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WORKPLACE INJURIES IN THE CLINICAL CENTER OF SERBIA IN THE PERIOD 2005-2009

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The aim of our study was to assess the incidence of workplace injuries in the employees in the Clinical Center of Serbia in Belgrade, in the period 2005-2009. We used clinical documentation on workplace injuries and data were analyzed by descriptive epidemiologic method. Eighty three injures were registered from 2005 to 2009 with a rising trend (y=2,1x+10,5; R^2=0, 4208). Forty out of 83 injured workers were health workers (doctors and nurses) (48.19 %); 43 out of 84 injured workers (51.8%) were non-health workers. Seven out of 40 injured health workers were doctors, and 33 were nurses. Among the non-health workers, the major number of injuries occurred in cleaners (13) and in workers employed in administration (12). Forty-eight out of 83 injures (57.1%) occurred in the workplace, while remaining 36 (42.9%) occurred on the way to work. Health workers had more frequent injuries at work compared to non-medical staff, but the difference was not statistically significant. Traumatism occurred most frequently due to falling (49-58.3%) and the most frequent cause of injuries was bad organization of the working process, responsible for 42 cases (50,60%). Upper and lower limbs were most frequently fractured, while contusions were the most frequent types of injuries. Two accidental needle punctures were observed only in nurses. No statistically significant difference was observed between health and non-health workers in regard to the severity of injuries, localization, source and way of sustaining injury, as well as the distribution of injuries during the week. *Acta Medica Medianae 2011; 50(3):27-33.*

Key words: *professional traumatism, medicine, Serbia, health and non-health workers*

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Introduction

Workplace injuries may occur in every workplace, even if adequate protective measures are applied, and represent an important medical, economical and social problem. Serbian low on pension and disability insurance define the term of workplace injury (1). Reporting workplace injuries is obligatory according to current low regulations (2,3).

From 2005, there are no precise data on the total number of workplace injuries in Serbia due to the changes in their registration system. Serbian Ministry of Employment has only data on fatal, severe and collective injuries that have been reported to the working inspection.

Workplace injuries in health workers occur most frequently in hospitals. The most frequent injuries are represented by accidental needle punctures and workplace injuries occur most frequently in nurses and laboratory technicians (4-6).

The aim of this study was to assess the professional traumatism in the employees of the Clinical Center of Serbia (CCS) in Belgrade, in the period 2005-2009.

Subjects and methods

In this study, the clinical documentation on workplace injuries was analyzed, using a descriptive epidemiology method. The rates of injuries were calculated per 100 employes.

Results

Clinical Centre of Serbia (CCS) performs highly specialized health assistance as well as the educational and scientific activity. In the field of health assistance, CCS offers tertiary diagnostic, therapeutic, preventive and rehabilitative programmes and also acts as general hospital for the population of Belgrade.

For this purpose, CCS is divided in 23 clinics, 9 centres and 9 services.

The mean number of employees in CCS during the five-year observation interval was 7.484. The number of workers showed a rising trend from 2005 to 2009, despite two social programmes with the aim to reduce the number of employees. The smallest number of workers was observed in 2005 (7.060 employees) and the largest number in 2009

(7.785 employees). The proportion between health and non-health workers was approximately 70% vs 30%, during the entire observation period (Table 1).

Eighty-three injures were registered from 2005 to 2009. Forty-three workplace injuries occurred in non-health workers (51.8%), while 40 injuries were reported in health workers (48,19%) (Table 1). Among the non-health workers (8 men and 35 women), workplace injuries were most frequent in cleaners (13, 37%) and in administrative employees (12, 29,3%). Health workers (18 men and 22 women; 7 doctors and 33 nurses) had workplace traumas.

The smallest number of workplace injuries was registered in 2005: 11 injuries of which 7 among non-health workers and 4 among health workers. The largest number was registered in 2008: 24 injuries of which 11 among non-health workers and 13 among health workers. The mean annual number of injuries was 16.

