

Smoking Habits, Signs of Chronic Diseases and Survival in Inland and Coastal Regions of Croatia: a Follow-up Study

Mladen Pavlović¹, Naima Čorović¹, Milica Gomzi¹, Diana Šimić², Anamarija Jazbec³ and Mirjana Kujundžić Tiljak⁴

¹ Institute for Medical Research and Occupational Health, Zagreb, Croatia

² Central State Administrative Office for e-Croatia of the Government of the Republic of Croatia, Zagreb, Croatia

³ Faculty of Forestry Engineering, University of Zagreb, Zagreb, Croatia

⁴ School of Public Health »Andrija Štampar«, School of Medicine, University of Zagreb, Zagreb, Croatia

ABSTRACT

Aim of the study was to estimate, the relationship between survival, smoking habits, and the results of medical examinations in inland and coastal regions of Croatia. Age and sex stratified sample of general population (1,571 men and 1,793 women, 37–56 years old in 1972; followed in 1982: N= 1,090 men; 1,325 women and/or 1972–1999 controlling vital status). Relative risks and 95% confidence limits were estimated using Cox regression in the model with time dependent covariates, separately by sex. In all regions, the proportion of male smokers decreased between 1972 and 1982. The proportion of female smokers increased, differently in urban and rural regions. During the follow-up between 1972 and 1999, 568 deaths were recorded among men and 382 among women. In men, in addition to age, significant hazards of death were the number of smoked cigarettes per day, body mass index, sedative intake, vital lung capacity (FVC), 100FEV₁/VC, systolic blood pressure, electrocardiogram, history of heart attack, and region. In women, in addition to age, significant predictors were the number of smoked cigarettes per day, systolic blood pressure, electrocardiogram, history of heart disease (excluding coronary diseases), and region. Survival relative risk increased with each additional smoked pack of cigarettes by 2.4% in women and 1.3% in men. Regional differences vs. smoking habit were observed. These data emphasize the need for prevention of smoking.

Key words: prospective studies, population survival, smoking habit

Introduction

Morbidity and mortality risks including cardiovascular diseases and impact of smoking in transitional countries such as Croatia were verified in the world health statistics¹. There has been a series of studies on the influence of smoking on health in the second half of 20 century^{2–6}. Besides, prospective studies indicate that smoking habit affects survival as well as general and specific mortality^{7,8}. Several papers published earlier in Croatia analyzed the influence of smoking on health⁹. They did not focus on survival, including regional differences and/or results of prospective check up^{10–12}. Our earlier results corroborate the findings on the variability of survival in different regions and/or urban vs. rural areas in Croatia¹³. It is well known that long-term smoking is related to long-term consequences on various indicators of health. The epidemiological model presented in this paper included some health indicators (qualitative or quantitative variables) and regional characteristics associated with smoking habits.

This part of the prospective study in adult and/or aged population is focused on the estimation of cigarette smoking in the past, including findings from past medical checks (a questionnaire on chronic bronchitis, chronic cardiovascular diseases, sedative intake, electrocardiogram findings (ECG), respiratory function tests, forced expiratory time, auscultation of concomitant adventitious lung sounds (râles), suffering pneumonia, systolic and diastolic blood pressure, nutrition habits, anthropometrics etc.) on all-cause mortality and survival rate. Potential differences regarding characteristics of the coastal and the inland features in past medical check up as well as vital data including general mortality were multivariate taken into account. Genders were analyzed separately in the model.

Subjects and Methods

Sampling involved two stages. The first stage was a judgment sample of six regions (out of 104 in 1969) covering rural and urban, inland (region: Zagreb /two urban areas/ and Virovitica /rural/) and coastal regions of Croatia (region: Split /urban/, Omiš, region, island Vis /rural/). The second stage was gender stratified with the sampling frame taken from voter's registry (Figure 1).

Survey and Interview Data

This study on age and sex stratified general population sample (aged between 38 and 57) started in 1972. Medical examinations and interviews, aimed at negative effects of certain habits, were conducted in 1972 and 1982. After exclusion of subjects unwilling to undergo medical measurements such as respiratory function tests and ECG the final sample in 1972 included 1,571 men and 1,793 women. Results and data of the check-up and interviews were coded. Smoking habits were registered as a number of cigarettes/day. Body mass index (BMI) was derived as weight (kg)/height² (m). The history of past illnesses was coded according to ICD IX code. Electrocardiogram was coded according to Rose and Blackburn¹⁴. Findings were sorted in four groups: normal, conditionally normal or bordering, mainly pathological, and pathological. Signs of right heart disease and ischemic heart diseases were noted separately. Forced vital capacity (FVC in L.), and 100 FEV₁/FVC were used as survival-known explanatory variables. Forced expiratory time in sec. was determined above trachea using a stopwatch. Auscultation of continuous adventitious lung sounds (râles); histories of pneumonia and chronic heart diseases were included in the check-up form for chronic obstructive pulmonary diseases, and tuberculosis¹⁵.

