



OUTBREAK OF FIRE INJURIES IN PLEVEN REGION FOR THE LAST TEN YEARS - RETROSPECTIVE STUDY ON ARCHIVE JUDICIAL MATERIAL AND THE FIRE EVIDENCE DATABASE

Diana Dimitrova¹, Dancho Dekov²

1) Department of Preventive Medicine, Faculty of Public Health, Medical University, Sofia, Bulgaria.

2) Department of General Medicine, Forensic Medicine and Deontology, FPH - Medical University -Pleven, Bulgaria..

ABSTRACT

According to the World Health Organization (WHO) data in *The European Union (EU)* number of areas affected by fires is increasing.

Purpose. Purpose of the study is to analyze the structure and number of irreversible losses occurring at the point of traumatic fire damage in Pleven region and comparative analysis of the country.

Methods. Original retrospective survey for ten years in the Pleven district, archival-documentary and statistical methods of study were used. Data processed statistically with SPSS19.

Results. The results of the study indicate the reasons for the occurrence of a fire and the occurrence of the death in case of fires in the Pleven region.

Conclusions. Special attention and care by the civil service and public organizations should be addressed to the elderly and lonely living people, mostly in the villages, and their winter heating and the operation of the heaters.

Keywords: outbreak of fire injuries, Pleven region, retrospective study, irreversible losses,

INTRODUCTION

The fire is burning, spreading without time and space control, characterized by smoke or flames and heat, or both threatens human health and life, affects material values and leads to environmental consequences. [1]

According to the World Health Organization (WHO) data in *The European Union (EU)* number of areas affected by fires is increasing. One of the most significant fires in the latest history in Europe

is the fire in Greece in July 2018. [2-5] It seems that in Bulgaria, fires are typical disasters as well. Generally, fires create an outbreak of traumatic injuries with many striking factors. Research shows that the health consequences of fires are challenges for society. The irretrievable losses (died, died within 24 hours after hospitalization, the missing persons) after fires are reported with forensic expertise for the cause of death and are of interest in preventive medical theory and practice.

PURPOSE AND TASKS OF THE STUDY

The purpose of the study is to analyze the structure and number of irreversible losses occurring at the point of traumatic fire damage in Pleven region and comparative analysis of the country. In order to achieve this goal, the following main tasks are set:

- To study the trends of the number of fires on the territory of the country and Pleven region.
- To investigate the number, dynamics, structure, type and nature of deaths in outbreaks of fire injuries in the Pleven region during the last 10 years.
- To investigate the distribution by sex, age and residence of the deceased, the causes and places of occurrence of the fires.
- To summarize the data (similarities and differences) with national statistics.
- In our final step, we sum up results and will use them afterwards for developing a risk prevention program in the Pleven region, optimize the reduction of fire-fighting behaviour and to optimize preventive medical practices to protect the population in cases of outbreak of fires.

MATERIAL AND METHODS

From archival data of the Department of Forensic Medicine and Deontology of the Medical University of Pleven 74 forensic examinations of the corpse, persons who died in fire outbreaks for the period 2008-2017 were studied. Data stored both electronically and in a computer is processed with Microsoft Excel and SPSS19. The database of the region and the country on the registered fires and about victims of fires from National statistical institute (NSI), the *Ministry of Interior Affairs (MoIA)*, Bulgarian Academy of Sciences (BAS) and the European Forest Fire Database (EFFD) have been investigated and analyzed. Archival-documentary and statistical methods of study were used. [6-12]

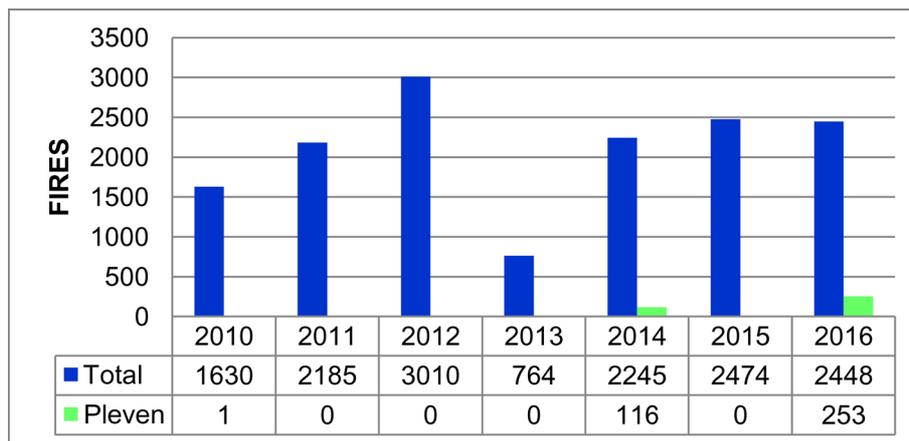
RESULTS AND DISCUSSION

Fires occupy a serious share of disasters in Bulgaria. The most affected by fires for the last ten

years is Stara Zagora region - more than two thousand fires. In figure 1 the absolute values of serious fires on the territory of the country summed up by years for the period 2010-2016 is presented. Special interest in the context of the current purpose and tasks is assigned to the number of fires in the Pleven region for the same period. The presented figure is entirely based on the fire reports submitted by the regional administrations for the period indicated (NSI database). [6]

