ASSOCIATION OF POOR SELF-PERCEIVED HEALTH WITH DEMOGRAPHIC, SOCIOECONOMIC AND LIFESTYLE FACTORS IN THE CROATIAN ADULT POPULATION

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The aim of this study was to analyse the association of poor self-perceived health with demographic, socioeconomic and lifestyle factors using data from the European Health Interview Survey. When applying the multiple logistic regression model, two demographic (male sex, older age), all four socioeconomic (low education level, unemployed and retired, living in households with lowest income, poor social support) and only one lifestyle factor (no alcohol consumption) were revealed as associated with poor self-perceived health. The association of socioeconomic factors with self-perceived health among the adult population in Croatia is direct and not mediated exclusively through lifestyle factors.

Keywords: self-perceived health, European Health Interview Survey, socioeconomic factors, lifestyle factors

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INTRODUCTION

Self-perceived health is a widely used indicator of an individual's general state of health. It is a multi-dimensional concept referring to the physical aspects of health, but also to the functional and wellbeing dimension of health as well as to the extent of adaptation and attitude towards an existing illness (Simon, De Boer, Joung, Bosma, & Mackenbach, 2005). Today, self-perceived health is considered to be one of the most important health indicators. It represents the individual perception and evaluation of one's own health, so it is a better predictor of future health condition in some cases, even better than clinical assessment (Steptoe & Wardle, 2017).

Self-perceived health has been included as indicator No. 33 into the Health Status chapter of European Core Health Indicators (ECHI), which is the main indicator system accepted for monitoring health in the European Union (EU). Therefore, data on self-perceived health are regularly collected and readily available for numerous European countries (European Commission, 2017a). Demographic, socioeconomic and lifestyle determinants of self-perceived health have been explored in several studies in different European countries, including international comparisons which showed significant differences among countries in both self-perceived health as well as its determinants (Babić-Banaszak, Kovačić, & Mastilica, 2002; Jureša et al., 2000; Vuletić, 2013; Džakula, Babić Bosanac, Brborović, Vukušić Rukavina, & Vončina, 2007).

In the Republic of Croatia, some research has been conducted in the past ten years or so, with self-health assessment considering various influences (age, sex, social and economic influences) as the basic indicator of health condition (Novak, Suzuki, & Kawachi, 2015; Šućur & Zrinščak, 2007; Smolić, 2017). The study conducted during the 1997–1999 period in fourteen Croatian counties showed that 20.7% of Croatian citizens evaluated their health as poor, and more often women, older respondents, those with lower educational level and lower income (Babić-Banaszak et al., 2002). According to the European Quality of Life Survey, which was conducted in Croatia in 2006, 14.6% of Croatian citizens rated their health as poor, compared with 5.8% in the European Union (EU) member states which joined the EU before May 2004 (EU15) and 15.8% in the EU member states which joined the EU in May 2004 – new member states (NMS). As expected, respondents in higher income quartiles assessed their health status as more favourable than those in lower income quartiles. However, when only respondents who rated their health as poor were taken into account, the proportion ratio between the extreme income quartiles in Croatia was twice the ratio in the EU15 and NMS, i.e. the poor in Croatia rated their health as poor more frequent-

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ly than the poor in EU countries. There were more rural than urban residents who rated their health as poor, and the rural-urban proportion ratio for those reporting poor health was much higher in Croatia than in the rest of the EU (Šućur & Zrinščak, 2007).

Other studies also showed that self-perceived health status in Croatia is low, and monitoring patients over a period of five years has shown that the perception is getting worse. Self-perceived health status differs within Croatia, being the lowest in the East region (Vuletić, 2013).

According to Eurostat statistics from 2014, women generally perceive their health as poor or very poor more often than men. In the EU as a whole (with all 28 member states included), 11% of women and 9% of men perceived their health as poor or very poor, but in Croatia 21.8% of women and 17.7% of men perceived their health as poor or very poor. In the EU, 54% of the population with completed lower secondary education, 70% of the population with completed upper secondary and 81% of the population with completed tertiary education perceived their health as very good or good. Croatia shows the largest gap in the share of the population reporting very good or good health between those with the highest and the lowest educational attainment levels (41 percentage points) (Eurostat, 2017). However, no studies in Croatia so far have analysed the association of lifestyle determinants, such as smoking, alcohol consumption, nutrition and social support with poor self-perceived health.