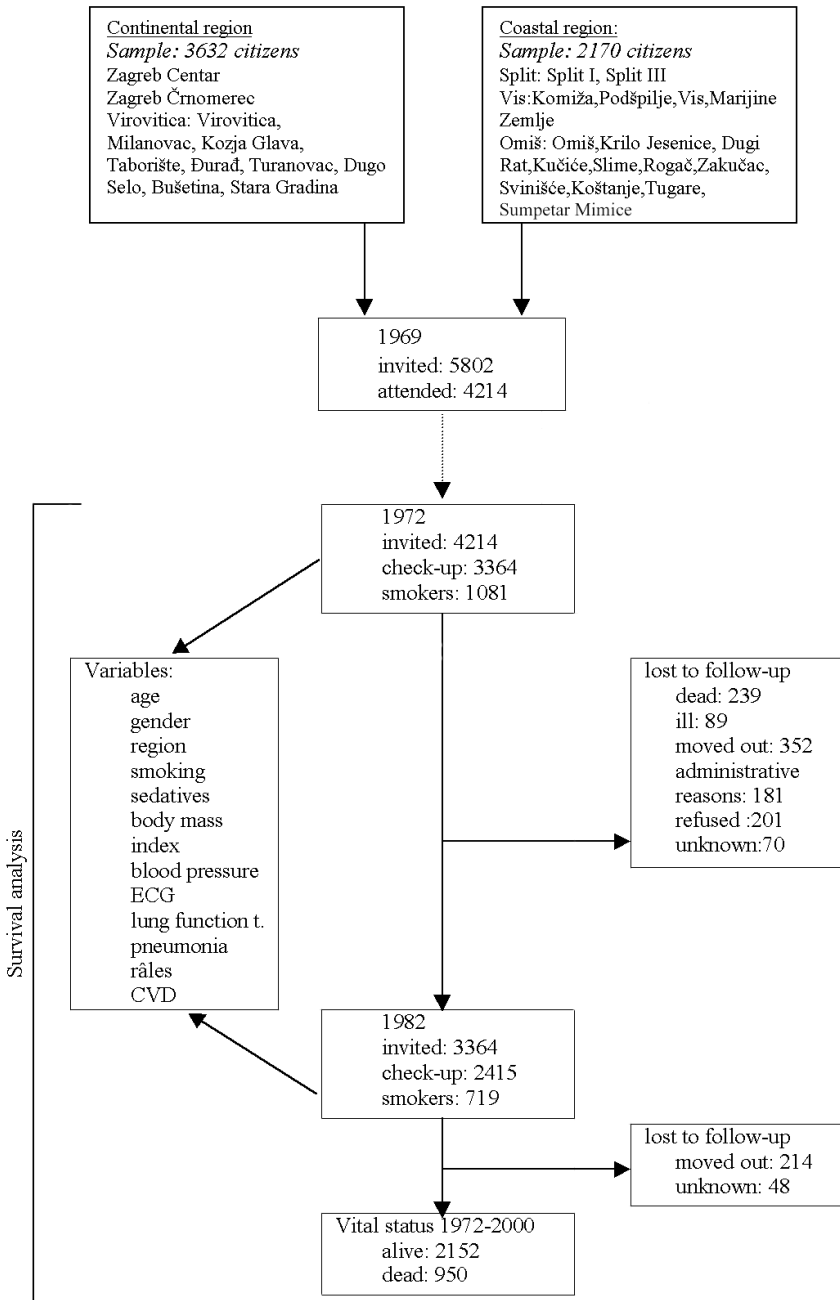


Fig. 1. Flow chart of prospective study.

Vital Data

Vital status data (alive-dead, cause of death, moved out from county or country) were collected between 1 January 1973 – 31 December 1999 (Table 1). Files with the lists of voters and files from birth register offices, diocese offices, mortuaries and cemeteries were searched through. Official forms of the Central Bureau of Statistics in Croatia were also checked. Subjects and/or their families were also contacted by phone. A small number of participants were hospitalized during examinations. 239 subjects died between 1973 and 1982. A total of 568 men and

382 women died between 1972 and 1999. Subjects who died from external causes and 48 subjects whose status could not be verified were excluded from analysis.

