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Physicians' Strike and General Mortality: Croatia's Experience of 2003

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A B S T R A C T

The aim of the study was to establish whether the physicians' strike, which took place in Croatia in 2003, had an impact on the mortality of the population. Mortality data from the National Bureau of Statistics relating to the strike period (15 January – 14 February 2003) were selected and compared with the previous and subsequent periods of the same duration in 2001, 2002 and 2004. Of the 52,575 deaths in 2003, Croatia recorded 4,682 (8.9%, 95% Confidence interval 8.4–9.4) in the strike period from the 15th of January to the 14th of February 2003 or 1.1 deaths per 1000. No deviations of the 15th of January to the 14th of February period's share of the death total in relation to other observation periods were noted. It is impossible to associate the strike based on the figures shown in this paper with either an increase or decrease in population mortality.

Key words: *physicians' strike, mortality*

Introduction

Because of their potential consequences for public health, physicians' strikes are an important event in any society.

They are a consequence of the crisis currently experienced by most health systems in the world. It is increasingly difficult to ensure resources for the application of new medical technologies and a sufficient number of professionals to use them. Nearly all countries are challenged by worker shortage, skill mix imbalance, maldistribution of resources and weak knowledge base[1].

In these circumstances, physicians' dissatisfaction with their professional life grows. The education necessary to practice this humane and responsible vocation is demanding, long and practically taking the entire working life. On completion of their training a difficult and responsible job awaits physicians, often with stressful demands for continuous cost reductions and ever more difficult providing of adequate patient care[2].

There are many examples of countries where physicians, dissatisfied with their working conditions, salaries and social status, resort to organising strikes[3–12]. Despite numerous controversies and ethical dilemmas surrounding such developments and due to the lack of other possibilities to struggle for the fulfilment of their demands, one could see future physicians' strikes organised[13–15].

In view of potentially significant public health consequences of medical strikes, it is important to explore the present experience and develop strike organisation models that would minimise health consequences of a strike for the population and their effective resolution[16–28].

The aim of this paper was to establish whether the physicians' strike conducted in Croatia in 2003 has had an impact on population mortality.

Organised by Croatian Physicians' Trade Union the strike lasted from the15th January to the 14th February 2003. The majority of physicians working in hospitals and polyclinics have joined in. In organising the strike, they took account of ethical principles and of the need to provide care to all the patients whose health had come under an acute threat. During the medical strike professional activity unfolded in line with an instruction from the Croatian Medical Association about the conditions for and volume of technical activity during on-duty shifts, continuous alert, respectively over weekends, banking holidays and holidays. Emergency medical and dental care was ensured for all patients. A month after the be-

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ginning of the strike, compulsory work order was introduced on the 15 February 2003 by governmental decree for all health workers with university degree to enable all citizens of the Republic of Croatia to use their right to comprehensive, continuous and accessible medical care. This has halted the strike, although it formally ended after the abolition of compulsory work order on 5 January 2004.

Materials and Methods

The paper made use of depersonalised data from the National Bureau of Statistics' deceased people database. Observing the methodology of the United Nations and EUROSTAT, the data covers the population domiciled residing in Croatia for at least one year or more in reference to the event of death[29].

Deaths were grouped into three equally long periods (31 days) this relating to the periods of the strike (15 January – 14 February), before the strike (15 December – 14 January) and after the strike (15 February – 17 March). A comparison was made between the year 2002/2003 transition data and those for transitions 2000/2001, 2001/2002 and 2003/2004 (Table 1).

The information gathered on each case of death included the date of death, sex, age of the deceased as well as the cause of death coded according to ICD-10[30].

The number of deaths and their proportion in total for the periods observed (during, before and after the strike) have been calculated by sex, age and cause of death. The mortality rates have been calculated according to Croatian Census data 2001[31].

To cover and analyse the information we used EpiInfo 2000 version 3.3[32]. Ninety-five percent confidence intervals (95% CI) were calculated using the normal distribution[33].

Results

Of the 52,575 deaths in 2003, Croatia recorded 4,682 (8.9%,95% CI=8.4–9.4) in the strike period from the 15th of January to the 14th of February 2003 or 1.1 deaths per 1000 (Table 2). No significant deviations of the 15th January to the 14th of February period's share of the death total per year in relation to other observation years were noted.

We analysed 14,580 fatal outcomes that occurred between the 15th of December 2002 and the 17th of March 2003. The smallest figure was recorded during the 15th of January to the 14th of February 2003 strike, i.e., 4,682 with a share of 32.1% (95% CI=31.4–32.9). In the after-strike period (15 February – 17 March 2003), there were records of 4,963 deaths, a 34% share (95% CI=33.3–34.8). As to the pre-strike period (15 December 2002 – 14 January 2003), there were 4,935 deaths or a 33.9% share (95% CI=33.1–34.6).