As the European Health Interview Survey (EHIS) included also data on lifestyle determinants, in this study it was possible to include them, alongside demographic and socioeconomic determinants, in the analysis and evaluate not only their association with self-perceived health, but also the way they modify the association of demographic and socioeconomic factors with self-perceived health in order to explore whether demographic and socioeconomic factors are directly connected to self-perceived health or if this relationship is to a great extent mediated by lifestyle factors. The aim of this study was to explore for the first time the association of lifestyle factors, alongside demographic and socioeconomic factors, with poor self-perceived health in the Croatian population.

PARTICIPANTS AND METHODS

Sample

This study was based on EHIS wave 2, which was conducted in Croatia in 2014 and 2015 by the Croatian Institute of Public Health in cooperation with the counties' and City of Zagreb Institute of Public Health, Croatian Bureau of Statistics and

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the Ministry of Health. The survey used stratified two-stage random sampling of private households. The sampling frame was the 2011 population census. Primary sampling units were segments chosen with square root probability proportional to a number of private households in each primary sampling unit, while secondary sampling units were inhabitant dwellings selected from the primary sampling units with equal probability. The sample consisted of households living in 3,140 dwellings, out of which 2,401 households with 5,446 individuals aged 15 years and older participated in this survey in the period from April 2014 until March 2015.

Basic breakdown of the sample according to sex, age, residence, marital status and education level is shown in Table 1.

◑ TABLE 1
Sample according to sex, age, residence, marital status and education level

		%
Sex	Male	47.3
	Female	52.7
Age group (in years)	15-24	12.3
	25-34	12.5
	35-44	14.0
	45-54	16.3
	55-64	18.2
	65-74	14.2
	75+	12.5
Residence	Thinly populated rural areas	49.8
	Intermediate density areas (towns and suburbs)	32.7
	Densely populated areas (cities)	17.5
Marital status	Never married and never in registered partnership	24.5
	Married or in registered partnership	59.6
	Widowed	12.2
	Divorced	3.7
Education level	Low (lower secondary education or less)	27.0
	Medium (upper secondary education)	55.0
	High (tertiary education)	17.9

The individual response rate was 81%. Respondents were interviewed face-to-face or by telephone by trained interviewers. Proxy interviews were allowed for respondents suffering from severe impairments or absent from the household for longer periods. The percentage of proxy interviews was 6.5%. However, proxy interviews were not allowed for certain questions, including the question on self-perceived health. Prior to participation in the survey, all respondents provided signed written consent for participation (for respondents younger than 18 years, consent was signed by their parent/legal guardian). In order for the results to be representative for the adult population in Croatia, all analyses were done on weighted

data. Calibration was used to adjust weighting to the estimated Croatian population in 2014 according to age groups and sex (Croatian Institute of Public Health, 2016).

Variables

The dependent variable poor self-perceived health was defined by answers "very poor" and "poor" to the question "How is your health in general?" (the remaining possible answers were "fair", "good" and "very good"). Answers "very poor" and "poor" were pooled together as poor self-perceived health, while answers "fair", "good" and "very good" were also pooled together as the opposite category of nonpoor self-perceived health for the purpose of this analysis, thus creating a dichotomous self-perceived health variable.

Independent variables were divided into three groups: demographic, socioeconomic and lifestyle. Demographic variables included sex, ten-year age groups (15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75+ years), region of residence, degree of urbanisation of respondent's place of residence and legal marital status, while socioeconomic variables included education level, working status, quintile of household's income and level of social support.

All respondents were divided into six regions according to the county of residence which resemble their geographic and historical specifics: Northern (Krapina-Zagorje, Varaždin, Koprivnica-Križevci and Međimurje), Eastern (Virovitica-Podravina, Požega-Slavonija, Slavonski Brod-Posavina, Osijek-Baranja and Vukovar-Srijem), Southern (Šibenik-Knin, Split-Dalmatia, Dubrovnik-Neretva and Zadar), Western (Primorje-Gorski Kotar, Lika-Senj and Istria), Central (Zagreb County, Sisak-Moslavina, Karlovac and Bjelovar-Bilogora) and City of Zagreb.

The degree of urbanisation was classified according to the Degree of Urbanisation Classification of Local Administrative Units (DEGURBA) into three categories: cities (densely populated areas), towns and suburbs (intermediate density areas) and rural areas (thinly populated areas) (European Commission, 2017b).

