SUDDEN DEATH PARTICULARITIES

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Abstract: *Purpose: Sudden death is a phenomenon of main interest for forensic medicine. Its causes are heart-related, digestive, respiratory, meningo-encephalitis, infectious etc. Materials and methods: We performed a retrospective longitudinal study over a period of 10 years, on a total of 946 cases within the casuistry of Sibiu County Forensic Service. We aimed at epidemiological distribution by age, gender, origin environment, seasonality, distribution of cases according to the location of death, the presence/absence of alcoholic intoxication and at the correlation of the obtained data with that from literature. Results: The study revealed that sudden deaths in men have a share of about three times higher than in women; it has been found a double number of cases in urban areas, with a maximum incidence in the age group of 50-59 years. Most deaths occurred in the winter months. As the cause of death in over two-thirds of the cases it was due to cardiac pathologies. The article has been elaborated as part of doctoral research.*

INTRODUCTION

The World Health Organization (WHO) defines sudden death as death occurring within less than 24 hours of the onset of symptoms, when death does not occur instantly, is secondary to cardiac pathologies, nor it is linked to the sudden infant death syndrome (SIDS) (International Statistical Classification of Diseases, 10th revision [ICD-10] code R96.1).(1,2)

The definition of sudden heart-related death includes the death that occurred in less than one hour of the onset of symptoms (ICD-10 code I46.1). However, there are some authors who consider as sudden death, the death occurring immediately instantly after the appearance of symptoms.(3,4)

Occurrence of sudden death in apparent full health status represents about 14% of all deaths, thus constituting a public health problem, which requires identification of the risk factors and taking preventive measures.(4,5)

Sudden death is estimated to represent 20% of total mortality in industrialized countries and 30% of pathologic deaths, cardiovascular diseases ranking first among the causes of death (80%). Coronary ischemia is responsible for 90% of sudden deaths. The maximum frequency of sudden death is, therefore, between 50 and 60 years old with the current trend of decreasing below the age of 50. Sudden death has, moreover, two peaks: between 0 and 6 months old and between 40 and 60 years old. After 70 years old, the sudden death by coronary accidents has a lower weight. Stroke is more frequently found in age group.(6,7,8)

The causes of sudden heart-related death include: myocardial infarction, hypertension; valvular diseases; bacterial endocarditis; cardiac toxicity induced by drugs (cocaine, anthracyclines).(7,9,10)

Pulmonary pathology responsible for sudden death can include the following conditions: epiglottitis, pulmonary embolism, asthma, pneumonia etc.(11,12)

At central nervous system level, the disorders involved in sudden death are: epilepsy, cerebral hemorrhage, brain tumours, meningitis, hydrocephalus etc.(1,11,12)

Sudden deaths due to digestive disorders can be caused by: tumours, peritonitis secondary to gastric ulcers or perforated duodenal ulcers.(8,11)

The etiology of sudden deaths mentions infectious causes, disorders of the hematopoietic system, of the genitourinary tract and endocrine causes.(1,6,7)

PURPOSE

The paper aims at identifying the etiologic and clinical pattern of sudden deaths in the county of Sibiu.

MATERIALS AND METHODS

It is a retrospective study of 946 cases of sudden deaths recorded in Sibiu County Clinical Service for a period of 10 years (2006-2015). There were studied autopsy reports, toxicological analysis reports and observational sheets for the period taken into study.

RESULTS AND DISCUSSIONS

Following the distribution of cases by gender of the deceased, it was found a number of 737 (77.90%) men and 209 (22.09%) women, which is consistent with data from the literature.

The distribution of cases by area of origin of the deceased revealed a higher proportion of people in urban area, 62.36%, compared to rural areas, where there were only 37.63% deaths.

Table no. 1. Distribution of sudden deaths according to victims' area of origin

Area of origin	No.	%
Urban	590	62.36%
Rural	356	37.63%
Total	**946**	**100%**

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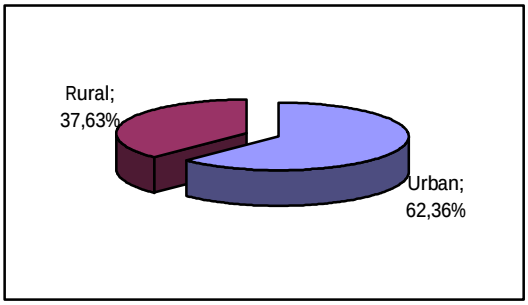
Figure no. 1. Distribution of sudden deaths according to victims' area of origin