The annual rates of injuries are shown on Graph 1. Annual rate of injuries in non-health workers ranged from 0,268 (during 2007) to 0,484 (during 2009). Annual rate of injuries in health workers ranged from 0,083 (during 2005) to 0.237 (during 2008). Cumulative rate of workplace injuries in non-health workers was 0,383 and was 2,5 times higher than the rate of injuries in health workers (0,153) (Table 2 and Graph 1).

The number of injuries according to their severity is shown in Table 3. Over the observation period there were 36 mild injuries (43,38%) and 47 severe injuries (56,63%). There were no fatal injuries.

The annual distribution of injuries was very heterogeneous. The smallest number of mild injuries was reported in 2006 (3 injuries) and the largest number was registered in 2008 (10 injuries). The smallest number of severe injuries was registered in 2005 (5 injuries), and the largest number in 2008 (14 injuries).

The number of mild and severe injuries over the five-year period, according to the place of injury is shown in Table 4. Fifty-five out of 83 injuries (66,3%) occurred in the workplace. Thirty out of 55 injuries that occurred at the workplace were severe (54,54%) and 25 were mild (45,45%). Twenty-eight injuries (33,7%) occurred on the way to work and back. Seventeen injuries occurred on the way to work (11 severe and 6 mild injuries) and 11 injuries occurred on the way back (6 severe and 5 mild).

Table 1. Mean number of employees in CCS in the period 2005–2009

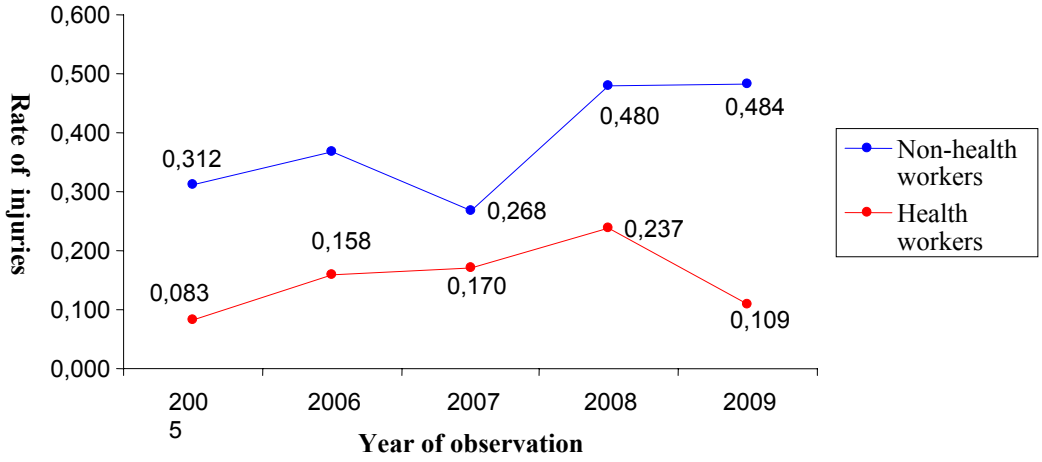
Year of observation	Non- health workers		Helth workers		Total	
	number	%	number	%	number	%
2005	2242	31,76	4818	68,24	7060	100
2006	2179	30,06	5071	69,94	7250	100
2007	2240	29,68	5306	70,31	7546	100
2008	2290	29,44	5489	70,56	7779	100
2009	2274	29,21	5511	70,79	7785	100

Table 2. Total number and rate of workplace injuries per 100 employees in CCS in the period 2005- 2009

Year of observation	Workplace injuries					
	Non- health workers			Health workers		
	Number of workers	Number of injuries	Rate of injuries	Number of workers	Number of injuries	Rate of injuries
2005	2242	7	0.312	4818	4	0.083
2006	2179	8	0.367	5071	8	0.158
2007	2240	6	0.268	5306	9	0.170
2008	2290	11	0.480	5489	13	0.237
2009	2274	11	0.484	5511	6	0.109
Total	11225	43	0.383	26195	40	0.153

Table 3. Distribution of workplace injuries in CCS according to severity in the period 2005-2009

