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DOCTORAL THESIS

ABSTRACT

**CONTRIBUTIONS ON THE ROLE OF FORENSIC EXPERTISE IN
MONITORING STUDIES IN THE FIELD OF OCCUPATIONAL
SECURITY AND HEALTH**

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INTRODUCTION

Occupational medicine is an essential component of occupational health and it is also situated at the interface with forensic medicine. In this respect, we mention a significant element, namely the „working conditions” that are likely to interfere with the health status as follows:

- Workplace accidents, including acute intoxications
- Professional diseases
- Diseases influenced by the place of work (23)

So far, there have been recorded enormous quantitative accumulations and qualitative increases in all the spheres of human activity. Important progress has been made in terms of understanding the macro and micro cosmos, starting with the deciphering of galactic clouds and antimatter, and continuing with the intracellular intimacy of genetic mechanisms.

Yet, every day all over the world there are workers who do not return home from work because of workplace accidents and professional diseases.

PART I

THE STATE OF ART REGARDING THE FIELD KNOWLEDGE CHAPTER 1

1.1. The issue of accidents and deaths at work in Romania

Promoting a strategy at a national level in order to reduce the incidence of workplace accidents and the number of victims (dead and wounded), as well as sudden death at work place (16) must start from the idea that a policy of preventing and fighting against the alarming phenomenon of workplace accidents is much more efficient and less expensive than the costs generated by their consequences, especially when referring to a country with economic difficulties, such as Romania. Moreover, taking into account the EU target on labor safety – reducing by half the number of the victims of workplace accidents until 2020 – as a perfectly

justifiable and legitimate target for the following years, Romania has the duty of thoroughly structure its strategic policy regarding labor safety, occupational health, accident prevention and employees training, as sectorial aims without which desired goals cannot be achieved. (11, 12, 13)

In economically developed countries where urbanization and industrialization have reached high levels, there have been and still are constantly adopted policies to ensure and promote standards of work safety. Thus, in France, Sweden, Finland, and Great Britain traffic safety campaigns bring along a significant decrease of the number of accidents / victims, despite the increase of amount of work. (1, 9, 19, 20)

1.2. Definition of work accidents

As phenomenon, cause and implications, workplace accidents represent the intense and profound research object of several scientific disciplines.

Generally speaking, by workplace accident we refer to a violent damage of human body, acute professional intoxication included, which may lead to temporary work disability (TWD) for at least 3 working days, invalidity (INV) or death (D). (Art. 5(g), of Law 319/2006). However, there are extremely rare cases when these events are not accidental, as some of them are suicidal or criminal actions. Differentiation can be difficult, but nevertheless achievable by following all the steps of expertise, as well as by research in site, which allows data collection in conjunction with the victim's lesions and the physical environment where the event occurred (33).

1.3. Dynamics of work accidents in Romania

Work safety and health have known a significant development in the past 10 years detectable in a reduction of the number of work accidents. In the past 20 years, a relatively continuous urbanization and economic growth has led to an increased amount of work. (14, 15)

In 2005 there were registered 519 deaths caused by workplace accidents, a significant decrease compared to the previous years. The year 2006 continued the tendency of progressive

decrease of deaths caused by work accidents. The total number of cases was 473. In 2007 there were 455 deaths following work accidents. The value recorded in 2012 and 2013 falls into a slow downward trend with a number of 282, respectively 250 deaths due to workplace accidents. (21, 24) All these aspects are illustrated in the following charts:

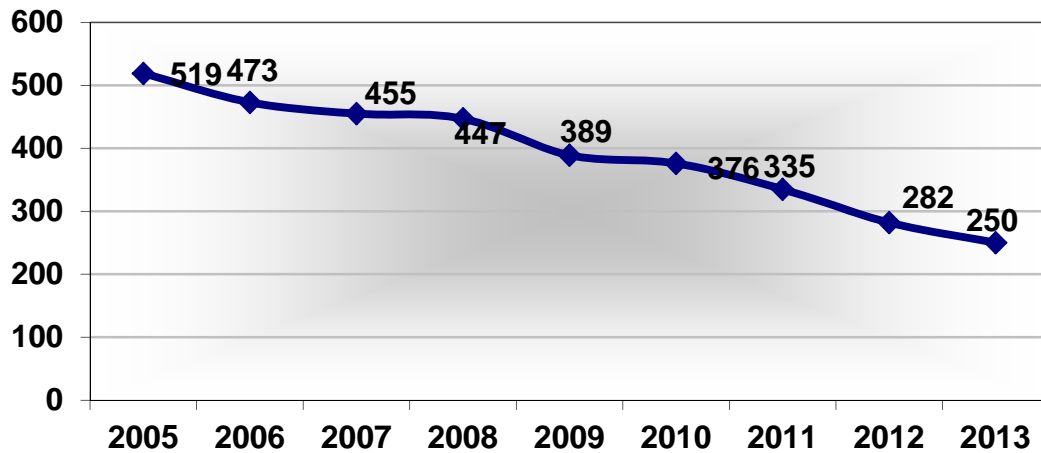


Figure nr. 1. Dynamics of mortality due to workplace accidents in Romania in 2005-2013