Legal marital status included four categories: never married and never in registered partnership, married or in registered partnership, widowed or with registered partnership that ended with the death of a partner (not remarried or in new registered partnership) and divorced or with registered partnership that was legally dissolved (not remarried or in new registered partnership).

The educational attainment level is defined according to the International Standard Classification of Education 2011 (ISCED, 2011). Classification is designed to serve as a framework to classify educational activities as defined in programmes and

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the resulting qualifications into internationally agreed categories. ISCED 2011 differentiates nine levels of education: level 0 – No formal education or below, level 1 – Primary education, level 2 – Lower secondary education, 3 – Upper secondary education, 4 – Post-secondary but non-tertiary education, 5 – Short-cycle tertiary education; 6 – Bachelor's or equivalent level; 7 – Master's or equivalent level and 8 – Doctoral or equivalent level. Low education level included ISCED 0-2, medium included ISCED 3-4 and high included ISCED 5-8 (Bonner et al., 2017). Education level was determined according to the highest education level completed based on the International Standard Classification of Education-2011 (ISCED-2011). Adjusted to Croatian education levels, that means that low education level included those with completed primary school or less, medium education level included those with completed secondary school or other education level following primary school, and high education level included those with completed college or bachelor degree and higher.

Self-declared working status included five categories: carries out a job or profession (includes unpaid work for family business or holding, apprenticeship or paid traineeship), unemployed, pupil/student (including unpaid training or unpaid work experience), retired and other (includes permanently disabled, voluntary military service, fulfilling domestic tasks and other inactive persons).

Household income quintiles were calculated using data on household's size and composition and data on the total net monthly income of a household which were collected for each household participating in the survey. Equivalised total net monthly income of the household was calculated for each household as a ratio between total net monthly income of the household and equivalised household size (which is a sum of weights attributed to each member of the household according to the modified OECD equivalence scale: 1.0 to the first adult, 0.5 to the second and each subsequent person aged 14 and over and 0.3 to each child aged under 14). After equivalised total net monthly income of the household had been calculated for all households, conversion into household income quintile groups was done so that all the survey population was divided into equally represented five groups according to the value of equivalised total net monthly income of the household.

The Oslo Social Support Scale (OSS-3) was selected to measure social support. It includes three individual variables: standardised questions on primary support group, interest and concern shown by others and easiness of obtaining practical help (each scored 0 to 4) which are used to calculate social sup-

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port score (with higher score indicating greater social support) placed into three categories: poor, intermediate and strong social support (Meltzer, 2003).

Lifestyle variables included body mass index (BMI), smoking status, fruits and vegetables intake and alcohol consumption. BMI was calculated from the self-reported height and weight. According to smoking status, respondents were divided into smokers and non-smokers. Fruits and vegetables intake included two categories: those who consume 5 or more portions of fruits and vegetables daily in line with the World Health Organisation recommendation and those who do not (World Health Organisation, 2015). According to alcohol consumption, respondents were divided into those who consume alcohol and those who do not.

Statistical analysis

Descriptive statistics (percentages) were calculated for poor self-perceived health as well as demographic, socioeconomic and lifestyle factors, including 95% confidence intervals (CI). Logistic regression was used to evaluate the association of poor self-perceived health (dependent variable) with demographic, socioeconomic and lifestyle factors (predictor variables). The association of each predictor variable with the dependent variable was analysed through simple logistic regression (without adjustment for other predictor variables) and through the multiple logistic regression model which was prepared using backward stepwise elimination procedure: all demographic, socioeconomic and lifestyle variables were initially included in the model regardless of the statistical significance of their relation to the poor health calculated by simple logistic regression; at each step a variable with the weakest relationship to poor health was removed, until only variables significantly related to poor health ($p > 0.05$) remained in the model. As an indicator of goodness-of-fit of multiple regression model, McFadden's pseudo R^2 index was used which indicated satisfactory goodness-of-fit for the final multivariate model ($R^2 = 0.26$) (McFadden, 1974; McFadden, 1979).

RESULTS

Distribution of poor self-perceived health among different demographic and socioeconomic population groups is presented in Tables 2 and 3.