Epidemiological Modeling

The composition of analyzed variables in multi-variable model was created empirically after processing univariate analysis as statistically significant, separately by sex^{16–23}. Cigarette smoking was analyzed incorporating explicatory variables (multivariate approach). Apart from cigarette smoking data, the model included quality and quantity explicatory variables. Quality components included body

TABLE 1
PARTICIPANTS IN FOLLOW-UP STUDY INCLUDED IN THE MODEL BY REGIONS AND SEX

REGION	Total	Deaths N (%)	Censored	
			Alive N (%)	The rest* N (%)
Črnomerec	651	182 (28.0)	413 (63.4)	56 (8.6)
Men	292	111 (38.0)	153 (52.4)	28 (9.6)
Women	359	71 (19.8)	260 (72.4)	28 (7.8)
Centar	549	144 (26.2)	363 (66.1)	42 (7.7)
Men	273	88 (32.2)	165 (60.4)	20 (7.4)
Women	276	56 (20.3)	198 (71.7)	22 (8.0)
Virovitica	769	276 (35.8)	413 (53.7)	80 (10.5)
Men	338	169 (50.0)	141 (41.7)	28 (8.3)
Women	431	107 (24.8)	272 (63.1)	52 (12.1)
Omiš	745	204 (27.4)	498 (66.8)	43 (5.8)
Men	365	119 (32.6)	225 (61.6)	21 (5.8)
Women	380	85 (22.4)	273 (71.8)	22 (5.8)
Split	371	76 (20.5)	261 (70.4)	34 (9.1)
Men	182	49 (26.9)	119 (65.4)	14 (7.7)
Women	189	27 (14.3)	142 (75.1)	20 (10.6)
Vis	279	68 (24.4)	204 (73.1)	7 (2.5)
Men	121	32 (26.5)	83 (68.6)	6 (4.9)
Women	158	36 (22.8)	121 (76.6)	1 (0.6)
Total	3364	950 (28.2)	2152 (64.0)	262 (7.8)
Men	1571	568 (36.2)	886 (56.4)	117 (7.4)
Women	1793	382 (21.3)	1266 (70.6)	145 (8.1)

* Rest = external causes of death + unknown residence status+ lost to follow-up

TABLE 2
FOLLOW-UP OF SMOKERS (1972 AND 1982) BY REGIONS AND SEX

REGION	1972		1982	
	N	Smokers (%)	N	Smokers (%)
Črnomerec	651	254 (39.0)	435	164 (37.7)
Men	292	164 (56.4)	191	90 (47.1)
Women	359	90 (25.5)	244	74 (30.3)
Centar	549	217 (39.5)	382	137 (35.9)
Men	273	141 (51.6)	183	81 (44.3)
Women	276	76 (27.7)	199	56 (28.1)
Virovitica	769	224 (29.1)	557	142 (25.5)
Men	338	207 (61.8)	230	123 (53.5)
Women	431	17 (3.9)	327	19 (5.8)
Omiš	745	160 (21.5)	595	121 (20.3)
Men	365	143 (39.9)	282	103 (36.5)
Women	380	17 (4.5)	313	18 (5.8)
Split	371	149 (40.2)	214	86 (40.2)
Men	182	102 (56.0)	101	45 (44.6)
Women	189	47 (25.0)	113	41 (36.3)
Vis	279	77 (27.6)	232	69 (29.7)
Men	121	65 (54.6)	103	48 (46.6)
Women	158	12 (7.8)	129	21 (16.3)
Total	3364	1081 (32.1)	2415	719 (29.8)
Men	1571	822 (52.8)	1090	490 (45.0)
Women	1793	259 (14.6)	1325	229 (17.3)

mass index, sedative intake (4 categories), adventitious lung sounds (râles), pneumonia in the past, forced expiratory time, electrocardiogram findings, previously suffered myocardial heart attack, ischemic heart disease, other heart diseases, and residence status (Figure 1; Table 3a, Table 4a). Quantity components included age, number of smoked cigarettes per day, forced vital capacity, 100FEV₁/VC, systolic, and diastolic blood pressure (Figure 1; Table 3b; Table 4b). Body mass index (18.5–25), ECG, mortality in Virovitica region, and negative results of described variables was used as baseline values.

Statistical analysis

Data processing included descriptive statistics and survival analysis by Cox regression method with changeable predictors explaining the relative risk of death and 95% confidence limits separately for men and women²⁴. The analyses were performed using SAS 8.0 software (SAS Institute Inc. 2003).

