one that occurs fast, unexpected and it's due to acute or chronic disease. The violent cause of death occurs as a result of impact of different external factors. Depending of the circumstances the violent death is divided into three groups – homicide, suicide and accidents [1]. Data in this report are based on information from all death certificates filled in by the forensic pathologists in the clinic.

Materials and methods:

Forensic autopsies were performed according the standard section technique, as well as additional histological examination of internal organs. Toxicological examinations of blood, urine and internal organ samples were performed for searching alcohol or narcotic substances. A statistical analysis was carried out.

Results:

For the studied period of time, a total of 6614 forensic medical autopsies were performed. The causes of death were determinate after thorough analyses of the results from the performed autopsies and the additional histological and toxicological examinations of blood, urine and internal organ samples. In both groups of non-violent sudden death and violent death, the most common causes of death were divided by sex and age. From the total number of death cases 3451 are cases of non-violent death and 2957 are cases of violent one.

As a result of our research, it has been established and confirmed by the years that cardiovascular disease are the most common cause of death [2]. It accounts for 70% of the total number of deaths - as a leading cause for those with acute coronary artery disease – narrowing of the lumen of a coronary artery by atheroma, due to complicated coronary atherosclerosis - lesioned atherosclerotic plaques, coronary thrombosis which can lead to myocardial infarction, sub-intimal haemorrhage in the thickness of the plaque and the outflow of detritus masses. As a complications of myocardial infarction, we have registered cases of myocardial rupture with blood leakage in the surrounding pericardium a condition -called tamponade of the heart. Also, we examined cases with certain changes in the aorta leading to the formation of the aneurysm, which is most often located in the ascending part. The damage caused by an atheromatous plaque can also result in an intimal defect and weakening of the media, allowing blood from the lumen to "dissect" into this weakened arterial wall, which can rupture and, depending on its localization, it will result in a heart tamponade, a massive hemorrhage in the chest cavity or the abdominal cavity. The next reason for the rapid death from cardiovascular disease is pulmonary thromboembolism originating from phlebotrombosis or lower limb thrombophlebitis.

The second place in the frequency in our practice or 17% of the total number of investigated cases of death were a result of respiratory diseases. Leading place among the deaths for the studied period are the different types of pneumonia, followed by tumor processes and tuberculosis. 7% of the total are diseases of the digestive tract - most commonly severe bleeding from ruptured sublingual varicose veins of the esophagus and from gastric or duodenal peptic ulcer. Disease of the nervous system occupies only 6% of the total number of cases for the studied period - ischemic and hemorrhagic strokes, tumor processes. Death resulting from a disease of the urogenital system is rarely found in our practice - isolated cases of tumor processes and kidney failure.

All cases of sudden death from diseases of different systems in the human body are presented graphically in the diagram below (chart 1).

In the group of violent death, the cases of mechanical asphyxia takes the first place - 22% of the total number of cases, and more often mechanical asphyxia due to suicide by hanging. 20% of the total number of cases is attributed to cases of falling form high - again cases of suicide. 18% are distributed to the traffic accidents - here the most common cases are pedestrian struck by motor vehicles, a collision between two cars with the following death of one or both drivers and accident with motorcyclists. In almost all of the cases in this particular group, the cause of death is due to combined head, thoracic and abdominal trauma. We have to add the fact that really often the drivers or the pedestrians are under the influence of alcohol or drugs. In 10% of the examined cases death was due to various intoxications - with ethyl alcohol, methanol or different types of drugs and illicit drugs [3]. 6% of the cases are due to deaths resulting from gunshot injuries in various anatomical areas - more often suicide cases. Next are the causes of death due to high or low temperatures – 6 % under fire conditions, death usually occurs as a result of intoxication with carbon monoxide and various other products of burning, but often death is due to thermal shock. Hypothermia takes 6 % of all the cases of violent death and can be both a self-sustaining cause of death and it can favor its

incoming on the background of severe chronic illness, alcohol intoxication, ect. Death as a result of the action of blunt objects – takes 4% of the total and the same percentage is distributed to the cases of stab-incised injuries. 2% of the total causes of death are due to railway injuries and deaths from electrical trauma. All cases of violent death are presented graphically in the diagram below (chart 2).