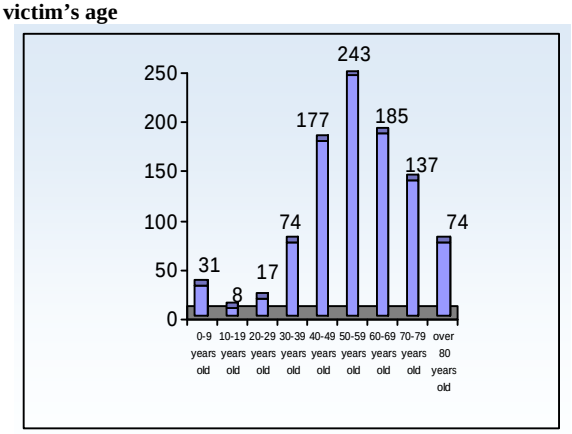


The maximum weight of sudden deaths was recorded in the age group of 50-59 years, 25.68%, followed in terms of weight, by the share of deaths in people aged 60-69 years old (19.55%), respectively, 40-49 years old (18.71%). A large number of cases was recorded in the age group of 0-9 years old (3.27%). Equal weights were found in age groups of 30-39 years old and over 80 years old (7.82%). In approximately 2% of cases (1.79%), sudden deaths were recorded in young people aged 20-29 years old.

Table no. 2. Repartition of sudden deaths according to victim's age

Age	No	%
0-9 years old	31	3.27
10-19 years old	8	0.84
20-29 years old	17	1.79
30-39 years old	74	7.71
40-49 years old	177	18.71
50-59 years old	243	25.68
60-69 years old	185	19.55
70-79 years old	137	14.48
Over 80 years old	74	7.82
Total	**946**	**100.00**

Figure no. 2. Repartition of sudden deaths according to victim's age

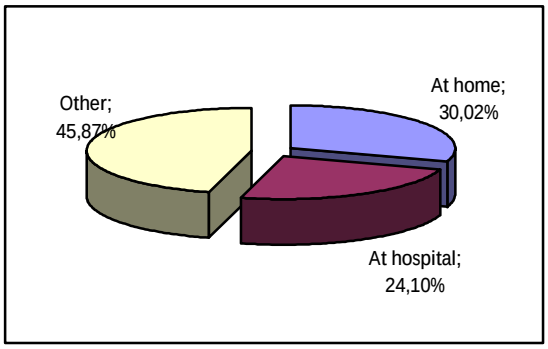


The place of death was another parameter studied. Thus, in about one third of cases (30.02%), death occurred at the victim's home. A quarter of deaths (24.10%) occurred in a hospital. In most cases, over 45% (45.87%), death occurred outside the two locations mentioned above, namely in the area of residence, on the street, at work etc.

Table no. 3. Repartition of sudden deaths according to the place when death occurred

Place where death occured	No.	%
At home	284	30.02%
At hospital	228	24.10%
Other	434	45.87%
Total	**946**	**100%**

Figure no. 3. Repartition of sudden deaths according to the place where death occured

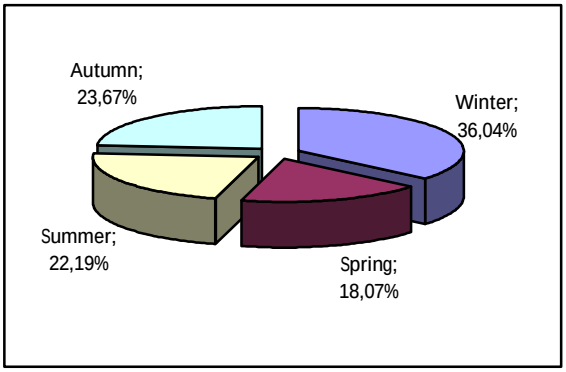


Following the distribution of cases according to the season in which they occurred, we obtained a maximum incidence of 50% during winter, autumn-winter (36.04% in winter season, 23.67% in autumn season). The fewest cases, 18.07% were recorded in spring, followed in terms of percentage by those recorded in summer, 22.19% cases.

Table no. 4. Repartition of sudden deaths according to the season in which deaths occurred

Season	No.	%
Winter	341	36.04
Spring	171	18.07
Summer	210	22.19
Autumn	224	23.67
Total	**946**	**100%**

Figure no. 4. Repartition of sudden death according to the season in which sudden death occurred

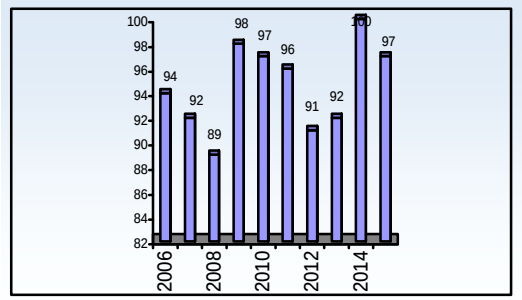


Distribution of sudden deaths per years, during 2006-2015 showed a decline during 2006-2008, respectively during 2009-2012, (from 9.93% in 2006 to 9.40% in 2008, and from 10.35% in 2009 to 9.61% in 2012). Minimum incidence of sudden death was recorded in 2008 (9.40%), and the highest in 2014 (10.57%). In the last year of study, the number of deaths has been decreasing (10.25%) compared to the previous year.