The recorded deaths are compared with deaths for the same calendar periods in years 2000/2001, 2001/2002 and 2003/2004 (Table 3). The proportion of the 15th of Janu-

TABLE 1
OBSERVATION PERIODS

Year	Period			Total 15 December–17 March
	I 15 December–14 January	II 15 January–14 February	III 15 February–17 March	
2000/2001	a1	b1	c1	d1=a1+b1+c1
2001/2002	a2	b2	c2	d2=a2+b2+c2
2002/2003	a3	b3*	c3	d3=a3+b3+c3
2003/2004	a4	b4	c4+	d4=a4+b4+c4
Total	a1+a2+a3+a4	b1+b2+b3+b4	c1+c2+c3+c4	d1+d2+d3+d4

* strike period, + In 2004, the leap-year made the period number III last from 15 February – 16 March.

TABLE 2
THE 15 JANUARY–14 FEBRUARY PERIOD'S SHARE OF THE DEATH TOTAL PER YEAR

Year	Total	Period 15 January – 14 February		
		Number	% of total (95% CI)	Rate/1000 population
2001	49,552	4,371	8.8 (8.6–9.1)	1.0
2002	50,569	4,575	9.0 (8.7–9.4)	1.0
2003	52,575	4,682*	8.9 (8.4–9.4)	1.1
2004	49,756	5,022	10.1 (9.4–10.8)	1.1

* strike period, 95% CI – 95% confidence interval

TABLE 3
SEX DISTRIBUTION OF DEATHS IN THE PERIODS PRECEDING, COINCIDING WITH AND FOLLOWING THE STRIKE

Sex	Year	Period I (15 December–14 January)			Period II (15 January–14 February)			Period III (15 February–17 March)			Total	
		Number	%	95% CI	Number	%	95% CI	Number	%	95% CI	Number	%
Male	2000/2001	2,250	33.7	32.6–34.9	2,162	32.4	31.3–33.6	2,257	33.8	32.7–35.0	6,669	100.0
	2001/2002	2,516	35.2	34.0–36.6	2,265	31.6	30.6–32.7	2,376	33.2	32.1–34.3	7,157	100.0
	2002/2003	2,435	33.9	32.8–35.0	2,330*	32.4	31.4–33.5	2,419	33.7	32.6–34.8	7,184	100.0
	2003/2004	2,489	33.9	32.8–35.0	2,503	34.1	33.0–35.2	2,346	32.0	30.9–33.1	7,338	100.0
	Total	9,690	34.2	33.6–34.7	9,260	32.7	32.1–33.2	9,398	33.2	32.6–33.7	28,348	100.0
Female	2000/2001	2,208	33.7	32.6–34.9	2,209	33.8	32.6–34.9	2,127	32.5	31.4–33.7	6,544	100.0
	2001/2002	2,550	35.7	34.6–36.8	2,310	32.4	31.3–33.5	2,279	31.9	30.8–33.0	7,139	100.0
	2002/2003	2,500	33.8	32.7–34.9	2,352*	31.8	30.7–32.9	2,544	34.4	33.3–35.5	7,396	100.0
	2003/2004	2,432	33.5	32.5–34.6	2,519	34.7	33.6–35.9	2,300	31.7	30.7–32.8	7,251	100.0
	Total	9,690	34.2	33.7–34.8	9,390	33.1	32.6–33.7	9,250	32.7	32.1–33.2	28,330	100.0
Total	2000/2001	4,458	33.7	32.9–34.6	4,371	33.1	32.3–33.9	4,384	33.2	32.4–34.0	13,213	100.0
	2001/2002	5,066	35.4	34.7–36.2	4,575	32.0	31.2–32.8	4,655	32.6	31.8–33.3	14,296	100.0
	2002/2003	4,935	33.9	33.1–34.6	4,682*	32.1	31.4–32.9	4,963	34.0	33.3–34.8	14,580	100.0
	2003/2004	4,921	33.7	33.0–34.5	5,022	34.4	33.7–35.2	4,646	31.9	31.1–32.6	14,589	100.0
	Total	19,380	34.2	33.8–34.6	18,650	32.9	32.5–33.3	18,648	32.9	32.5–33.3	56,678	100.0

* strike period, 95% CI – 95% confidence interval

ary to the 14th of February deaths in the observation years ranged from 32.0% (95% CI=31.2–32.8) in 2002 to 34.4% (95% CI=37.7–35.2) in 2004.