The second stage of our study is the distribution of the deceased by sex for each group - violent and non-violent deaths. Here the analysis of collected data shows that in each of the systems - cardiovascular, respiratory, digestive and nervous system - the cases of deceased men are considerably higher, as for the 7-year study 1864 men have died from diseases of cardiovascular system and 1297 of deceased for the same period were women. A total of 419 men died from diseases of the respiratory system and only 160 women for the explored period. 173 cases of death due do diseases of digestive system are men and 54 cases of women. Our study showed that a total of 132 men died from different conditions associated by the nervous system and only 44 women for the inspected 7-year study. For diseases of the urogenital system, the cases for men and women are equal – 7 for each.

Graphically the exact number of cases for men and women is presented for each of the years in the diagram bellow. (chart 3).

Similar conclusions were made for the group of violent death - a significant prevalence of cases of deceased men in each of the categories examined. From different types of mechanical asphyxia 505 men died and only 149 women. Falling from high were the reason for 420 men and 168 women to lose their life. In motor-vehicle trauma 386 men and 128 women. The alcohol and drug abuse was the reason of death for 238 men and 45 women. According to the gunshot injuries for the inspected period almost all the deceased were men – 171 men to 14 women. All the cases are presented graphically for men and women for each of the year's in the diagram bellow (chart 4).

The third final stage of our study examines all the cases of non-violent and violent death in three age categories, namely from 0 to 40 years, from 41 to 70 years and from 71 to 100 years. For the analyzed period of time in each of the inspected age intervals there is a relative persistence of the cases in the group of the deceased from non-violent deaths. Nevertheless the highest mortality rate - the peak of deaths is for the age interval 41-70 years for each of the years. The results are detailed graphically for each year (Chart 5).

The results in the group of violent deaths are similar, but here the peak for the age range of 41-70 years is not so highly demonstrated as those who died as a result of illness. There is a significant increase in the deaths of men and women under the age of 40 compared to the non-violent cause of death.

The results are presented graphically below (chart 6)

Discussion:

The wide variety of cases in the forensic practice, make it possible to trace a relatively accurate estimate of the most common causes of death, as well as the most frequently affected groups - by age and gender.

As a result of the study, it has been found that non-violent death rates occur often and takes more than 50% of the forensic autopsies with the most common cause of cardiovascular death. This study provides information for the most common and socially significant diseases, as well as identifying the risk groups of people which can help us in combating them – taking measures for early diagnosis and adequate treatment, leading to an increase in life expectancy.

The statistical analysis of cases of violent death by the Department of Forensic Medicine and Deontology for the studied seven year period indicates that the highest share is attributed to the cases of death due to mechanical asphyxia – suicides by hanging, followed by cases of falling from high and traffic accidents. In most of the presented cases the death people from traffic accident were under the influence of alcohol or illicit drugs. Most common cases are pedestrian struck by car, or trauma in the motor vehicle, or collision between two cars [4, 5]. Here there is a tendency for the fall of the age limit and the occurrence of more and more deaths among the young people. The analysis of the violent causes of deaths - homicide, suicide cases and accidents makes it possible to set up prevention programs to reduce such cases to their complete eradication.

The statistical indicators that take into account the number, type and structure of distribution of the human mortality, represent the ultimate outcome of life as a consequence of changes in the individual's state of health. These findings are a clear and fair indicator of the socio-economic, domestic and socio-political conditions in which people live [6]. The report and analysis of the results on the cause, type and structure of death enables the determination of the level of quality of human life in the society as well as it helps searching, identifying and solving problems, in order to prevent adequately deaths from these diseases.

Statement for Potential Conflicts of Interest – No potential conflict of interest was reported by the authors.

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Chart 1.

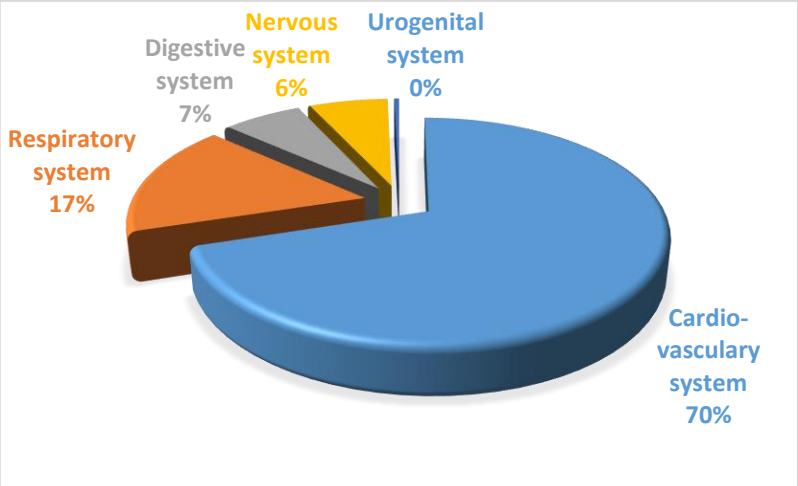


Chart 1. Distribution of the total number of cases of non-violent (due to a disease) cause of death for the period 2011-2017

Chart 2.