Table no. 5. Repartition of sudden deaths per years within the analysed casuistry during 2006-2015

Year	No.	%
2006	94	9.93
2007	92	9.72
2008	89	9.40
2009	98	10.35
2010	97	10.25
2011	96	10.14
2012	91	9.61
2013	92	9.72
2014	100	10.57
2015	97	10.25
Total	**946**	**100.00**

Figure no. 5. Distribution of sudden deaths with traumatic determinism per years in the studied cases during 2006-2015

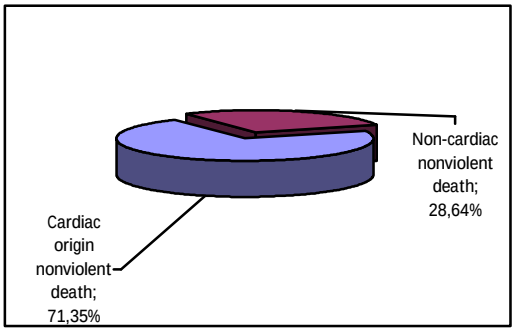


The medical cause of death was also analysed in the present study. Of the total sudden deaths, over 70% (71.35%) had occurred secondary to cardiac etiology, the rest (28.64%) were due to non-cardiac pathology (digestive, respiratory, meningo-encephalitis etc.).

Table no. 6. Distribution of sudden deaths according to the cause of death

Cause of death	No.	%
Of cardiac origin	675	71.35%
Of non-cardiac origin	271	28.64%
Total	**946**	**100%**

Figure no. 6. Distribution of sudden deaths with traumatic determinism in the studied cases during 2006-2015



CONCLUSIONS

- The percentage of sudden deaths occurred in males was about three times higher than in the opposite gender.
- Most sudden deaths, with an incidence almost double, were recorded in urban areas.
- The age group of 50-59 years has the highest incidence. In about 5% of cases, death was recorded in minors aged 0 to 18 years.
- Depending on the place where death occurred, in more than two thirds of cases this occurred in the person's home or in a hospital.
- The maximum weight of sudden deaths was recorded in the winter season, followed by autumn in terms of frequency.
- In the studied cases we observed a fluctuating evolution of sudden deaths with a minimum incidence in 2008 and a peak in 2014.
- In 70% of cases, cardiac pathology was the cause of death.

REFERENCES

1. Schoppe CH, Denton JS. Pathology of Sudden Natural Death. http://emedicine.medscape.com/article/1680282-overview#a2.
2. Christiansen LR, Collins KA. Natural death in the forensic setting: a study and approach to the autopsy. Am J Forensic Med Pathol. 2007 Mar 28(1):20-3. [Medline].
3. Leoveanu IHT. Moartea subită cardiacă în medicina legală. Amanda Edit: Bucureşti; 2014. http://86.125.112.199/vlib/Moartea.pdf.
4. Centers for Disease Control and Prevention. Injury prevention & control: data & statistics (WISQARS) (2010). Available at http://www.cdc.gov/injury/wisqars/index.html. Accessed: September 26, 2011.
5. Chugh SS, Reinier K, Teodorescu C, et al. Epidemiology of sudden cardiac death: clinical and research implications. Prog Cardiovasc Dis. 2008 Nov-Dec. 51(3):213-28. [Medline].
6. Darke S, Duflou J, Torok M, Prolov T. Characteristics, circumstances and toxicology of sudden or unnatural deaths involving very high-range alcohol concentrations. Addiction. 2013 Aug. 108(8):1411-7. [Medline].
7. Pilgrim JL, Woodford N, Drummer OH. Cocaine in sudden and unexpected death: a review of 49 post-mortem cases. Forensic Sci Int. 2013 Apr 10 227(1-3):52-9. [Medline].
8. World Health Organization. Global status report on alcohol and health 2011. Geneva: World Health Organization. 2011. p.1-53. Extras din URL: http://www.who.int/substance_abusea...pdf; accesat la 22 martie 2012.
9. Adabag AS, Luepker RV, Roger VL, Gersh BJ. Sudden cardiac death: epidemiology and risk factors. Nat Rev Cardiol. 2010;7:216-25. Medline
10. Selcuk Adabag A, Peterson G, Apple FS, Titus J, King R, Luepker RV. Etiology of sudden death in the community: Results of anatomical, metabolic, and genetic evaluation. American Heart Journal. 2010;159(1):33-39.
11. Morar S. Medicină Legală. Curs partea I și II. Editura Universității Lucian Blaga: Sibiu; 2006.
12. Enache A. Medicină legală. Curs pentru studenții facultăților de medicină. Editura MIRTON: Timișoara; 2005.