Results

The lowest mortality among women was observed in Split and among men in Split and Vis the highest in Virovitica

TABLE 3
 MODEL WITH UNIVARIATE AND MULTIVARIATE RELATIVE RISKS WITH CONFIDENCE LIMITS (BY YEAR OF EXAMINATION) – MEN

Variable	Men		Multivariate analysis				Univariate analysis			
	1972.	1982.	RR	95 % CI	P	RR	95 % CI	P		
	N (%)	N (%)								
a) qualitative variables										
Sedatives:					0.0279					
Never	1321 (84.0)	572 (52.7)	1.000	–	–	–	–	–	–	–
Sometimes	185 (11.9)	309 (28.5)	0.869	(0.687–1.097)	0.2378	1.044	(0.847–1.286)	0.6873		
Regularly a little	54 (3.5)	133 (12.3)	1.397	(1.041–1.874)	0.0260	1.686	(1.305–2.178)	<0.0001		
Regularly a lot	10 (0.6)	70 (6.5)	1.219	(0.801–1.855)	0.3542	2.004	(1.422–2.824)	<0.0001		
Râles	270 (17.3)	500 (45.9)	1.271	(0.993–1.492)	0.0579	1.747	(1.476–2.067)	<0.0001		
Forced expiratory time > 5 seconds	462 (32.0)	74 (36.3)	1.240	(0.919–1.374)	0.2557	1.748	(1.468–2.082)	<0.0001		
Pneumonia	33 (2.1)	363 (33.3)	0.873	(0.698–1.092)	0.2336	1.186	(0.972–1.448)	0.0924		
Electrocardiogram findings:					0.0012					
o.k.	1074 (68.9)	618 (56.8)	1.000	–	–	–	–	–	–	–
Mainly o.k.	113 (7.2)	87 (8.0)	0.558	(0.368–0.848)	0.0062	0.643	(0.431–0.959)	0.0303		
Mainly pathologic findings	233 (15.0)	160 (14.7)	1.173	(0.917–1.501)	0.2034	1.326	(1.053–1.670)	0.0165		
Pathologic findings	139 (8.9)	223 (20.5)	1.327	(1.047–1.681)	0.0191	1.791	(1.460–2.196)	<0.0001		
Right heart ECG signs	3 (0.3)	3 (0.3)	0.399	(0.917–1.713)	0.1575	2.851	(1.860–4.372)	<0.0001		
Chronic ischemic heart disease	113 (7.2)	73 (6.7)	1.253	(0.918–1.715)	0.1577	1.969	(1.515–2.559)	<0.0001		
Others heart diseases	31 (2.0)	33 (3.0)	0.940	(0.557–1.586)	0.8172	1.372	(0.878–2.144)	0.1644		
Region:					<0.0001					
Zagreb Črnomerec	292 (18.6)	191 (17.5)	0.729	(0.549–0.970)	0.0299	0.673	(0.529–0.855)	0.0012		
Zagreb Centar	273 (17.4)	183 (16.8)	0.598	(0.435–0.823)	0.0016	0.538	(0.415–0.696)	<0.0001		

Variable	Men		Multivariate analysis				Univariate analysis			
	1972. N (%)	1982. N (%)	RR	95 % CI	P	RR	95 % CI	P		
Virovitica	338 (21.5)	230 (21.1)	1.000	–	–	–	–	–		
Omiš	365 (23.2)	282 (25.9)	0.640	(0.491–0.835)	0.0010	0.528	(0.418–0.668)	<0.0001		
Split	182 (11.6)	101 (9.3)	0.462	(0.330–0.647)	<0.0001	0.425	(0.309–0.585)	<0.0001		
Vis	121 (7.7)	103 (9.4)	0.481	(0.322–0.719)	0.0004	0.404	(0.277–0.590)	<0.0001		