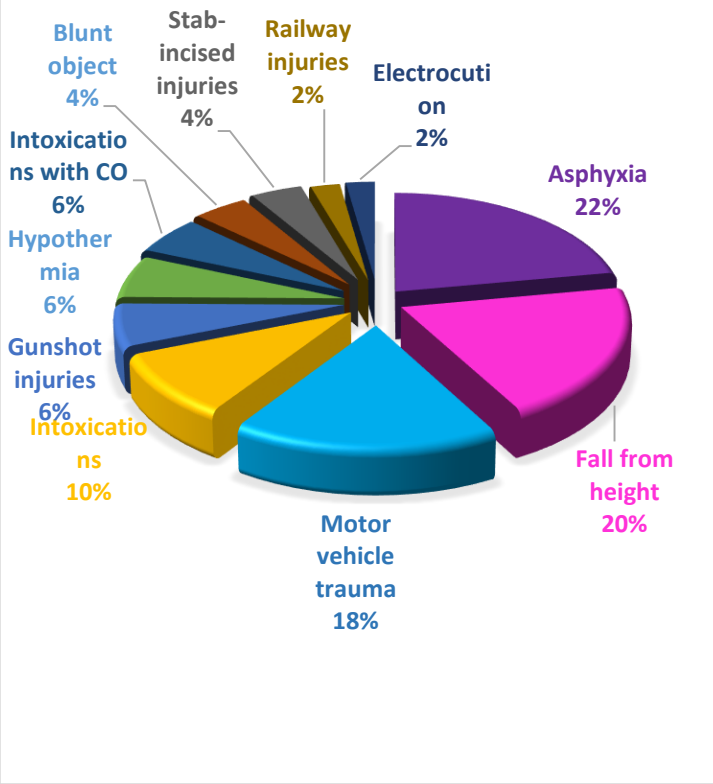
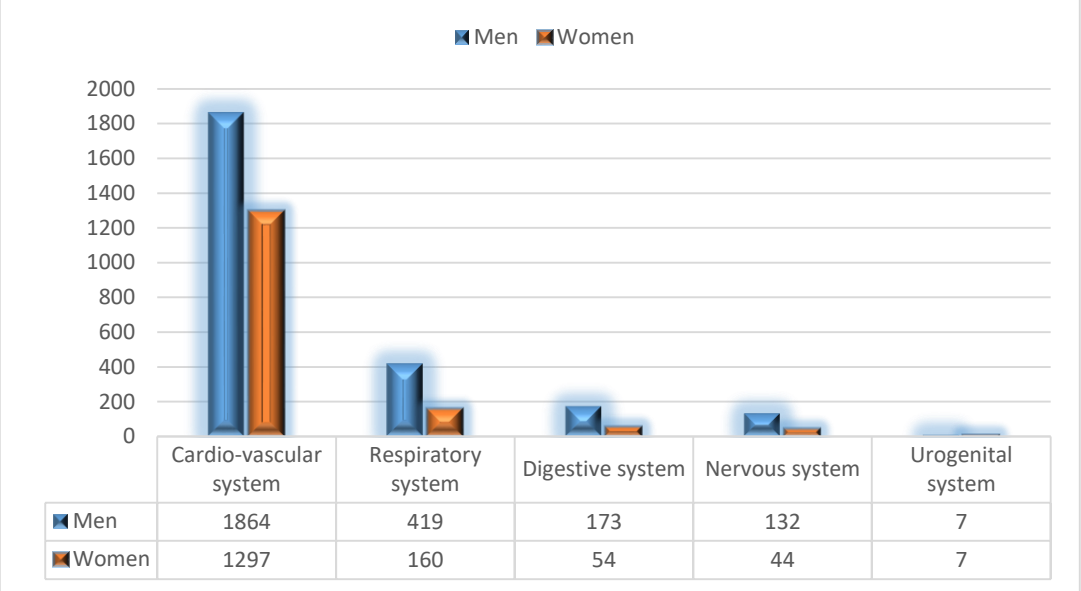