The percentage of the population with poor self-perceived health in the Croatian adult population is 14.9% (13.7% among men and 16.0% among women). It is constantly increasing from the youngest (15-24 years) to the eldest age group (75 years and older). According to the region, the percentage of the po-

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⟳ TABLE 2
Distribution of poor
self-perceived health
according to
demographic
variables*

pulation with poor self-perceived health varies between 12.1% (City of Zagreb) and 17.5% (Central region). The City of Zagreb and Southern region have both among men and women the lowest percentages of poor self-perceived health, while the Northern and Central regions have the highest. The prevalence of poor self-perceived health is higher among the population in rural areas, widowed persons, the population with low education level, retired persons, those living in households in the first income quintile and those with poor social support, with the same pattern of results recorded both among men and women.

	Total		Men		Women	
	poor health (%)	95% CI	poor health (%)	95% CI	poor health (%)	95% CI
Total	14.9	13.9-15.9	13.7	12.4-15.2	16.0	14.6-17.4
Age group (years):						
15-24	1.1	0.5-2.4	1.3	0.5-3.6	1.0	0.3-2.6
25-34	2.2	1.3-3.8	2.9	1.5-5.4	1.6	0.6-3.9
35-44	5.5	4.0-7.6	7.0	4.6-10.3	4.1	2.4-7.0
45-54	11.1	9.0-13.5	11.5	8.6-15.1	10.7	8.0-14.0
55-64	21.2	18.6-24.1	22.7	18.9-27.0	19.8	16.4-23.9
65-74	27.4	24.1-31.0	25.2	20.4-30.6	29.2	24.6-34.1
75+	45.8	41.6-50.0	40.9	34.4-47.6	48.4	43.0-53.9
Region:						
City of Zagreb	12.1	9.4-15.4	9.9	6.5-14.9	13.6	9.9-18.3
Northern	16.3	14.1-18.7	14.6	11.6-18.1	17.8	14.7-21.3
Eastern	15.9	13.8-18.3	14.5	11.6-18.0	17.2	14.1-20.7
Southern	13.0	10.9-15.4	11.5	8.8-14.9	14.5	11.6-18.0
Western	14.7	12.3-17.5	13.3	10.0-17.5	15.8	12.5-19.9
Central	17.5	15.3-19.8	17.6	14.6-21.2	17.3	14.4-20.6
Residence:						
densely populated areas (cities)	12.0	10.0-14.4	10.0	7.4-13.5	13.6	10.8-16.9
intermediate density areas (towns and suburbs)	13.5	12.0-15.3	12.0	9.9-14.4	15.0	12.8-17.5
thinly populated areas (rural areas)	17.7	16.2-19.2	17.0	14.9-19.2	18.3	16.3-20.6
Legal marital status:						
never married and never in registered partnership	5.4	4.3-6.9	6.9	5.2-9.0	3.6	2.2-5.7
married or in registered partnership	14.4	13.2-15.8	16.0	14.2-18.0	12.9	11.3-14.7
widowed	38.7	34.7-42.9	36.6	27.0-47.3	39.0	34.6-43.6
divorced	18.1	13.0-24.8	15.8	9.4-25.4	20.1	12.9-29.9

* Abbreviation: CI – confidence interval

↻ TABLE 3
Distribution of poor self-perceived health according to socioeconomic variables*

	Total		Men		Women	
	poor health (%)	95% CI	poor health (%)	95% CI	poor health (%)	95% CI
Education level:						
low	26.4	24.1-28.9	22.4	18.9-26.3	28.7	25.7-32.0
medium	12.3	11.1-13.6	12.5	10.9-14.4	12.0	10.3-14.0
high	7.9	6.3-9.9	9.3	6.9-12.6	6.7	4.7-9.4
Working status:						
carries out a job or profession	4.3	3.5-5.4	4.9	3.7-6.5	3.7	2.6-5.2
unemployed	11.1	9.0-13.7	11.4	8.4-15.3	10.9	8.2-14.4
pupil/student	0.9	0.4-2.0	0.7	0.2-2.9	1.0	0.4-2.8
retired	32.5	30.2-34.9	31.4	28.2-34.9	33.4	30.3-36.6
other	27.8	22.3-33.9	29.9	16.6-47.8	27.3	21.6-33.9
Household income quintiles:						
1st	22.5	19.5-26.0	18.1	14.2-22.8	26.3	21.9-31.4
2nd	21.0	18.0-24.4	20.1	15.9-25.0	21.9	17.7-26.7
3rd	15.2	12.5-18.3	14.1	10.7-18.4	16.1	12.3-20.8
4th	10.6	8.5-13.1	10.1	7.3-13.9	11.0	8.1-14.8
5th	8.0	6.1-10.3	6.8	4.5-10.1	9.1	6.4-12.7
Social support:						
poor social support	32.0	27.6-36.8	31.8	25.5-38.8	32.1	26.2-38.8
moderate social support	15.8	14.2-17.6	13.6	11.4-16.0	17.8	15.5-20.4
strong social support	11.5	10.3-12.8	11.3	9.6-13.2	11.6	10.0-13.5