1.4. Determinism of work accidents

1.4.1. The role of alcoholism in work accidents

In terms of the negative role of alcohol, the statistic data reveals that the number of victims handling equipment under the influence of alcohol and cause accidents is around 10%. (2, 3)

Resorption rate is influenced by the strength of the alcoholic beverage, as well as by the consumed quantity and the stomach fullness at the time of consumption. To these one should add the individual factors related to the consumer's health status. The following charts come to exemplify the values of consumed alcohol amount (table 4) and the relation to neuropsychiatric disorders that are likely to occur:

Table nr.1: Relation between consumed quantity of alcohol and the value of alcohol amount (W=women; M=men)

Pure alcohol (g)	Consumed quantity	Level of alcohol amount (g‰)					
		46 kg		69 kg		92 kg	
		F	B	F	B	F	B
14	1 dose spirt (28 g alcohol)	0,	0,	0,	0,2	0,	0,19
	1 glass of wine	45	37	30	5	22	
	1 bottle of beer						
28	2 -//-	0,	0,	0,	0,5	0,	0,37
		90	75	60	0	45	
57	4 -//-	1,	1,	1,	1,0	0,	0,70
		80	50	20	0	90	
85	6 -//-	2,	2,	1,	1,5	1,	1,10
		70	20	80	0	30	
113	8 -//-	3,	3,	2,	2,0	1,	1,50
		60	00	40	0	80	
142	10 -//-	4,	3,	3,	2,5	2,	1,80
		50	70	00	0	20	

(source: GRADINARU C., Medico-social aspects of car accidents, Ed. Sport-Turism, Bucharest, 1977) (10)

CHAPTER 2: FORENSIC EXPERTISE

2.1. Definition of forensic expertise

Forensic expertise is an official medical and judicial action which represents significant evidence in the court in criminal and civil law cases, as well as in notarial cases. Actually, the forensic expertise is an interdisciplinary binder with probative value that certifies a series of obvious facts at the time of factual examination. (4, 5, 6, 22).

2.2. Classification of forensic examinations

The classification of forensic examinations is described in literature (22) according to article 12 of the procedure regulations of the law in force, which states that the forensic examinations and researches include:

- a. examinations and researches on human corpses or parts thereof;
- b. examinations and researches on cadaverous and biological products;
- c. examinations and researches on live persons;
- d. examination of medical and forensic works in relation to the expertise and the forensic activity.

2.3. Forensic expertise of work capacity

Forensic expertise of work capacity becomes necessary when the legislative field requires the demonstration of a certain deliberate prejudice to a person who can no longer perform their normal activities at work. This type of expertise will assess the degree of loss of work capacity in relation the person's condition prior the damaging event (6).

Work capacity expertise is relevant in terms of both criminal and civil law. In terms of criminal expertise, forensics must assess the consequences that led to the occurrence of a certain trauma, based on legislative regulations (art. 998 and art. 999 Cod Civil) (17), which state the fact that the prejudice must be fully repaired. In terms of civil law, forensic expertise of work

capacity is issued in cases of obligation to maintenance for persons that are to be financially supported and it is meant to establish whether the paying person is able to make additional income. (29, 30, 31, 32).

PART II: PERSONAL RESEARCH

CHAPTER 3: METHOD OF RESEARCH

3.1. Work hypothesis

The present study refers to professional accidentology as an extremely important field of contemporary public health, with major consequences within all sectors: economic, social, juridical, and political, since the concern for occupational health and safety improvement is a legitimate priority for administrations all over the world.

Work accidents imply important expenses at society, firm or organization level, as well as due to the suffering and individual disabilities which can severely and often irremediably affect the lives of the victim and their family.

Currently, there are no scientifically confirmed studies in Romania regarding the proportions and the characteristics of this specific pathology at economic level or any other type of activity, community or country. Also, we lack an instrument capable to integrate the results of the researches in the field of health assistance with those of others involved in the promotion of occupational health (political factors, employers, supervisors, and civil society) (25, 26, 27)

The choice of the research theme had as a starting point the awareness of these gaps of information and research methodology, which underlined the role that the holistic studies might have in the identification of the main issues of work safety and health, at economic and community level.