During the strike, there were records of 2,330 (49.8%) male and 2,352 (50.2%) female deaths. Between the 15th of December 2002 and the 17th of March 2003) (before, during and after the strike) the male group had 7,184 deaths, with 2,330 (32.4%, 95% CI=31.4–33.5) males dying during the strike, 2,435 (33.9%, 95% CI=32.8–35.0) in the pre-strike and 2,419 (33.7%, 95% CI=32.6–34.8) in the post strike periods. In comparison with other years, the share of deaths during the 15th of January to the 14th of February period varied in the range from 31.6% (95% CI=30.6–32.7) in 2002 to 34.1% (95% CI=33.0–35.2) in 2004 (Table 3).

Between the 15th of December 2002 and the 17th of March 2003 (before, during and after the strike) there were 7,396 female deaths on record, 2,352 (31.8%, 95% CI=30.7–32.9) of which during the strike, 2,500 (33.8%, 95% CI=32.7–34.9) before it and 2,544 (34.4%, 95% CI=33.3–35.5) during the equally long post-strike period. In observation years, the share of women dying in the 15 January – 14 February period ranged from 31.8% (95% CI=30.7–32.9) in 2003 to 34.7% (95% CI=33.6–35.9) in 2004 (Table 3).

Of the 4,682 people that died during the strike most were aged 65+ years, i.e., 3,646 (77.9%, 95% CI=76.7–79.0), 846 (18.1%, 95% CI=17.0–19.2) were aged 45–64-years and 190 (4.1%, 95% CI=3.4–4.7) were under 45-year old. The age structure of died persons was similar in four observation periods (Figure 1).

Causes of death during strike period were analysed and compared for the same period between the years observed. Diseases of the circulatory system, recorded as the cause of 2,531 (54.1%, 95% CI=52.6–55.5) deaths, were the most numerous. Unknown cause of death was recorded in as few as 76 (1.6%, 95% CI=1.3–2.0) fatal outcomes. For observation years, no differences were noticed in relation to the distribution of causes of death (Table 4).

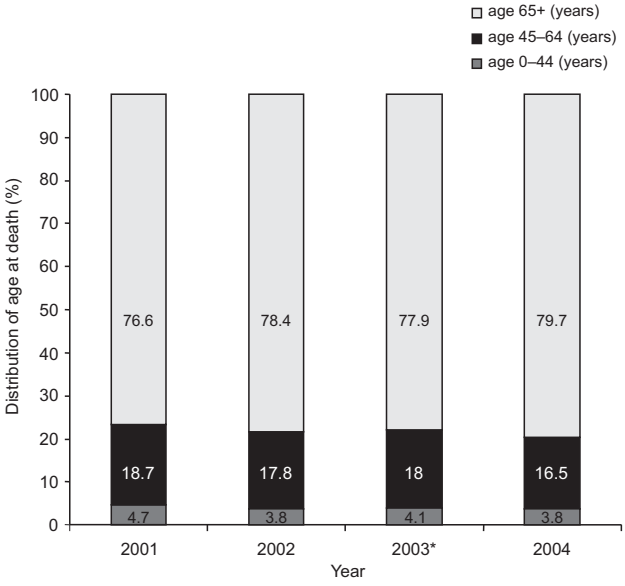

Fig. 1. Age at death for the period 15 January – 14 February: comparison for years 2001–04. Asterisk indicate the strike period.

TABLE 4
CAUSE-OF-DEATH COMPARISON FOR THE STRIKE PERIOD (15 JANUARY–14 FEBRUARY 2003) WITH THE SAME CALENDAR PERIODS OF 2001, 2002, 2004

Diagnosis (ICD-10)	2001			2002			2003*			2004			Total		
	Number	%	95% CI	Number	%	95% CI	Number	%	95% CI	Number	%	95% CI	Number	%	95% C.I.
Cardiovascular diseases	2,386	54.6	53.1–56.1	2,431	53.2	51.7–54.6	2,531	54.1	52.6–55.5	2,639	52.5	51.2–53.9	9,987	53.5	52.8–54.3
Neoplasm's	1,060	24.2	23.0–25.6	1,036	22.6	21.4–23.9	1,029	22.0	20.8–23.2	1,118	22.3	21.1–23.4	4,243	22.8	22.2–23.4
Respiratory diseases	171	3.9	3.4–4.5	248	5.4	4.8–6.1	254	5.4	4.8–6.1	357	7.1	6.4–7.9	1,030	5.5	5.2–5.9
Diseases of the digestive system	195	4.5	3.9–5.1	217	4.7	4.2–5.4	225	4.8	4.2–5.5	219	4.4	3.8–5.0	856	4.6	4.3–4.9
Injury, poisoning and certain other consequences of external causes	201	4.6	4.0–5.3	201	4.4	3.8–5.0	217	4.6	4.1–5.3	237	4.7	4.2–5.4	856	4.6	4.3–4.9
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	29	0.7	0.5–1.0	122	2.7	2.2–3.3	76	1.6	1.3–2.0	84	1.7	1.3–2.1	311	1.7	1.5–1.9
Other causes	329	7.5	6.8–8.4	320	7.0	6.3–7.8	350	7.5	6.7–8.3	368	7.3	6.6–8.1	1,367	7.3	7.0–7.7
All causes	4,371	100.0		4,575	100.0		4,682	100.0		5,022	100.0		18,650	100.0	