Year of observation	Number of injuries	Mild		Severe	
		number	%	number	%
2005	11	6	54,54	5	45,45
2006	16	3	18,75	13	81,25
2007	15	8	53,33	7	46,66
2008	24	10	41,67	14	58,33
2009	17	9	52,94	8	47,06
TOTAL	83	36	43,38	47	56,63



Graph 1. Rate of workplace injuries in health and non-health workers in CCS in the period 2005-2009

Table 4. Distribution of workplace injuries in CCS according to the place where the injury occurred in the period 2005-2009

Year of observation	Injuries in workplace				Injuries on the way to work				Injuris on the way from work				TOTAL	
	mild	severe	total	Total %	mild	severe	total	Total %	mild	severe	total	Total %	Nr	%
2005	4	4	8	72.73	2	-	2	18.18	-	1	1	9.09	11	100
2006	2	10	12	79.00	1	3	4	25.00	-	-	-	-	16	100
2007	7	1	8	53.33	-	3	3	20.00	1	3	4	26.67	15	100
2008	6	9	15	62.50	3	4	7	11.14	1	1	2	26.52	24	100
2009	6	6	12	70.59	-	1	1	5.88	3	1	4	23.52	17	100
Total	25	30	55	66.26	6	11	17	20.48	5	6	11	13.25	83	100

Nr=number

Table 5. Distribution of workplace injuries in CCS according to age in the period 2005-2009

Age (years)	Workplace injuries distributed according to age										total	%
	2005		2006		2007		2008		2009			
	number	%	number	%	number	%	number	%	number	%		
< 20	-	-	-	-	-	-	-	-	-	-	-	-
< 29	-	-	1	6,25	1	6,67	3	12,50	1	5,88	6	7,22
< 39	5	45,45	4	25,00	5	33,33	8	33,33	8	47,06	30	36,14
< 49	5	45,45	5	31,25	4	26,67	8	33,33	5	29,41	27	32,53
< 59	1	9,09	6	37,50	5	33,33	5	20,83	3	17,65	20	24,09
61<	-	-	-	-	-	-	-	-	-	-	-	-
Total	11	100	16	100	15	15	24	100	17	100	83	100

Table 6. Distribution of workplace injuries in CCS according to total length of work experience in the period 2005-2009

Total length of work experience	Workplace injuries distributed according to total length of work experience										total	%
	2005		2006		2007		2008		2009			
	Nr	%	Nr	%	Nr	%	Nr	%	Nr	%		
0-10	6	54,54	6	37,5	4	26,67	9	37,5	5	29,41	30	36,14
10-20	2	18,18	4	25	2	13,33	6	25	5	29,41	19	22,89
21-30	3	27,27	3	18,75	6	40	5	20,8	6	35,29	23	27,71
31-40	-	-	3	18,75	2	13,33	4	16,7	1	5,89	10	12,05
41<	-	-	-	-	1	6,67	-	-	-	-	1	1,20
Total	11	100	16	100	15	100	24	100	17	100	83	100

Nr = number

Table 7. Distribution of workplace injuries in CCS according to length of exposition to noxae, in the period 2005 – 2009

Length of work experience	2005		2006		2007		2008		2009		total	%
	Nr	%	Nr	%	Nr	%	Nr	%	Nr	%		
>	6	54,54	7	43,75	4	26,67	11	45,83	7	41,18	35	42,17
10-19	3	27,27	4	25,00	2	13,33	7	29,17	5	29,41	21	25,30
20-29	2	18,18	4	25,00	6	40,00	4	16,67	5	29,41	21	25,30
30-39	-	-	1	6,25	3	20,00	2	8,33	-	-	6	7,23
40<	-	-	-	-	-	-	-	-	-	-	-	-
Total	11	100	16	100	15	100	24	100	17	100	83	100

Nr = number

Table 8. Distribution of workplace injuries according to manner of sustaining injury, in CCS in the period 2005 - 2009