3.2. The purpose of the work

The hereby research aims at a dynamic clinical-epidemiological approach of the consequences of work accidents that would allow the structural and functional integration of recorded phenomena in the field of health care within the monitoring studies of multi sectorial consequences of work accidents at national level.

3.3. Objectives

- Assessment of medical-social consequences of workplace accidents
- Assessment of the implications of alcohol consumption in workplace accidents
- Assessment of work capacity of surviving victims from the point of view of occupational medicine and forensic expertise
- Sudden death at the place of work and outside the place of work
- Formulating specific suggestions concerning the management of work accidents on different levels of intervention.

3.4. Material and work method

The research was conducted within the Clinical Forensic Service of Sibiu County and the Sibiu Territorial Labor Inspectorate, with the management's approval regarding the purpose and the method of study.

The studied material is represented by the info biographical and medical data which allow the correlation of social consequences with forensic and occupational medicine issues regarding the victims of workplace accidents.

The method is the observational study based on a retrospective longitudinal investigation, with full research of the study material in 2005-2013. (8)

The gathering of information was achieved by accessing the following documents:

- Forensic certificates, Fact-finding reports, Autopsy reports, Expertise reports, Toxicology test reports, Clinical examination report existing in the Archive of Clinical Forensic Service of Sibiu County;
- Medical and juridical documents submitted at the Department for Criminal Investigation with reference to workplace accidents.
- Registration forms of workplace accidents filed in the Archives of the Territorial Labor Inspectorate of Sibiu County.

The study is focused on two directions:

1. Identification and quantification of medical-social consequences of workplace accidents;
2. Assessment of social implications of workplace accidents;

Information processing was preceded by quantitative certification (inventory of documents and accurate data registration). No observation errors or incompatibilities were remarked. The material has been managed by combined and repeated groups, according to the main quantitative particularities (environment of origin, age group) and qualitative (sex, diagnosis, medical cause of death, types of lesions, etc.).

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1. Assessment of medical and social consequences of work accidents

During the period of 2005-2013, within the Clinical Service of Forensics in Sibiu County and the Forensic Cabinet in Mediaş, a number of 19593 of forensic documents have been issued, referring to a number of 16490 living persons and 3103 dead persons. A number of 1006 documents (5.13%) referred to victims of work accidents. For surviving victims of work accidents a number of 917 forensic documents have been elaborated (91.5% of the total). These were represented by 625 (62,12%) documents on request (forensic certificates) and 292 (29,02%) documents on request of the Criminal Investigation Authorities (Forensic / finding report). For

the deceased victims of work accidents 89 autopsy reports have been issued during the study period (8,86%).(7)

Table no. 2. Percentage of types of forensic papers referring to victims of work accidents during the period of 2005-2013

Nr. crt.	Cause of injury	Type of forensic paper					
		Surviving victims				Deceased	
		E/FR		FC		AR	
		Nr.	%	Nr.	%	Nr.	%
1	Workplace accidents	292	11.03	625	4.51	89	2.86
2	Other causes	2353	88.97	13220	95.49	3014	97.14
3	Total	2645	100	13845	100	3103	100

(E/FR = Expertise / Finding Report, FC = Forensic Certificates, AR= Autopsy Reports)

4.1.1. Identification and quantification of medical and social consequences in surviving victims of work accidents

Out of the 16490 forensic papers referring to living persons, 917 were issued for victims of work accidents (5.56%).

Table no. 3. Percentage of forensic papers in surviving victims of work accidents during 2005-2013

Nr. crt	Cause of injury	Number of cases	Percentage (%)
1	Work accident	917	5.56
2	Other causes	15573	94.44
3	Total	16490	100

Chart no. 2. Percentage of forensic papers in surviving victims of work accidents during 2005-2013