* Abbreviation: CI – confidence interval

↻ TABLE 4
Distribution of poor self-perceived health according to lifestyle variables*

	Total		Men		Women	
	poor health (%)	95% CI	poor health (%)	95% CI	poor health (%)	95% CI
BMI:						
< 25	10.0	8.8-11.3	11.1	9.0-13.5	9.3	7.9-11.0
25-29.99	16.4	14.8-18.2	13.5	11.6-15.7	20.4	17.7-23.4
> 30	22.8	20.1-25.7	17.8	14.6-21.6	28.3	24.1-33.0
Smoking:						
smoker	11.7	10.1-13.6	11.9	9.8-14.5	11.5	9.1-14.4
non-smoker	16.2	15.0-17.4	14.6	12.9-16.4	17.5	15.9-19.2
Fruit and vegetables intake:						
at least 5 portions a day	11.4	8.5-15.1	14.4	9.5-20.5	9.5	6.2-14.3
less than 5 portions a day	15.1	14.1-16.2	13.7	12.3-15.2	16.5	15.0-18.0
Alcohol consumption:						
yes	10.0	8.9-11.2	10.4	9.0-12.0	9.3	7.7-11.1
no	21.3	19.6-23.1	21.6	18.7-24.8	21.1	19.1-23.3

* Abbreviations: CI – confidence interval, BMI – body mass index

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Concerning differences in lifestyle characteristics presented in Table 4, poor self-perceived health was most common among obese persons (BMI>30), non-smokers, persons who eat less than 5 portions of fruit and vegetables a day and those who do not drink alcohol. The same pattern of results was recorded both among men and women, except for eating less than 5 portions of fruit and vegetables a day, which was not related to the higher percentage of poor self-perceived health among men.

The results of unadjusted univariate logistic regression presented in Table 5 revealed that female sex (compared to male) and older age (compared to the youngest age group 15-24 years) were significantly associated with poor self-perceived health. Living in the Northern and Central regions (compared to the City of Zagreb) was significantly associated with poor health, while no significant difference was recorded for the remaining three regions. Residence in rural area (compared to residence in densely populated area – city) was significantly associated with poor health. Married, widowed and divorced had higher odds ratio (OR) for poor health compared to singles. Persons with high and middle education level had significantly lower OR for poor health compared to those with low education level. The unemployed, retired and other had higher OR for poor health compared to the employed, while pupils and students had a lower one. The OR for poor health decreased with the increase in household income quintiles. Persons with moderate and strong social support had significantly lower OR for poor health compared to those with poor social support. Both overweight (BMI 25-29.99) and obese persons (BMI>30) had higher OR for poor health compared to persons with BMI<25. Smokers had lower OR for poor health compared to non-smokers. Eating less than 5 portions of fruits and vegetables a day was not significantly associated with poor health compared to eating at least 5 portions of fruits and vegetables a day. No alcohol consumption was significantly associated with poor health.

⟲ TABLE 5
Association of poor self-perceived health with demographic, socioeconomic and lifestyle variables – multiple logistic regression model*

Dependent variable: poor health		Unadjusted	95% CI	Multivariable--adjusted**	95% CI
Demographic factors					
Gender:	Male	1.00		1.00	
	Female	1.20	1.02-1.40	0.72	0.57-0.93
Age group (years):	15-24	1.00		1.00	
	25-34	1.99	0.80-4.98	0.67	0.13-3.43
	35-44	5.07	2.24-11.48	2.37	0.61-9.21
	45-54	10.83	4.99-23.52	3.90	1.04-14.61
	55-64	23.45	10.96-50.19	6.57	1.75-24.66
	65-74	32.89	15.34-70.53	6.66	1.72-25.86
	75+	73.51	34.30-157.52	13.44	3.49-51.80

(Continued)

(Continued)