Manner of sustaining injury	2005		2006		2007		2008		2009		total	%
	Nr	%	Nr	%	Nr	%	Nr	%	Nr	%		
Falling down	6	54,54	12	75,00	9	60,00	15	62,50	11	64,71	53	63.85
Fall of an object	4	36,36	-	-	2	13,33	1	4,17	-	-	7	8.43
Walking on ..., hitting against..., fall of an object	1	9,09	2	12,50	4	26,67	6	25,00	1	5,88	14	16.87
Overwork	-	-	2	12,50	-	-	2	8,33	2	11,76	6	7.23
Exposition to high temperature	-	-	-	-	-	-	-	-	1	5,88	1	1.20
Puncture	-	-	-	-	-	-	-	-	2	11,76	2	2.40
Total	11	100	16	100	15	100	24	100	17	100	83	

Nr = number

Table 9. Distribution of injuries according to cause of injury in CCS in the period 2005- 2009

Cause of injury	2005		2006		2007		2008		2009		total	%
	Nr	%	Nr	%	Nr	%	Nr	%	Nr	%		
Defects of machines and devices	2	18,18	-	-	-	-	1	4,16	1	5,88	4	4.82
Bad organisation of working process	5	45,45	10	62,50	9	60,00	12	51,00	6	35,29	42	50.60
Lack of professional experience	1	9,09	1	6,25	-	-	-	-	-	-	2	2.41
Defects of tools and instruments	-	-	1	6,25	-	-	1	4,16	-	-	2	2.41
Other – inattention on the way to/from work	3	27,27	4	25,00	6	40,00	10	41,67	10	58,82	33	39.75
Total	11	100	16	100	15	100	24	100	17	100	83	100

Nr=number

Table 10. Distribution of workplace injuries according to type of injury

Type of injury	2005		2006		2007		2008		2009		total	%
	Nr	%	Nr	%	Nr	%	Nr	%	Nr	%		
Fractures	5	45,45	10	62,50	5	33,33	12	50,00	6	35,29	38	45.78
Dislocations	1	9,09	-	-	1	6,67	-	-	4	23,53	6	7.23
Distorsions	1	9,09	2	12,50	1	6,67	1	4,16	3	17,65	8	9.64
Contusions and internal organ injuries	1	9,09	-	-	-	-	1	4,16	2	11,76	4	4.82
Wounds and lacerations	1	9,09	1	6,25	2	13,33	4	16,67	1	5,88	9	10.84
Punctures	-	-	-	-	-	-	-	-	1	5,88	1	1.20
Contusions	2	18,18	3	18,75	6	40,00	6	25,00	-	-	17	20.48
TOTAL	11	100	16	100	15	100	24	100	17	100		

Nr=number

Table 11. Distribution of injuries in CCS according to site of injury in the period 2005 -2009

Site of injury	2005		2006		2007		2008		2009		total	%
	Nr	%	Nr	%	Nr	%	Nr	%	Nr	%		
Head	1	9.09	-	-	1	6,67	3	12,50	2	11,76	7	8.43
Neck	1	9.09	-	-	-	-	-	-	-	-	1	1.20
Abdomen	1	9.09	1	6,25	-	-	1	4,16	-	-	3	3.61
Upper limbs	3	27,27	6	37,50	6	40,00	7	29,17	9	52,94	31	37.57
Lower limbs	4	36,36	7	43,75	8	53,33	10	41,67	4	23,53	33	39.76
Back	-	-	2	12,50	-	-	2	8,33	1	5,88	5	6.02
Several places	1	9,09	-	-	-	-	1	4,16	1	5,88	3	3.61
Total	11	100	16	100	15	100	24	100	17	100		

Nr = number

Distribution of workplace injuries according to the age of injured workers is shown in Table 5. In health operators, the mean age of male workers was 38,14 years and of female workers 42,08 years. In non-health operators, the mean age of male workers was 42,57 years and of female workers 44,45 years.