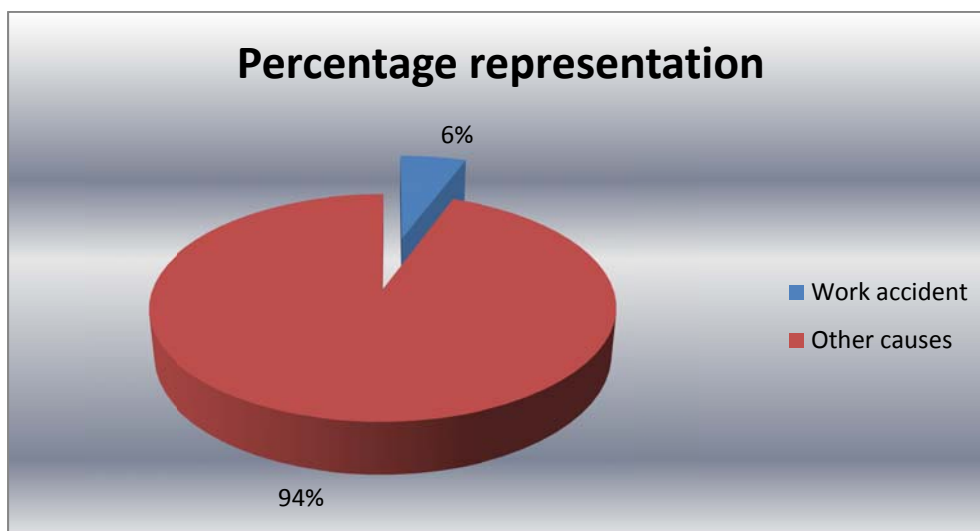
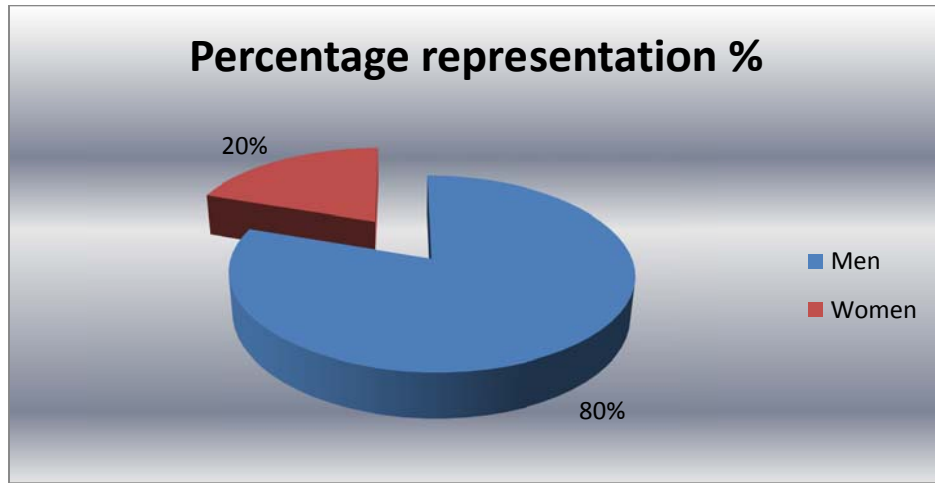


Table no. 4. Gender distribution of surviving victims of work accidents

Nr. crt	Victim's gender	Number of cases	Percentage (%)
1	Men	736	80
2	Women	181	20
3	Total	917	100

Chart no.3. Gender distribution of surviving victims of work accidents

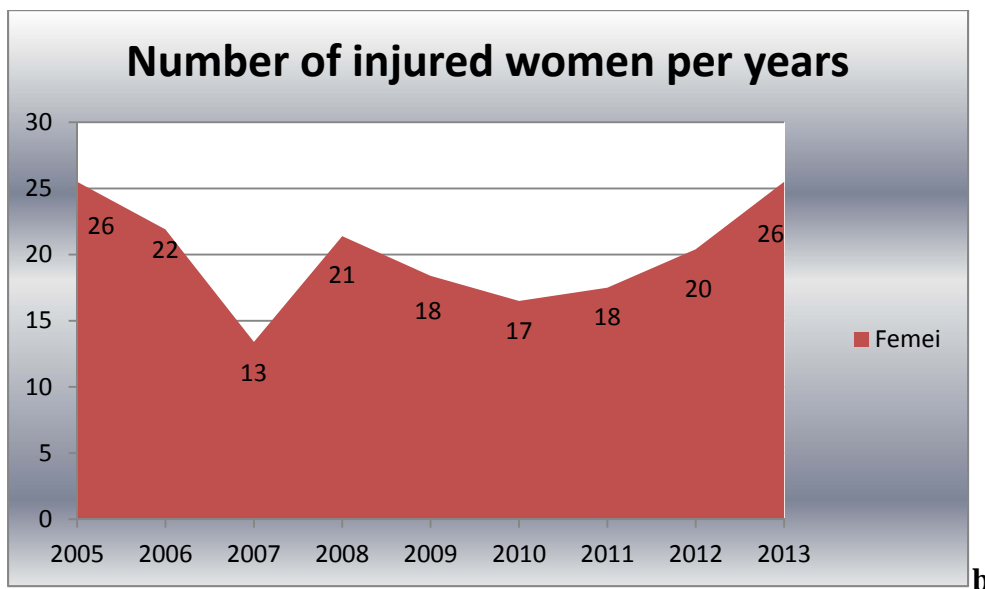
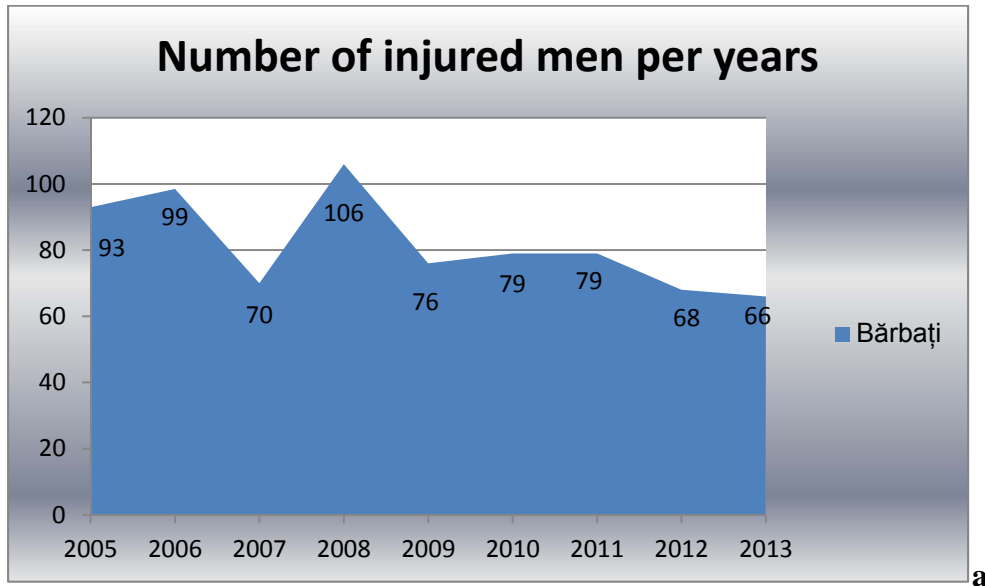