b. Quantitative variables										
Variables	Men		Multivariate analysis				Univariate analysis			
	Valid N	X	± SD	RR	95 % CI	p	RR	95 % CI	p	
Age '72	1571	47.55	5.65	1.048	(1.030–1.066)	<0.0001	1.070	(1.053–1.086)	<0.0001	
Age '82	1571	57.55	5.65							
Body mass index =25 '72	1557	26.18	3.60	0.732	(0.602–0.889)	0.0031	0.695	(0.583–0.828)	<0.0001	
Body mass index =25 '82	1090	27.60	3.80							
N. Cigarettes/day>0 '72*	822	23.60	11.04	1.013	(1.007–1.020)	<0.0001	1.014	(1.009–1.019)	<0.0001	
N. Cigarettes/day>0 '82*	490	21.83	12.16							
FVC '72 (dl.)	1560	445.89	78.58	0.998	(0.997–0.999)	0.0002	0.996	(0.995–0.997)	<0.0001	
FVC '82 (dl.)	1046	365.22	85.28							
100FEV ₁ /VC '72	1559	72.29	9.24	0.991	(0.982–0.999)	0.0349	0.978	(0.971–0.985)	<0.0001	
100FEV ₁ /VC '82	1046	75.85	11.09							
Systolic BP '72 (mm Hg)	1561	141.11	20.29	1.009	(1.004–1.013)	<0.0001	1.014	(1.010–1.017)	<0.0001	
Systolic BP '82 (mm Hg)	1090	146.56	22.11							

* Only for smokers; Bold = statistically significant RR

TABLE 4
MODEL WITH UNIVARIATE AND MULTIVARIATE RELATIVE RISK WITH CONFIDENCE LIMITS (BY YEAR OF EXAMINATION)—WOMEN

Variable	Women		Multivariate analysis				Univariate analysis			
	1972. N (%)	1982. N (%)	RR	95 % CI	P	RR	95 % CI	P		
a) Qualitative variables										
Sedatives:					0.0967					
Never	1221 (68.8)	522 (39.8)	1.000	—	—	—	—	—	—	—
Sometimes	442 (24.9)	488 (37.1)	0.972	(0.744–1.709)	0.8360	1.057	(0.834–1.340)	0.6468		
Regularly a little	100 (5.6)	221 (16.8)	1.350	(0.973–1.873)	0.0728	1.722	(1.299–2.281)	0.0002		
Regularly a lot	13 (0.7)	83 (6.3)	1.478	(0.929–2.352)	0.0991	2.075	(1.376–3.129)	0.0005		
Râles	106 (6.0)	407 (30.7)	0.874	(0.663–1.152)	0.3406	1.171	(0.926–1.480)	0.1887		
Forced expiratory time > 5 seconds	186 (11.6)	38 (17.6)	1.109	(0.808–1.522)	0.5214	1.421	(1.062–1.900)	0.0180		
Pneumonia	36 (2.0)	337 (25.4)	1.133	(0.855–1.501)	0.3855	1.245	(0.969–1.601)	0.0865		
Electrocardiogram findings:					0.0012					
o.k.	1138 (64.1)	663 (50.3)	1.000	—	—	—	—	—	—	—
Mainly o.k.	101 (5.7)	49 (3.7)	0.813	(0.423–1.562)	0.5344	0.898	(0.512–1.577)	0.7086		
Mainly pathologic findings	347 (19.5)	332 (25.2)	1.015	(0.769–1.340)	0.9152	1.215	(0.945–1.563)	0.1284		
Pathologic findings	190 (10.7)	275 (20.8)	1.247	(0.931–1.670)	0.1395	1.793	(1.399–2.300)	<0.0001		
Right heart ECG signs	1 (0.1)	4 (0.3)	3.010	(0.858–10.565)	0.0853	3.313	(1.567–7.002)	0.0017		
Chronic ischemic heart disease	258 (14.3)	66 (5.0)	1.289	(0.907–1.832)	0.1564	2.000	(1.493–2.680)	<0.0001		
Others heart diseases	49 (2.8)	37 (2.8)	2.219	(1.400–3.518)	0.0007	2.860	(1.906–4.291)	<0.0001		
Region:					<0.0001					
Zagreb Ŗrnomerec	359 (20.0)	244 (18.4)	0.739	(0.508–1.075)	0.1133	0.729	(0.540–0.985)	0.0393		
Zagreb Centar	276 (15.4)	199 (15.0)	0.675	(0.456–1.000)	0.0500	0.752	(0.544–1.039)	0.0841		