Over the observation period, no workplace injuries were registered in workers over 60 years of age and below 20 years of age. The largest number of injuries occurred in workers aged from 30 to 39 years (30 injuries (36,14%)). In the workers aged from 40 to 49 years there were 27 injuries (32,53%) and in workers older than 50 years there were 20 injuries (24,09%). Workplace injuries occurred most frequently in workers with a total work experience bellow 10 years (35 injuries (42,17%)); the lowest incidence of injuries occurred in workers with the longest work experience (Table 6). Professional traumatism was most frequent in workers with the work experience bellow 10 years (35 injuries, 42,17%) (Table 7). The mean number of years of work was 16,48 years in health workers and 17,83 years in non-health workers. Distribution of injuries according to the manner of sustaining injury in shown in Table 8. The most frequent way of sustaining injuries was „falling down" (53 injuries (63,85%)), followed by: „walking on..., hitting against..., collision with…", represented by 14 injuries (16,87%), „fall of an object" (seven injuries), „overwork" (six injuries), „puncture" (two injuries) and „exposure to high temperature" (one injury). Distribution of injuries according to age was unequal.

Distribution of injuries according to the cause is shown in Table 9. The most frequent causes of injuries were represented by: „bad working process organization " (42 injuries (50,60%)), and „ other – inattention on the way to/from work" (33 injuries (39,75%)), followed by: „defects of machines and devices" (four injuries (4,82%)), „lack of professional experience" (2,41%)) and „defects of tools and instruments" (two injuries (2,41%)). „Bad organization of the working process" was very frequent in all ranges of age, as well as „other – inattention on the way to/from work" (Table 9).

Distribution of injuries according to the type of injury is shown in Table 10. The most frequent types of injuries were: fractures (38; 45,78%), contusions (17; 20,48%), wounds and lacerations (9; 10,8%), distortions (8; 9,6%), accidental needle punctures (2; 3,8%) and others.

Distribution of injuries according to the site of injury is shown in Table 11. Mild injuries occurred in 36 workers (43.38%) and severe in 47 workers (56.63%). Hands (36 ;42,9%) and legs (31; 36,9%) represented the most frequent sites of injuries.

Discussion

Professional traumatism may be caused by a number of factors. The current concept of professional traumatism indicates that its aetiological factors should be first searched in a single human being (subject of working process), its personality, motivation and attitude towards work and psycho-physical abilities, and then in objective work conditions (work and life surrounding). These two groups of aetiological factors are connected and are acting together to cause traumatism. Working conditions alone represent rarely a direct cause of traumatism; they often act indirectly by causing fatigue or by other mechanisms. Besides factors such as working conditions, state of machines, devices, tools and instruments, as well as protective measures, there is a human factor. It is the human factor which should determine the risk factors, evaluate correct function of machines and instruments, inadequate work organization and disturbed human relations.

The employees in health institutions are exposed to risk of traumatism. However, in non - medical workers specific working traumatism was not observed as in health workers (4-6). Our study showed no difference in health and non-health workers concerning the injury severity, localization and way of sustaining the injury as well as the distribution of traumatism over the days of the week.

Eighty three injures were registered from 2005 to 2009, and the incidence of injuries showed a rising trend ($y=2,1x+10,5$; $R^2=0,4208$). Annual rates of working traumatism were low and cumulative rate of injuries in non-health workers was 0,383 and was 2,5 times higher than the rate of injuries in health workers (0,153).

Professional traumatism was most frequent in workers aged from 30 to 39 years. No workplace injuries were registered in workers over 60 years and below 20 years of age. Injuries occurred most frequently in workers with a total work experience under 10 years and the lowest incidence of injuries occurred in workers with the longest work experience. The length of total work experience and exposition to noxae influenced the occurrence of health injuries. Experience and training are very important for professional security. It is well known that injuries occur more frequently in workers with short work experience and without adequate professional training who are not well adapted to the working place (5,7,8).

Medical and non-medical staff were most frequently injured at the place of work, where about two thirds of injuries occurred. Health workers sustained injuries more frequently in the workplace compared to non-health workers, but the difference was not statistically significant.

Severe injuries were more frequent in health workers in respect to non-health workers.

International working organization do not consider work-related those injuries that occur on a way to work or from work as well as on a business trip, because they can be caused by other factors, not related to work.

The largest number of injuries occurred due to falling; the most frequent cause of injuring was bad organization of the working process, and the most frequent types of injuries were fractures and contusions. There were also two accidental needle punctures in nurses.