Men represent 80% of the surviving victims of work accidents due to the fact that they are more involved than women in professions with a higher degree of risk and danger.

Table no. 5. Dynamic of gender distribution of surviving victims of work accidents

Nr. Crt.	Year	Number of injured males	Number of injured women	Percentage of injured men (%)	Percentage of injured women (%)
1	2005	93	26	12.64	14.36
2	2006	99	22	13.45	12.15
3	2007	70	13	9.51	7.18
4	2008	106	21	14.40	11.60
5	2009	76	18	10.33	9.94
6	2010	79	17	10.73	9.39
7	2011	79	18	10.73	9.94
8	2012	68	20	9.24	11.05
9	2013	66	26	8.97	14.36
10	Total	736	181	100.00	100.00

Chart no.4 a, b: Dynamic of gender distribution of surviving victims of work accidents

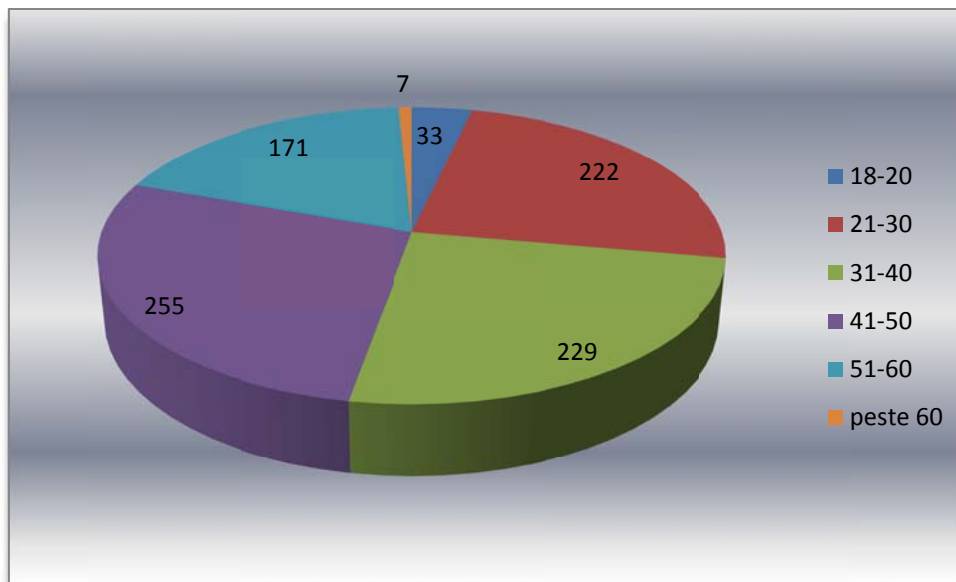


The number of male and female victims had a proportional progress in the interval 2005 – 2011 and then registered a decline in case of men and an increase in case of women.