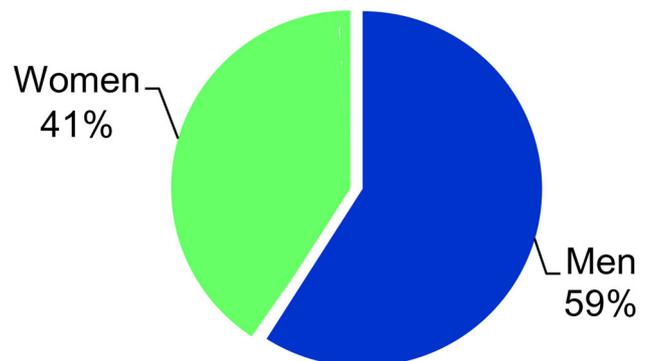
Nearly ten times larger the number of fires for the country in comparison with the number of Pleven only in 2016 is reported. For the study area, there is a doubling of the number of fires in 2016 compared to 2014. Increasing the number of fires also affects the health status of the population and public health and is also a challenge for medical professionals and the medical prevention of life and health of the nation. (fig. 1.)

Fig. 1. Number of fires for the country and Pleven region for the period 2010-2016 (absolute shares; according to NSI database)



In an outbreak of fire injuries, deaths are seen as irreversible losses. They constitute 5.8% of all cases of violent death in the Pleven region and 3.8% of all forensic medical autopsies for the study period in the region. [6] The distribution of victims of fires in the region by sex in Figure 2 and age in Table 1 are of interest to the survey. (fig. 2.)

Fig. 2. Victims of fires in Pleven region according to sex for the last ten years. (relative shares, original study)



The distribution of victims by sex is male - 44 (59.5%) and women - 30 (40.5%). The male to female ratio is approximately 1.5: 1. The distribution by age group is as follows: (table. 1.)

Table 1. Distribution of deaths in fires in Pleven region for the last ten years by age (original study) compared to NSI database for the country.

Age	Pleven region Victims number (own surveys)	Period 2008-2017, Bulgaria, (NSI)	
		Died	Injured
Up to 18 years old (children)	0	50	217
18 – 30	8	343	1605
30 - 40	3		
40 – 50	3		
50 – 60	11		
60 - 70	10	177	379
70 - 80	19	416	568
More than 80 years old	20		
Total	74	986	2769

*National NSI database for the country for the survey period.

Data show that more than half cases (about 53%) of deaths in fire outbreaks are over 70 years of age in the Pleven region. Compared to this, about 42% of deaths in the case of fires above the age of 70 for the territory of the country are reported. An interesting fact is that in Pleven region, there are no registered cases of children killed in fire (age 18) compared to the country's data - 50 deaths in fires. It is noteworthy that for Pleven region, people in active working age who died in fires were 25 (34%) compared to the country - 343 (about 35%). The tendency for working age in Pleven region is roughly the same as for the whole country - about 1/3. Total for the surveyed period 74 (7.5% total) people died in fires in the Pleven region and 986 in the country (according to NSI data). [6]

The number of injured (NI) for the country in fires according to NSI data is about three times higher than the number of died (ND) - NI:ND = 3:1. In fires according to their place of residence, 31 (42%) died in the cities, and 43 (58%) were rural inhabitants died (fig. 3).

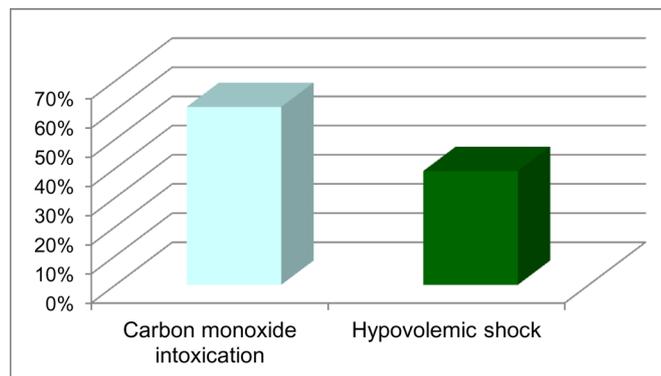
Fig. 3. The irretrievable losses in fires in the Pleven district, distributed in towns and villages for the last ten years (relative shares, original study)



According to national statistics, the rural population in the Pleven region in 2016 occupies only 33.5%. [13,14] This means that, in relation to the total population, the rate of irretrievable fire loss among rural residents is much higher.