Variable	Women		Multivariate analysis				Univariate analysis			
	1972. N (%)	1982. N (%)	RR	95 % CI	P	RR	95 % CI	P		
Virovitica	431 (24.0)	327 (24.7)	1.000	–	–	–	–	–		
Omiš	380 (21.2)	313 (23.6)	0.739	(0.537–1.016)	0.0622	0.810	(0.609–1.077)	0.1475		
Split	189 (10.5)	113 (8.5)	0.541	(0.345–0.849)	0.0076	0.525	(0.344–0.801)	0.0028		
Vis	158 (8.8)	129 (9.7)	0.768	(0.512–1.152)	0.2018	0.806	(0.553–1.176)	0.2640		
b) Quantitative variables										
Variables	Women		Multivariate analysis				Univariate analysis			
	Valid N	X ± SD	RR	95 % CI	p	RR	95 % CI	P		
Age '72	1792	47.73	1.106	(1.081–1.133)	<0.0001	1.122	(1.101–1.145)	<0.0001		
Age '82	1792	57.73	5.72							
Body mass index =25 '72	1777	27.80	4.54			0.834	(0.630–1.103)	0.5449		
Body mass index =25 '82	1325	29.50	4.82					0.972 (0.757–1.248)		
N. Cigarettes/day>0 '72*	259	16.96	9.20			1.024	(1.005–1.943)	0.0111		
N. Cigarettes/day>0 '82*	229	13.93	9.79					1.011 (1.002–1.020)		
FVC '72 (dl.)	1777	320.13	58.16			0.999	(0.997–1.001)	0.3321		
FVC '82 (dl.)	1233	270.93	65.69					0.994 (0.992–0.995)		
100FEV ₁ /VC '72	1777	75.14	7.88			1.006	(0.994–1.018)	0.2952		
100FEV ₁ /VC '82	1233	76.32	10.21					0.990 (0.980–1.000)		
Systolic BP '72 (mm Hg)	1777	144.60	22.02			1.007	(1.003–1.012)	0.0030		
Systolic BP '82 (mm Hg)	1325	154.91	23.20					1.014 (1.009–1.018)		

* Only for smokers; Bold = statistically significant RR

(Table 1). Table 2. presents the analysis of smoking habit related to region and sex. In 1972, there were 52.8% men smokers, and 14.6% women smokers. In 1982, the proportion of men smokers decreased significantly to 45.0%, and the proportion of women smokers increased to 17.3%. The proportion of men smokers in 1972 ranged from 40.0% in Omiš to 61.8% in Virovitica. Ten years later (1982), the proportion of men smokers was still the lowest in Omiš (36.5%) and highest in Virovitica (53.5%) region. There is a noticeable difference between women from urban (Centar, Črnomerec, Split) and rural regions (Virovitica, Omiš, Vis). In 1972, there were more than 25% women smokers from urban areas and less than 8% from rural areas. In 1982, the proportion of women smokers increased and was above 20% in urban and below 8% in rural regions. The exception is Vis where the proportion of women smokers increased from 7.8% to 16.3% between 1972 and 1982.

Table 3 A presents, in sample of men the distribution of qualitative variables and RR for survival. Trends of sedative consumption and frequency of health problems were noticed.

Table 3 B (distribution of quantitative variables, RR for survival in men sample) shows a statistically significant increase in BMI >25, systolic pressure, and a decrease in FVC. Apart from age, BMI, sedative consumption, FVC (decline >0.1 L), 100FEV₁/VC (10% decline), systolic blood pressure (inclination >10 mm Hg), adverse ECG findings, past heart attacks, and the region presented a statistically significant RR in men. In women (Table 4A., 4B.), these risks included (apart from age) systolic pressure >10 mm Hg, adverse ECG findings, history of heart diseases (with the exception of coronary syndrome) and the region.

The analysis showed statistical significance of smoking to survival in men and women. The relation was more obvious in

women. In men, each additional cigarette pack smoked per day increased the death risk by 1.3%. In women each additional cigarette pack smoked per day increased the risk by 2.4%.

Discussion

Results on cigarette smoking habit were described by multivariate Cox regression. Apart from smoking, the model included a set of concomitants explicatory variable. The study points out that the relative risk of death related to smoking habit is more obvious in women, which is in line with the results of similar studies^{25,26}. Study results confirmed that tobacco smoking independently represents one of statistically significant survival risks, as well as included confounders^{27,28}. The relative risk of some confounders resulted insignificantly in the model. We speculate that the reasons for that may be in a relatively low mortality rate, especially in women. We could not analyze specific mortality (e.g. cardiovascular, neoplasm). In the Republic of Croatia, apart from the known tobacco production size (Virovitica region: possible occupational exposure to nicotine = green tobacco sickness), there has been no analysis conducted so far, which would be comprehensible, epidemiological, prospective and age-based cohorts. Neither has been conducted an analysis regarding sex, urban/rural population, and regarding macro-regional or regional location^{29,30}. Mortality in Croatia is higher than in the neighboring western countries^{13,30,31}. Moreover, our multivariable model indicates mortality dissimilarities between urban and rural areas of the country. In rural areas, unfit life and work conditions, diet structure, and incomplete health insurance that had been in function until 1976, could explain these results to some extent. This mostly relates to the survival results in the population of Virovitica and Vis. Besides, population