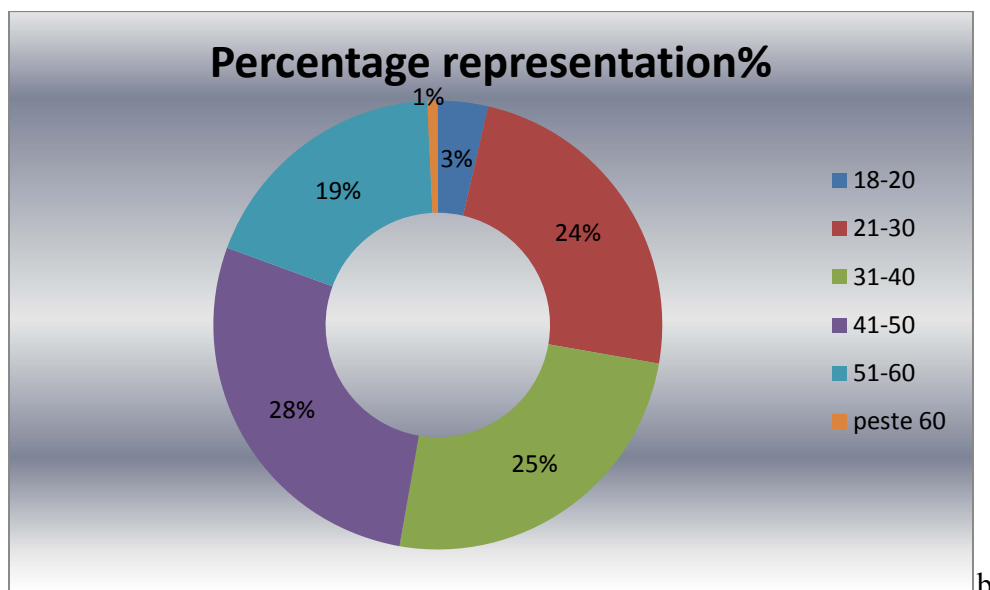
Table no. 6. Age distribution of surviving victims of work accidents

Nr. crt	Age group (years)	Number of cases	Percentage (%)
1	18-20	33	3.60
2	21-30	222	24.15
3	31-40	229	24.97
4	41-50	255	27.86
5	51-60	171	18.65
6	>60	7	0.76
7	Total	917	100

Chart no. 5 a, b: Age distribution of surviving victims of work accidents



a

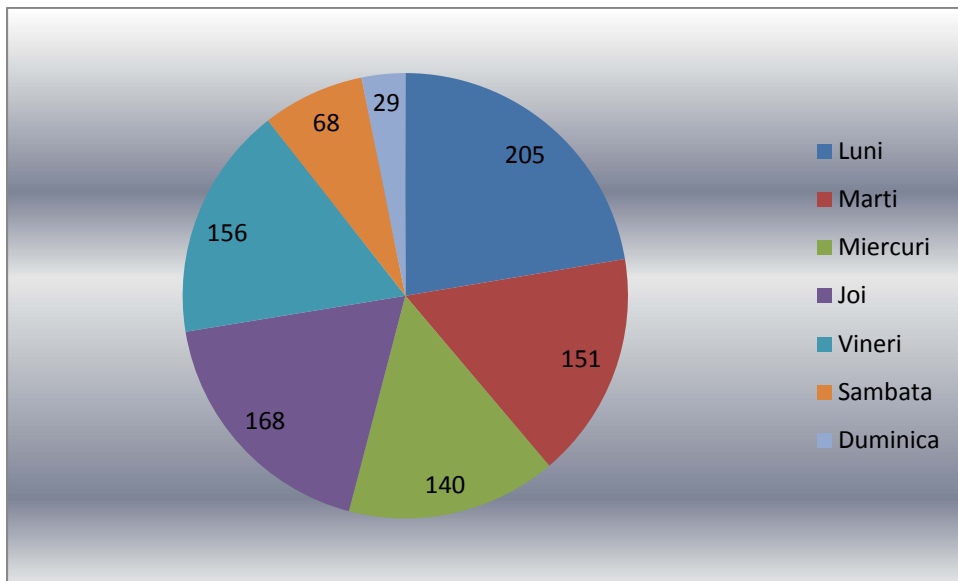


Half of the forensic examinations for surviving victims of work accidents refer to adults between 31-50 years, most of them with years of service in employment. The survey data confirm the conclusions provided by literature, thus stating once more the enormous impact of work accidents on the socially active labor force. (28)

Table no. 7. Distribution of the surviving victims of work accidents according to the weekday

Nr. crt	Weekday	Number of cases	Percentage (%)
1	Monday	205	23
2	Tuesday	151	16
3	Wednesday	140	15
4	Thursday	168	18
5	Friday	156	17
6	Saturday	68	8
7	Sunday	29	3
8	Total	917	100

Chart no. 6. Distribution of the surviving victims of work accidents according to the weekday



The dynamic of work accidents on weekdays is relatively constant in the range 15-18%, with a 23% peak that corresponds with Monday.