* strike period, 95% CI – 95% confidence interval

Discussion

The few papers that have looked at the topic of population mortality during physicians' strikes indicated a decline in mortality during the strike itself[19,24–27].

Our data reveal that the strike has not entailed an increase in the mortality of Croatia's population. Although the number of deaths recorded during the strike was greater than in previous years, their share of the annual death toll was approximately equal to those in the previous years and lower than the 2004's.

Also recorded during the strike were a smaller number and share of fatal outcomes in relation to the equally long period immediately preceding and following. This raises the question whether this might warrant the conclusion that a decrease in mortality is a consequence of the strike. Data analysis of deaths for the years available in the same, and equally long, periods uncovered the fact that fewer deaths were recorded also in the preceding years in the 15th of January to the14th of February period. On the other hand, the number of fatal outcomes recorded in the same period of 2004 was the highest. The data corroborates the assumption that a drop in population mortality was not one of consequences of the strike.

The age and sex distribution of the deceased during the strike was similar in comparison to other study periods. The distribution of causes of death during the strike did not differ from that during the other observation periods. It should be noted that as few as 1.6% of causes of death not otherwise specified were registered, which is similar to 1.5% on the level of the whole year.

We also established that greater number of deaths in the years observed sometimes occurred at the beginning of the observation period and sometimes in the middle or at the end. One should assume this is consequence of weather changes in the winter months. As known from the literature, the increased number of deaths is explainable by the arrival of colder weather when mostly the more sensitive elderly die. Several studies have reported the occurrence of excess mortality precisely during the winter months with the arrival of cold weather fronts[34–36]. A comparative analysis of excess mortality in several European countries during the winter has uncovered a paradox that excess mortality significantly occurs in winter in temperate climate countries, not in those with severe winters. The authors have linked this with lower efficiency of room heating and with lower housing standards in countries with warmer climate, as Portugal, Spain and Ireland[37]. In Britain, studies have shown greater vulnerability to death in winter in a group of elderly women affected by respiratory diseases[38].

The wave of more deaths could also be associated with respiratory viral infection complications occurring at that time of the year and which are the most prevalent among elderly chronic patients[39].

Conclusion

Basing on the data shown in the present paper, it is impossible to associate the strike either with an increase/decrease in population mortality.