Dependent variable: poor health		Unadjusted	95% CI	Multivariable-adjusted**	95% CI
Region:	City of Zagreb	1.00			
	Northern	1.42	1.02-1.97		
	Eastern	1.38	0.99-1.92		
	Southern	1.09	0.77-1.53		
	Western	1.26	0.88-1.78		
	Central	1.54	1.12-2.12		
Residence:	densely populated areas (cities)	1.00			
	intermediate density areas (towns and suburbs)	1.14	0.89-1.47		
	thinly populated areas (rural areas)	1.57	1.25-1.97		
Legal marital status:	single	1.00			
	married or in registered partnership	2.93	2.23-3.86		
	widowed	10.96	8.05-14.92		
	divorced	3.85	2.40-6.16		
Socio-economic factors					
Education level:	low	1.00		1.00	
	middle	0.39	0.33-0.46	0.76	0.59-1.00
	high	0.24	0.18-0.32	0.41	0.26-0.66
Working status:	employed	1.00		1.00	
	unemployed	2.77	1.99-3.85	1.92	1.22-3.03
	student	0.20	0.08-0.47	0.43	0.07-2.69
	retired	10.63	8.23-13.73	3.31	2.13-5.15
	other	8.49	5.85-12.30	2.89	1.65-5.06
Household income quintiles:	1st	1.00		1.00	
	2nd	0.92	0.70-1.20	0.96	0.70-1.32
	3rd	0.61	0.50-0.82	0.59	0.42-0.84
	4th	0.41	0.30-0.55	0.60	0.41-0.88
	5th	0.30	0.21-0.42	0.62	0.40-0.97
Social support:	poor social support	1.00		1.00	
	moderate social support	0.40	0.31-0.51	0.49	0.34-0.69
	strong social support	0.28	0.22-0.35	0.42	0.29-0.59
Lifestyle factors					
BMI:	< 25	1.00			
	25-29.99	1.78	1.47-2.14		
	> 30	2.67	2.15-3.30		
Smoking:	non-smoker	1.00			
	smoker	0.69	0.57-0.83		
Fruit and vegetables intake:	at least 5 portions a day	1.00			
	less than 5 portions a day	1.38	0.99-1.93		
Alcohol consumption:	no	1.00		1.00	
	yes	0.41	0.35-0.48	0.49	0.38-0.62

 * Abbreviations: CI – confidence interval, BMI – body mass index;
** backward stepwise logistic regression model was applied; initially all variables were included in the model; at each step a variable with the weakest relationship with poor health was removed (empty cells refer to such variables), until only variables significantly related to poor health remained in the model.

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When backward stepwise multiple logistic regression model was applied, three of the included demographic and three of the included lifestyle factors were eliminated (each in a separate step) because their relationship to poor self-perceived health was the weakest compared to other included factors and did not reach statistical significance. These factors were region, degree of urbanisation, legal marital status, BMI, smoking status and fruit and vegetable intake. None of the four socioeconomic factors were removed. The remaining seven factors (two demographic, four socioeconomic and one lifestyle factor) were kept in the final model (also presented in Table 5) because all of them were significantly associated with poor health even when controlled for all other factors included in the model. These factors were sex, age, education level, working status, household income quintile, social support and alcohol consumption. When controlled for other factors, female sex (compared to male) had lower OR for poor health. Older age (compared to the youngest age group 15-24 years) remained significantly associated with poor health. Persons with high education level retained significantly lower OR for poor health compared to those with low education level, even after adjustment for other factors. Unemployed, retired and other also retained higher OR for poor health compared to the employed. Persons in the 3rd, 4th and 5th household income quintile retained lower OR for poor health compared to persons in the 1st household income quintile. Persons with moderate and strong social support had lower OR for poor health compared to those with low social support. Out of the included lifestyle factors, only one remained significantly associated with poor health after adjustment: persons who reported alcohol consumption still had lower OR for poor health compared to those who do not consume alcohol.

DISCUSSION

According to the available information, this is the first study in Croatia which included lifestyle factors alongside demographic and socioeconomic factors in the analysis of their association with self-perceived health. The multiple logistic regression model enabled the exploration whether the association of poor self-perceived health with certain demographic and socioeconomic factors could be modified and explained by lifestyle factors. Results revealed that all four analysed socioeconomic factors were significantly associated with poor self-perceived health, not only in a univariate model, but also in a multivariable model controlled for demographic and lifestyle factors, suggesting that their association with poor self-perceived health is not mediated by demographic and lifestyle factors included in this analysis. This conclusion is

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confirmed by results of studies in other populations (Kraja, Kraja, Cakerri, & Burazeri, 2016; Janković, Janević, & Von dem Knesebeck, 2012). Similar findings were in line with some studies suggesting that self-perceived social status was related to self-rated health and irrespective of sex, self-perceived social status was related to self-rated health, depression, and long--standing illness or disability over and above education, occupational status, wealth, age, and marital status (Franzini & Fernandez-Esquer, 2006; Hu, Adler, Goldman, Weinstein, & Seeman, 2005; Ostrove, Feldman, & Adler, 1999; Singh-Manoux, Marmot, & Adler, 2005).