Table no. 8. Distribution of surviving victims of work accidents according to the number of worked days per week

Nr. crt	Worked days/ week	Number of cases	Percentage (%)
1	3 zile	2	0.22
2	4 zile	2	0.22
3	5 zile	783	85.39
4	6 zile	97	10.58
5	7 zile	33	3.60

6	Total	917	100
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Chart no. 7. Distribution of surviving victims of work accidents according to the number of worked days per week

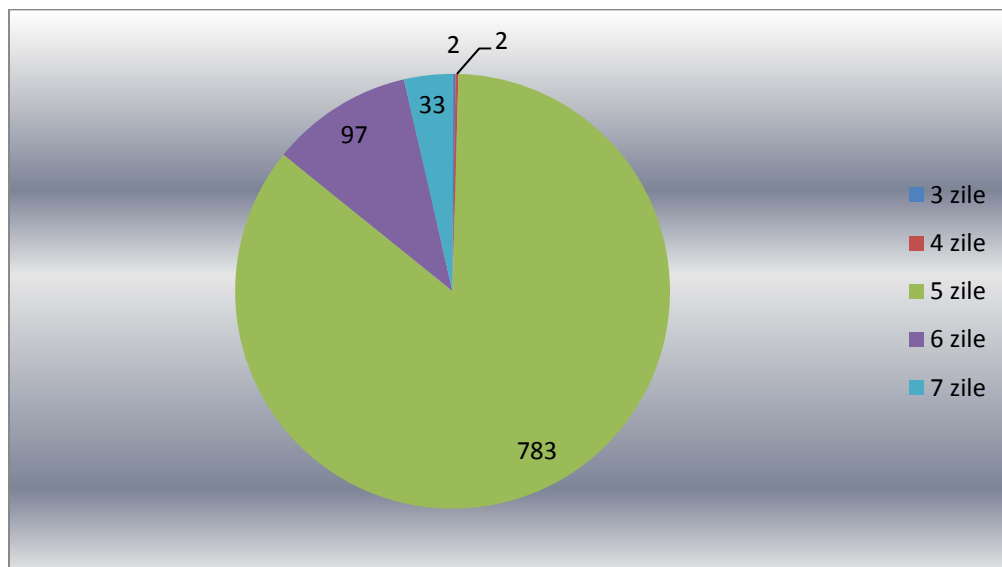
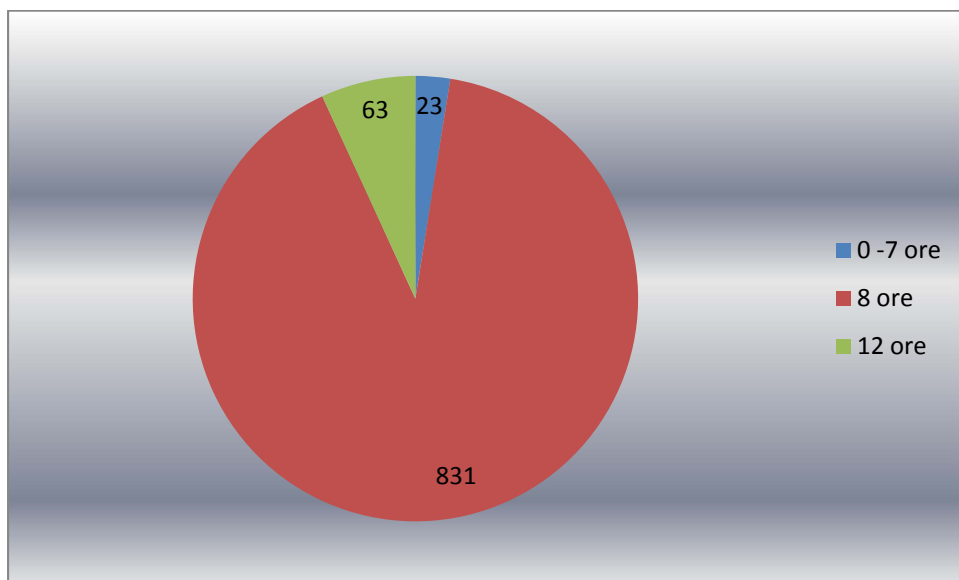


Table no. 9. Distribution of the surviving victims of work accidents according to number of worked hours per day