Chart 2. Distribution of the total number of cases of violent cause of death for the period 2011-2017

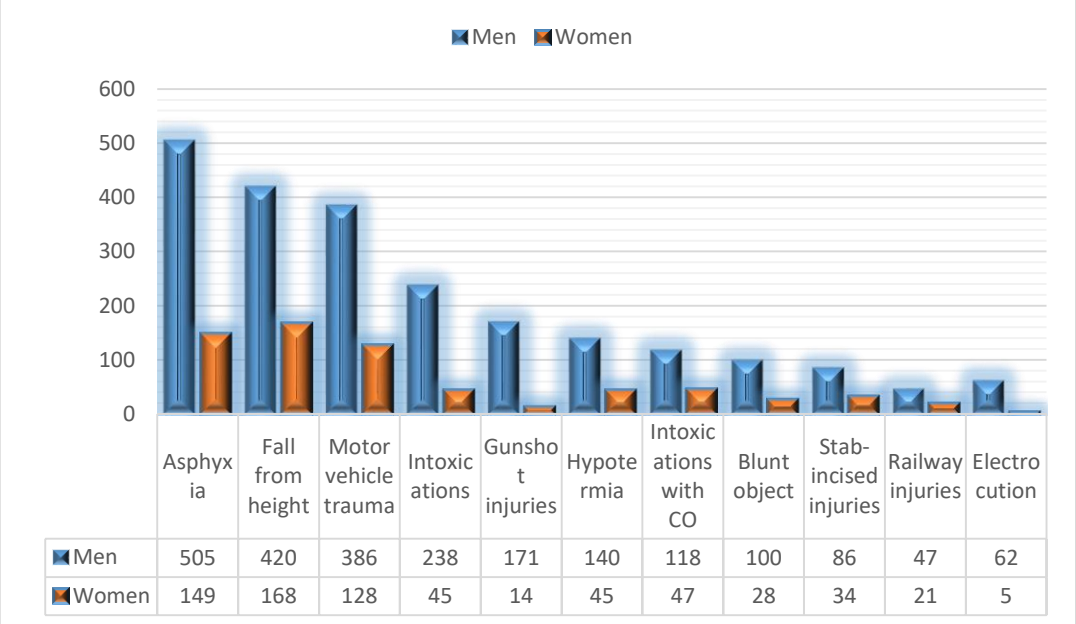
Chart 3.



	Cardio-vascular system	Respiratory system	Digestive system	Nervous system	Urogenital system
Men	1864	419	173	132	7
Women	1297	160	54	44	7

Chart 3 - Distribution of the total number of cases of non-violent (due to a disease) cause of death by sex for the period 2011-2017

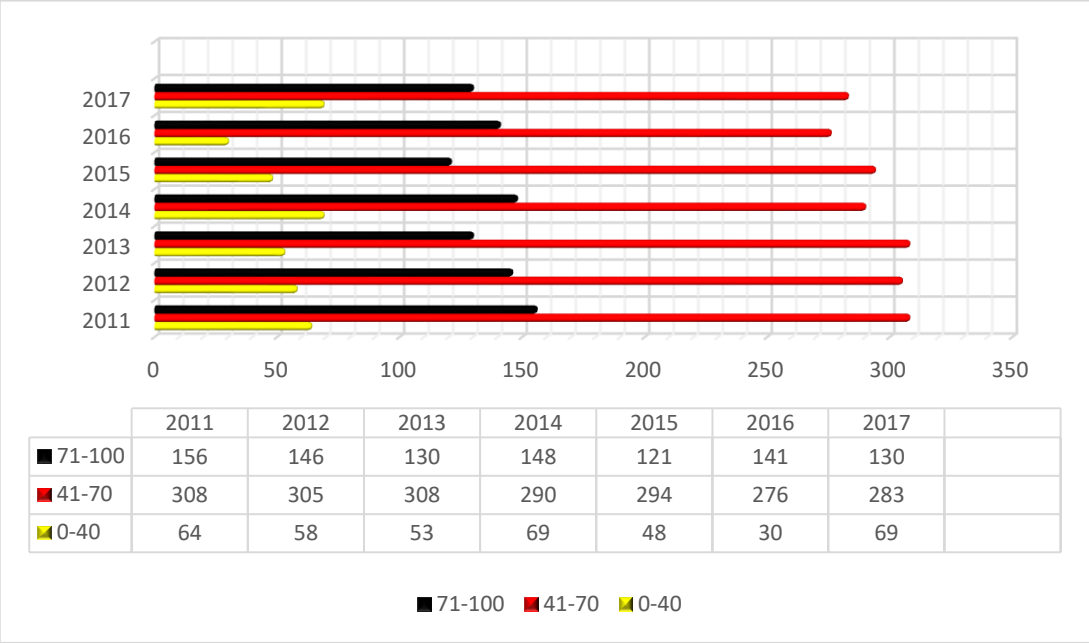
Chart 4.