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REFERENCES

1. CHEN L, EVANS T, ANAND S, BOUFFORD JI, BROWN H, CHOWDHURY M, CUETO M, DARE L, DUSSAULT G, ELZINGA G, FEE E, HABTE D, HANVORAVONGCHAI P, JACOBS M, KUROWSKI C, MICHAEL S, PABLOS-MENDEZ A, SEWANKAMBO N, SOLIMANO G, STILWELL B, DE WAAL A, WIBULPOLPRASERT S, Lancet, 364 (2004) 1984. — 2. EDWARDS N, KORNACKI MJ, SILVERSIN J, BMJ, 324 (2002) 835. — 3. FRASER B, Lancet, 363 (2004) 1374. — 4. TURONE F, BMJ, 328 (2004) 976. — 5. KROSNAR K, BMJ, 327 (2003) 1010. — 6. TURONE F, BMJ, 328 (2004) 976. — 7. CARPENTER G, Lancet, 362 (2003) 1903. — 8. BUIRCHARD K, Lancet, 354(1999) 1188. — 9. DOROZYNSKI A, BMJ, 12 (1996) 993. — 10. DOROZYNSKI A, BMJ, 311 (1995) 1521. — 11. FRASER B, Lancet, 363 (2004) 1374. — 12. COOPER-MANKHORN D, BMJ, 318 (1999) 76. — 13. GOODMAN CD, West J Med, 171 (1999) 297. — 14. GOIC A, Rev Med Çhil [in Spanish], 124 (1996) 873. — 15. GROSSKOPF I, BUCKMAN G, GARTY M, J Med Ethics, 11 (1985) 70. — 16. ARO S, HOSIA P, Scand J Prim Health Care, 5 (1987) 245. — 17. ELLENCWEIG AY, GINAT IT, Isr J Med Sci, 26 (1990) 559. — 18. ADELMAN S, West J Med, 171 (1991) 298. — 19. MESLIN EM, Hastings Cent Rep, 17 (1987) 11. — 20. KMIETOWICZ Z, BMJ, 326 (2003) 1165. — 21. HADŽIBEGOVIĆ I, ĐANIĆ A, HREN D, Croat Med J, 45 (2004) 63. — 22. BUITRAGO F, GAMERO S, VERGELES B, CANO L, Rev Esp Salud Publica, [in Spanish], 71 (1997) 35. — 23. BUKOVSKY I, HERMAN A, SHERMAN D, SCHREYER P, ARIELI S, CASPI E, Isr J Med Sci, 21 (1985) 804. — 24. JAMES JJ, Am J Public Health. 69 (1979) 437. — 25. SIEGEL-ITZKOVICH J, BMJ, 320 (2000) 1561. — 26. STEINHERZ R, Lancet, 1 (1984) 107. — 27. SLATER PE, EVER-HADANI P, Lancet, 2 (1983) 1306. — 28. BARNOON S, CARMEL S, ZALCMAN T, Health Serv Res, 22 (1987) 141. — 29. UNITED NATIONS STATISTICAL COMMISSION, Recommendations for the 2000 censuses of population and housing in the ECE region, [Statistical standards and studies – No. 49.] (United Nation, Geneva, 1998). — 30. WORLD HEALTH ORGANISATION, International Classification of Diseases and Related Health Problems Tenth Revision. Volume 1, (WHO, Geneva, 1992). — 31. REPUBLIC OF CROATIA CENTRAL BUREAU OF STATISTICS, Census 2001, Available fromhttp://www.dzs.hr/default_e.htm, accessed January 14, 2006. — 32. DEAN AG, ARNER TG, SUNKI GG, FRIEDMAN R, LANTINGA M, SANGAM S, ZUBIETA JC, SULLIVAN KM, BRENDEL KA, GAO Z, FONTAINE N, SHU M, FULLER G, Epi Info™, a database and statistics program for public health professionals, (Centers for Disease Control and Prevention, Atlanta, 2002). — 33. DALY LE, BOURKE JB, MCGILVARY J, Interpretation and Uses of Medical Statistics, 4th ed. (Blackwell science. Oxford, 1995). — 34. BRENN T, YTTERSTAD E, Tidsskr Nor Laegeforen [in Norwegian], 123 (2003) 13:1826-8. — 35. HONG YC, RHA JH, LEE JT, HA EH, KWON HJ, KIM H, Epidemiology, 14(4) (2003) 473. — 36. MURPHY NF, STEWART S, MACINTYRE K, CAPEWELL S, MCMURRAY JJ, Int J Cardiol, 97(2) (2004) 283. — 37. JD HEALY, J Epidemiol Community Health, 57 (2003) 784. — 38. WILKINSON P, PATTENDEN S, ARMSTRONG B, FLETCHER A, SARI R, KOVATS RS, MANGTANI P, ANTHONY J M, BMJ, 329 (2004) 647 — 39. REICHERT TA, SIMONSEN L, SHARMA A, PARDO SA, FEDSON DS, MILLER MA, Am J Epidemiol,160(5) (2004) 492.

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ŠTRAJK LIJEČNIKA I OPĆA SMRTNOST: HRVATSKO ISKUSTVO IZ 2003. GODINE

SAŽETAK

Cilj ovog istraživanja bio je ispitati je li štrajk liječnika, koji je proveden tijekom 2003. godine, imao utjecaj na opću smrtnost stanovništva. Analizom su obuhvaćeni podaci Državnog zavoda za statistiku o umrlima u razdoblju štrajka od 15. siječnja do 14. veljače 2003 i jednako dugom razdoblju prije i poslije. Ista razdoblja analizirana su za 2001., 2002. i 2004. godinu. Od ukupno 52 575 smrti zabilježenih 2003. godine, 4 682 (8,9%, 95% CI=8,4–9,4) je zabilježeno tijekom štrajka ili 1.1 na 1 000 stanovnika. U usporedbi udjela broja umrlih tijekom štrajka u ukupnom broju umrlih s drugim promatranim razdobljima, nisu zabilježena odstupanja. Na osnovu prikazanih podataka štrajk liječnika nije moguće povezati ni s porastom ni s padom opće smrtnosti.