According to the literature, workplace injuries in health workers occur most frequently in hospitals, particularly in the operating rooms; senior doctors get injured more often, while junior doctors get injured during interventions in the patient room (6-9). The most frequent injuries among health operators are needle punctures. Nurses and laboratory technicians get injured more often than doctors.

In our study, only two needle punctures were registered over the five-year period. This very low incidence is probably due to the lack of reporting and registration, rather than the real low incidence in health workers in CCS. The most frequent professional disease caused by a biological agent is viral hepatitis B, both in Serbian health workers and the rest of the world, so the importance of registration of micro injuries on working place is fundamental.

The largest number of injuries used to occur on Monday. During other days of the week the rate of injuries decreased from Tuesday to Sunday, being lowest on Saturday and Sunday.

The importance of the distribution of health injuries over the week seems to be overestimated. Many authors have reported that the incidence of workplace injuries may fluctuate over the week, and that it is higher on the last working day. Others have reported the major incidence of workplace injuries on the first working day after the weekend, explaining this by the irrational use of time, alcohol abuse and alike (5,10).

Conclusion

Workplace injuries in CCS have been in mild increase over the last years and have been registered in health and non-health workers.

Although the annual rates of workplace injuries were very low, cumulative rate of sustaining injury in non-health workers (0,383) was 2,5 times higher than the rate reported in health workers (0,153). Injuries occurred more frequently in the workplace, but there is also a proportion of injuries that occurred on the way to and from work. There were no differences among health and non-health workers concerning the severity, localization and manner of sustaining injuries, as well as the distribution over the days of the week. Workplace injuries were more frequent on Monday and their incidence used to decrease over the week.

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POVREDE NA RADU U KLINIČKOM CENTRU SRBIJE ZA PERIOD OD 2005. DO 2009. GODINE

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Cilj ovog ispitivanja bio je da se proceni učestanost povreda na radu među radnicima Kliničkog centra (KC) Srbije u Beogradu u periodu od 2005. do 2009. godine. Kao materijal korišćene su povredne liste radnika zaposlenih u KC Srbije, a u radu je korišćen deskriptivni epidemiološki metod. U periodu od 2005. do 2009. godine u KC Srbije ukupno su registrovane 83 povrede na radu, a u posmatranom periodu trend povređivanja bio je u porastu (y = 2,1x + 10,5; R2 = 0,4208). Mada su godišnje stope povređivanja veoma niske, kumulativna stopa povređivanja nemedicinskih radnika (0,383) 2,5 puta bila je veća od iste među medicinskim osobljem (0,153). Među povređenim osobama 40 (48.192%) radnika bila su medicinske struke, a 43 (51.8%) nemedicinske struke. Među povređenim medicinskim osobljem bilo je 7 lekara i 36 tehničara. Među nemedicinskim radnicima najviše su se povređivali spremači (13) i administrativni radnici (12). Od ukupnog broja povreda 55 (66,26%) se desilo na radnom mestu, a 28 (33.73%) na putu do i od posla. Zdravstveni radnici su se u odnosu na nezdravstvene više povređivali na radnom mestu, mada ova razlika nije statistički značajna. Najveći broj povreda (49; 58.3%) dogodio se pri padu, najčešći uzrok povreda bila je loša organizacija procesa rada (42; 50,60%), najviše povreda bilo je lokalizovano na gornjim i donjim ekstremitetima, a najučestaliji bili su prelomi (38; 45,78%), kontuzije i nagnječenja (17; 20,48%). Samo kod medicinskih radnika (tehničara) registrovane su dve povrede izazvane ubodom igle. Nije utvrđeno da postoje statistički značajne razlike među zdravstvenim i nezdravstvenim radnicima u odnosu na težinu povrede, lokalizaciju, izvor i način povređivanja, kao i u odnosu na raspodelu povređivanja u danima nedelje. *Acta Medica Medianae 2011;50(3):27-33.*

***Ključne reči**: profesionalni traumatizam, medicina, Srbija, medicinski i nemedicinski radnici*