	Asphyxia	Fall from height	Motor vehicle trauma	Intoxications	Gunshot injuries	Hypothermia	Intoxications with CO	Blunt object	Stab-incised injuries	Railway injuries	Electrocution
Men	505	420	386	238	171	140	118	100	86	47	62
Women	149	168	128	45	14	45	47	28	34	21	5

Chart 4. Distribution of the total number of cases of violent cause of death by sex for the period 2011-2017

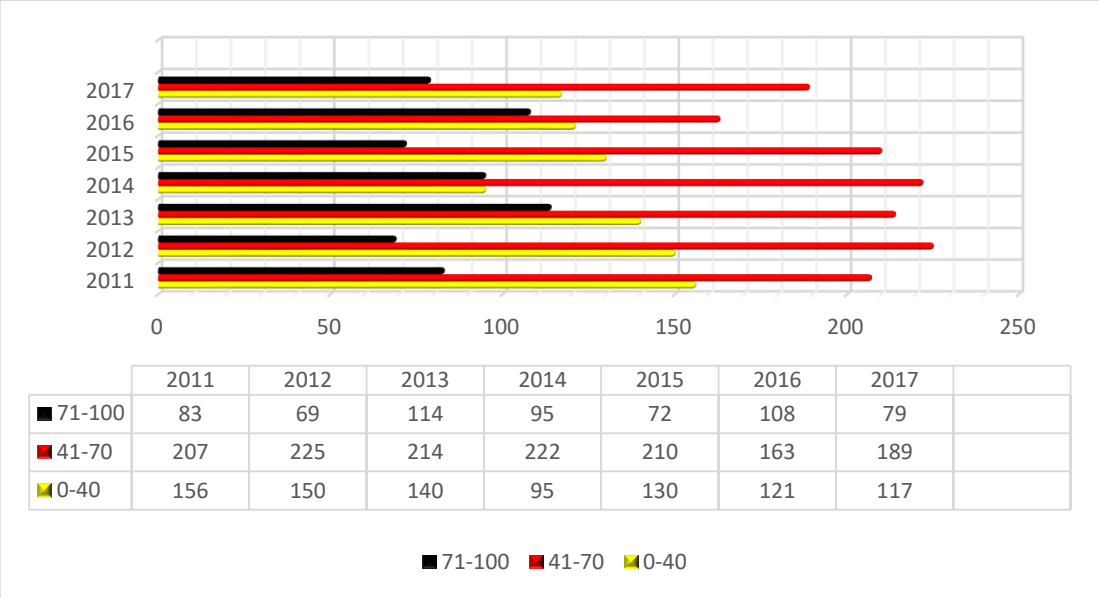
Chart 5.



	2011	2012	2013	2014	2015	2016	2017
71-100	156	146	130	148	121	141	130
41-70	308	305	308	290	294	276	283
0-40	64	58	53	69	48	30	69

Chart 5 - Distribution of the total number of cases of non-violent (due to a disease) cause of death by age for the period 2011-2017

Chart 6.



	2011	2012	2013	2014	2015	2016	2017
71-100	83	69	114	95	72	108	79
41-70	207	225	214	222	210	163	189
0-40	156	150	140	95	130	121	117

Chart 6. Distribution of the total number of cases of violent cause of death by age for the period 2011-2017

** Corresponding author:Biliana Mileva,MD Department of Forensic Medicine and Deontology Medical University, Sofia Zdrave 2 Str., Sofia 1431, Bulgaria Tel.: +359 878 456 219e-mail: bibs_15@abv.bg*