As the leading cause of death in 45 cases (60.8%), it was assumed that carbon monoxide poisoning (and other toxic gases) was considered, and in the remaining 29 (39.2%) cases, the leading cause of death was accepted thermal injury (body burn) in the shock phase due to the fact that the established blood glucose concentration in the blood was at lower (non-lethal) concentrations. The country's available database indicates that over 70% of the victims of fires are poisoned as a result of combustion products containing 50-100 kinds of chemical compounds but mainly due to carbon monoxide. (fig. 4.)

Fig. 4. The irretrievable losses in fires in Pleven region, distributed according to the established cause of death. (relative shares, original study)



According to the study, according to the type of violent death, 72 (more than 95%) perished are unfortunate. There are two cases of suicide by self-immolation. There are no proven deaths in fire outbreaks due to murder. Determining the genus of violent death is a legal issue, the clarification of which is mainly assisted by forensic expertise. Except for the benefit of the investigation, its results may also have a place in the socio-ethical prospects of preventing mortality due to fires. The study also clarified the structure of the place of occurrence of fires in the Pleven region and the number of died persons (Table 2.).

Table 2. Distribution of the number of persons killed in fires in the Pleven region and type of fire incidents. (Original study)

Died number	Fire accident	Place
9	Fire in a train	Sofia-Kardam
4	Fire at crash	Pleven region
1	Fire in stubble	Pleven region
1	Fire in a wagon	Pleven region
59	Fire in residential buildings	Pleven region

The locations of fires have the following structure:

- in the event of the fire on the Sofia-Kardam train in the night of 28-29 February 2008 - 9 died;
- in fires occurring during the crash – 4 fires, 4 died. In two cases the cars with a gas bottle are reported;
- in stubble fires - 1 killed (unregistered occupational accident);
- in fires in a wagon of a self-made oil burner - 1 perished (officially registered occupational accident);
- In the remaining 59 dead, the fires occurred in the lodging. In two of them - two people died; in other cases, it is about lonely living, elderly people who died in fires in their homes.

The causes of the fires cannot always be established. According to the fire-fighting experts, 15 of the fires in the dwellings were caused by faulty heating appliances and 6 by an ignited cigarette (most often after alcohol use, cigarette burning, falling asleep and subsequent fire). Other cases are due to solid fuel stoves in the dwelling, more in the villages. According to the available data of the Min-

istry of the Interior, and according to the cause of fires in Bulgaria for the studied period, it is mainly “Unspecified cause - less than 1/5” and “Negligence - close 1/4”, but is defined as “Intentional cause in over 6% of cases”. According to data, technical cause account for less than 1/5 of the fires, and due to natural phenomena below 1%. [7] In 19 of the dead (25.7%) in the chemical examination of blood taken from the autopsy, alcohol was found. Four people died from alcoholism (blood alcohol concentration between 0.5 and 1.5), 5 for average alcohol consumption (1.5-2.5 mg) and 10 for severe alcoholic absorption (over 2.5 washes of alcohol in the blood). Alcoholic drinking has undoubtedly played a significant role both in the occurrence of the fire and the onset of death.

CONCLUSION

Our survey covers a small territory and population from the Republic of Bulgaria (area 4337 km² and population 248 138 people, 31 December 2016), which does not allow cardinal summaries to be made. However, the results of this regional study should be taken into account when

preparing fire-fighting and mortality measures. The Forensic Statistics in Pleven show the following:

1. Victims of fires are 5.8% of all cases of violent death and 3.8% of all forensic autopsy in Pleven region.

2. As mischance, 95% the cases are determined.

3. Most of the died are men - almost 60%, over the age of 70 - are more than 50% and living in the villages - nearly 60%.

4. In the event of fires in the dwelling die more than 80%.

5. More than ¼ of the victims are under alcohol impact.

6. In over 60% of cases, carbon monoxide intoxication is identified as the cause of death in fires in the region.

RECOMMENDATIONS

Special attention and care by the civil service (branches, social, health and fire departments) and public organizations (BRC, NGOs and foundations) should be addressed to the elderly and lonely living people, mostly in the villages, and their winter heating and the operation of the heaters. These are promising preventive measures that ensure a reduction in the number of victims in fires in the region.

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Address for correspondence:

Dr. Diana Dimitrova, PhD.

Department of Preventive medicine, Faculty of Public Health, Medical University - Sofia

8, Bialo more str., 1527 Sofia, Bulgaria

E-mail: d.dimitrova@foz.mu-sofia.bg