Results showed that the percentage of the Croatian population which perceived their health as poor is almost exactly the same as it was in 2003, which was 14.6% (Šućur & Zrinščak, 2007). One of the possible reasons why respondents did not perceive the improvement of their health is the result of the downward trend of some social and economic indicators recorded in that period. Following the world economic crisis, Croatia faced a deep economic and financial crisis in a relatively long period from 2008 to 2015, which led to a significant slowdown in international trade, fall in GDP and industrial production and deterioration in numerous social and economic indicators consecutively leading to the rise of unemployment and economic insecurity and therefore contributing to the absence of improvement in overall self-perceived health status among the population in Croatia.

Compared to other European countries, the percentage of the Croatian population perceiving their health as poor is higher than in most of them. The lowest percentages of adult population with poor self-perceived health were recorded in Malta (3.6%) and Sweden (3.8%), and the highest, besides Croatia, in Portugal (18.0%) and Lithuania (17.7%) (Eurostat, 2017). The EU-SILC study also collected data on self-perceived health in Croatia and recorded an even higher percentage of the population which rated their health as poor (19.9%), thus confirming that Croatia is among the leading European countries in the percentage of people with poor self-perceived health (Eurostat, 2017). Findings concerning the association of demographic, socioeconomic and lifestyle factors with poor self-perceived health were in general consistent with the results of previous studies.

Female sex significantly increased the chances of poor health compared to male sex in the univariate analysis, but in the multivariate model this was reversed – female sex was associated with decreased chances of poor health, meaning that the results of the univariate analysis were influenced by other factors which were eliminated in the multivariate model. That enabled the protective influence of female sex to be re-

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vealed. Although there were studies which recorded higher OR of poor health among women even when controlled for certain socioeconomic factors (Darviri, Artemiadis, Tigani, & Alexopoulos, 2011), some of the studies obtained the same results as this: when controlled for other factors, female sex was associated with lower chances of reporting poor health (Kraja et al., 2016; Crimmins, Jung Ki, & Solé-Auró, 2011).

As expected, age was strongly associated with poor self--perceived health both in the univariate and multivariate analyses. This was in line with a significant number of other studies, although some studies showed no association between age and self-perceived health or even the opposite effect of the age (Bonner et al., 2017; Menec & Nowicki, 2014; Jerez--Roig et al., 2016; Janković & Simić, 2012).

Regions were not significantly associated with differences in poor health in the multivariate model, although in the univariate analysis the Northern and Central regions had greater OR for poor health compared to the City of Zagreb. However, these differences were not significant in the multivariate model indicating that they were recorded due to differences among regions in other factors which were controlled for in the multivariate model.

The same was true for rural residence and legal marital status which did not turn out to be significantly associated with poor health in the multivariate model (Kraja et al., 2016; Menec & Nowicki, 2014; Janković & Simić, 2012; Pickett et al., 2015).

In contrast to demographic factors, all four socioeconomic factors remained significantly associated with poor health in the multivariate model. As confirmed in numerous previous studies, people with high education had significantly better self-perceived health compared to those with low education, even when controlled for not only demographic, but also for several lifestyle factors, suggesting that the positive influence of education on health is not achieved and cannot be explained exclusively through healthier lifestyle (Janković et al., 2012; Kurtinová, 2015).

Being unemployed as well as any other working status except being a student was associated with poorer health compared to being employed, both in the univariate model and multivariate model, which is in line with the previous studies (Janković et al., 2012). As this is a cross-sectional study, it was not possible to determine to what extent this was due to the fact that persons with poorer health are less likely to be employed and to what extent due to the fact that the unemployed experience difficult social as well as psychological circumstances.

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Living in households in the third, fourth and fifth household's income quintile was associated with better self-perceived health compared to those in households in the first income quintile, pointing out that those with the lowest income have poorer health, which has been confirmed in numerous previous studies, both in Croatia (Šućur & Zrinščak, 2007) and abroad (Mackenbach et al., 2008; Bauer, Huber, Jenny, Müller, & Hämmig, 2009).