sample from Virovitica as an inland rural area has the worst morbidity indicators^{11,13}. Higher death risk in women from the region of Vis (in comparison with Split region) is statistically significant. It might be possibly derived that biologically common difference in survival between men and women was missing. We have tried to apply a limited model to imitate actual life conditions. Smoking in our study does not include smoking index, passive smoking or separate data on former smokers in both check-ups and specific mortality rates. The study is limited by incomplete data on specific mortality (e.g. lung neoplasm). They were not included in the multivariate epidemiological model because of small frequencies with specific cause of death in the sample in this follow-up. That type of data analysis could not esti-

mate differences in survival between women and men. The inconvenience of the method is that the model could not solve the relation between statistical interactions and biologic synergism for health indicators. Our results confirm the susceptibility of men and especially women smokers, indicating a necessity to improve prevention of smoking in order to increase a survival. Our report justifies the extension of a prospective study of long-term effects of smoking, and widens compound of explicatory variables on life span, survival and mortality.

Acknowledgment

This study has been supported by the grant 0022006 of the Ministry of Science, Education and Sports, Republic of Croatia.

REFERENCES

1. GEORGIEVA, L., J. POWLES, G. GENCHEV, P. SALCHEV, G. POPTODOROV, *Croat. Med. J.*, 43 (2002) 240. — 2. HAMMOND, E. C., D. HORN, *JAMA*, 148 (1954) 1316. — 3. KAUFMAN, F., D. BRAILLE, J. SELLOUT, *Bull. Physiopath. Resp.*, 11 (1975) 45. — 4. DOLL, R., R. PETO, K. WHEATLY, R. I. GRAY, R. SUTHERLAND, *BMJ*, 309 (1994) 901. — 5. PETO, R.: Mortality from smoking in developed countries 1950–2000. (New York, Oxford University Press; 1994). — 6. REAMY, J., S. OREŠKOVIĆ, *Croat. Med. J.*, 40 (1999) 237. — 7. NILSON, S., J. M. CARSTENSEN, G. PERSHAGEN, *J. Epidem. Community Hlth.*, 55 (2001) 825. — 8. TAYLOR, D. H., V. HASSELHAD, S. J. HENLEY, M. J. THUN, F. A. SLOWAN, *Am. J. Public Hlth.*, 92 (2002) 990. — 9. HORVAT, D., *Coll. Antropol.*, 27 (2003) 541. — 10. HRUŠTIĆ, O., M. ŠARIĆ, *Arh. Hig. Rada Toksikol.*, 26 (1975) 15. — 11. MIMICA, M., M. ŠARIĆ, M. MALINAR, *Arh. Hig. Rada Toksikol.*, 29 (1978) 289. — 12. ŠIMUNIĆ, M., *Liječ. Vjesn.*, 115 (1993) 185. — 13. PAVLOVIĆ, M., A. JAZBEC, D. ŠIMIĆ, N. ČOROVIĆ, M. MALINAR, M. MIMICA, *Eur. J. Epidemiol.*, 16 (2000) 1061. — 14. ROSE, G. A., H. BLACKBURN: *Monograph. Series No 56.* (Geneva, World Health Organization; 1996). — 15. FLETCHER, C., R. PETO, C. TINKER, F. E. SPEIZER: *Natural history of chronic bronchitis and emphysema.* (Oxford University Press, 1976). — 16. BOSSE, R., D. SPARROW, A. J. GARVEY, *Arch. Environ. Health*, 35 (1980) 247. — 17. FARCHI, G., A. MENOTTI, S. CONTI, *Am. J. Epidemiol.*, 126 (1987) 400. — 18. ZAVELA, K. J., J. E. BARNETT, K. J. SMEDI, J. A. ISTVAN, *J. Appl. Soc. Psychology*, 20 (1990) 835. — 19. PHILLIPS, A. N., S. G. WANNAMETHE, M. WALKER, A. THOMSON, G. D. SMITH, *BMJ*, 313 (1996) 907. — 20. ABRAHAM, E., E. DINYA, A. SALL, *Overosi. Hetilap.*, 138 (1997) 523. — 21. CHUN, M. J., L. F. APICELLA, S. J. HENLEY, *JAMA* 284 (2000) 706. — 22. TESSIER, J. F., C. NEJJARI, L. LETENNEUR, P. BARBERGER-GATEAU, J. F. DARTIGUES, R. SALAMON, *Intern. J. Tuberc. Lung Dis.*, 4 (2000) 698. — 23. WEEL, W., J. C. BAKX, M. I. VELDSTRA, H. J. M. VAN DER HOOGEN, G. A. ZIELHUIS, T. THIEN, C. VAN, F. VAN DER BOSCH, *Prev. Medicine* 32 (2001) 142. — 24. COLLET, D.: *Modeling survival data in medical research.* (London, Chapman & Hall; 1994). — 25. PRESCOT, E., M. OSLER, P. K. ANDERSON, H. O. HEIN, K. BORCHJOHNSEN, P. LANGE, V. SCHNOHR, J. VESTBO, *Intern. J. Epidemiol.* 27 (1998) 27. — 26. NILSON, S., J. M. CARSTENSEN, G. PERSHAGEN, *J. Epidem. Community Hlth.*, 55 (2001) 825. — 27. SCOTT, W. K., C. A. MACERA, C. B. CORNMAN, P. A. SHARPE, *J. Clin. Epidemiol.*, 50 (1997) 291. — 28. BENETOS, A., A. RUDNICH, F. THOMAS, M. SAFAR, L. GUIZE, *Hypertension*, 33 (1999) 44. — 29. JACOBS, D. R., H. ADACHI, I. MULDER, D. KROMHOUT, A. MENOTTI, A. NISSINEN, H. BLACKBURN, *Arch. Intern. Med.* 159 (1999) 733. — 30. FERNANDEZ, E., A. SCHIAFFINO, J. M. BORRAS, *Salud Publica de Mexico, 1 Suppl.* (2002) S11. — 31. WATSON, P., *Social. Sci. Medicine*, 41 (1995) 923.