Nr. crt	Number of hours/ day	Number of cases	Percentage (%)
1	0 -7 ore	23	2.51
2	8 ore	831	90.62
3	12 ore	63	6.87
4	Total	917	100

Chart no. 8. Distribution of the surviving victims of work accidents according to number of worked hours per day



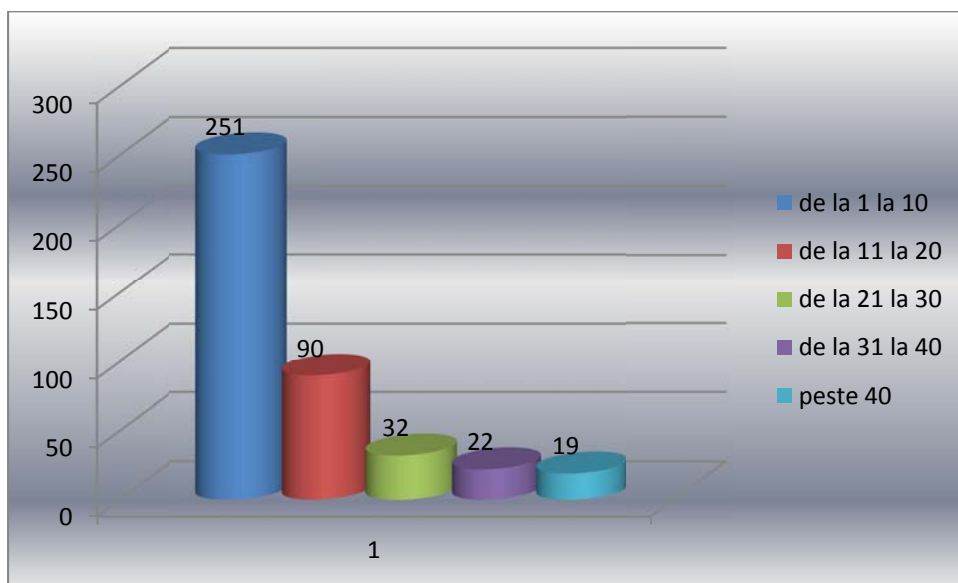
913 (99.56%) of the work accidents with surviving victims out of the total of 917 occurred in persons who work at least five days a week; also, 603 (65.76%) of the work accidents occurred in persons working in one shift, while 831 (90.62%) work accidents occurred in persons working 8 hours/day.

Table no. 10. Duration of hospitalization of surviving victims of work accidents which required medical care

Nr. crt	Duration of hospitalization	Number of cases	Percentage (%)
1	1-10 days	251	61
2	11-20 days	90	22
3	21-30 days	32	8
4	31-40 days	22	5
5	40-90 days	19	4

6	Total	414	100
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Chart no. 9. Duration of hospitalization of surviving victims of work accidents which required medical care



Almost half of the victims of work accidents (45%) needed medical care. 251(61%) of these cases required up to 10 days of hospitalization, as compared to 19 persons (4%) who needed over 40 days of hospitalization. Similar data concerning surviving victims of work accidents are provided by literature. (34)

CHAPTER 5

CONCLUSIONS

- ✓ 19593 forensic documents were issued during 2005-2013 within the Clinical Service of Forensics in Sibiu, for 16490 living persons and 3103 deceased.
- ✓ Approximately 5% of the total documents were issued for victims of work accidents. 91.1% of these referred to living persons, while 8.9% referred to deceased victims of work accidents.

- ✓ More than half of the forensic examinations regarding surviving victims of work accidents refer to adults ranging between 31-50 years of age, with a majority within the 41-50 age groups.
- ✓ 80% of the victims of work accidents are men from urban environment.
- ✓ A higher number of work accidents with surviving victims (25%) occurred on the first workday of week, in case of a working schedule of 7 days a week (85.39%), one shift (65.76%) of 8 hours per day (90.62%).

CHAPTER 6

SUGGESTIONS

➤ Creation of an intensive and extensive program of labor safety training that would include the risks people are subjected to in case the rules of labor protection are not respected. The program ought to be supervised by the Territorial Labor Inspectorate, with the mandatory attendance of all employees regardless of the length of service in employment. The main target of the training program will be to decrease morbidity and mortality rate of work accidents through their prevention and lessening of consequences.

✓ Elaboration of legislation on alcohol consumption at the place of work, besides the internal regulations, which would also grant the employer and representatives of Territorial Labor Inspectorate the right of requesting blood sampling to determine the level of alcohol and apply coercive methods in case of positive results. We recommend the lawmaking on mandatory blood sampling to determine the level of alcohol in case of work accidents, in accordance with specialized literature (18).

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