M. Pavlović,

Institute for Medical Research and Occupational Health, Ksaverska c. 2, 10000 Zagreb, Croatia

PUŠENJE, SIMPTOMI KRONIČNIH BOLESTI I PREŽIVLJENJE U KONTINENTALNOJ I OBALNOJ POPULACIJI U HRVATSKOJ: DALJNJE ISTRAŽIVANJE

S A Ž E T A K

Cilj istraživanja bio je procijeniti povezanost životnih navika, a posebno navike pušenja cigareta te sklopa pojedinih rezultata jednostavnih liječničkih pregleda s trajanjem dužine životnog vijeka – preživljenjem vodeći računa o kontinentalnoj i primorskoj regiji zemlje ali i različitostima urbanog i ruralnog načina življenja. Istraživanje se temeljilo na podacima dobnog i spolno stratificiranog uzorka opće populacije Hrvatske u dobi od 38–57 g. (1571 muškarac i 1793 žene iz 1972 g., te ponovljenog pregleda 1982 g na ispitanicima koji su se odazvali na ponovni pregled (N= 1090 M; 1325 Ž) /općine: Zagreb – četvrti: Centar i Črnomerec; Split, Omiš, Vis, Virovitica). Od 1985–1999 g. praćen je vitalni status sudionika studije. U razdoblju između pregleda 1972–1982 g. registriran je pad broja pušača cigareta u cjelokupnom uzorku. Uočljiva je razlika u broju žena pušača u urbanim i ruralnim sredinama, te porast navike pušenja u žena. U gradskim sredinama broj pušača cigareta bio je više od 28%, a u ruralnim 6%. U uzorku stanovništva otoka Visa navika pušenja se u tom razdoblju u pučanstvu uvećala sa 7.8 na 16.3%. Nakon univarijatne analize koja je arbitrarno uključila varijable potencijalno povezane s navikom pušenja urađena je multivarijatna analiza postupkom Coxove regresije. U populaciji muškaraca uz dob kao značajni prediktor hazarda preživljenja te dnevne potrošnje cigareta bile su kao eksplikatorne varijable zabilježene BMI, liječenje sedativima, vitalni kapacitet, 100FEV₁/VC, sistolički krvni tlak, elektrokardiografski nalaz, preboljeli srčani infarkt i regija, a najviše pušača zabilježeno je u općini Virovitica. U žena su značajni predktori rizik preživljenja uz životnu dob i pušenje cigareta bili sistolički krvni tlak, nalaz elektrokardiograma, zabilježene preboljele bolesti srca izuzev infarkta miokrada te regionalna pripadnost. Svaka pupušena kutija cigareta više od one koju su ispitanici iznijeli prilikom medicinskog pregleda uvećava rizik smrti za 2.4% u žena, a 1.3% u muškaraca. U radu se potvrđuje utjecaj navike pušenja cigareta na rizik preživljenja.