As recorded in previous studies poor social support was associated with poor health (Niškanović & Šiljak, 2015).

In contrast to socioeconomic factors, among lifestyle factors only alcohol consumption remained significantly associated with poor health in the multivariate model – alcohol abstinence was associated with poorer health compared to the consumption of alcohol. This was in line with the results of some previous studies (Green & Polen, 2001; Perlman & Bobak, 2008); however there are also studies with opposite results, which found that alcohol abstinence was associated with better self-perceived health (Janković et al., 2012; Bobak, Pikhart, Hertzman, Rose, & Marmot, 1998; Girón, 2012). Inconsistent results were also recorded for the association of smoking with poor health – some of the studies showed smoking to be associated with poor health (Girón, 2012; Ho, Lam, Fielding, & Janus, 2003), while others showed it to be associated with better self-perceived health (Janković et al., 2012; Bobak et al., 1998) or not associated with self-perceived health at all (Wolk & Rössner, 1996). A possible reason why alcohol consumption and smoking were found to be related to better self-perceived health in some studies, which is also true for alcohol consumption in this study, could be in the thesis that healthy people are more often alcohol consumers and smokers compared to the people who are ill, which could not be evaluated in this study due to its limitation of being a cross--sectional study. Related to these results, it is important to mention that smoking and drinking rates in Croatia are high compared to the rest of Europe. Namely, according to Health for All Database, pure alcohol consumption, measured in litres per capita for individuals aged 15 years and older, in Croatia was 12.14 in 2014, which puts Croatia among countries with the highest pure alcohol consumption in Europe (World Health Organisation, 2018). Data for smoking rates are similar; according to Eurostat, in 2014 in Croatia, 24.5% of individuals aged 15 years and older were daily smokers of cigarettes, which is significantly higher than the average for the EU countries (18.4%) (Eurostat, 2018). Regarding daily smokers of tobacco products, Croatia is, with 25% of daily smokers, again in the top six countries of EU (Eurostat, 2018). This could lead to a relatively high percentage of persons who quit alco-

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hol drinking as well as smoking due to illness among non--smokers and non-drinkers, thus contributing to the observed association of alcohol abstinence with poor self-perceived health in both the univariate and multivariate models and association of non-smoking with poor self-perceived health in the univariate model.

The fact that this study is cross-sectional means also that only the association between poor health and demographic, socioeconomic and lifestyle factors could be analysed, without any conclusions concerning their temporal relations, which also led to limitations in establishing a possible causality. Further limitations of this study include possibly insufficient precision of both self-perceived health as a measure of health as well as lifestyle factors, whose more detailed breakdown might have given further insight into their association with poor self-perceived health. Self-perceived health, despite being recognised and evaluated as an important health indicator is prone to a certain degree of subjectivity and this should be taken into account when using the results of this study. Another limitation of this study is that it does not consider other heterogeneities i.e. ethnicity and other, while the exploration of these connections is beyond the scope of the study. These results also do not resolve the question concerning the relative importance of subjective and objective socioeconomic status as the causes of health inequalities – this study is focused on measuring the magnitude of its effects on self--perceived health.

However, despite its limitations, this study provides an important insight into the association of socioeconomic factors with health in Croatia. This is the first study done in the Croatian population which explored the association of lifestyle factors (such as smoking, alcohol consumption, body mass index and fruits and vegetables intake) with self-perceived health, alongside demographic and socioeconomic factors. Indicators of lifestyle factors are quite unfavourable in the Croatian population with a high percentage of smokers, alcohol consumers and those with increased body mass index, which points out the importance of analysing their association with self-perceived health.

The results of this study enable comparisons with previous studies on self-perceived health of the Croatian population and a follow-up on the trends. They also suggest that the association of socioeconomic factors with health in Croatia is not mediated exclusively through lifestyle factors, but also through other factors which were not included in this study and are probably more difficult to measure, but remain a possible target for further research.

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The obtained results can be used in the planning of health and social policies as they emphasise that socioeconomic factors are independently associated with self-perceived health (not exclusively through lifestyle factors), meaning that efforts to improve self-perceived health in the Croatian population cannot be directed exclusively to lifestyle factors improvement.

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Povezanost samoprocijenjenoga lošeg zdravlja s demografskim i socio-ekonomskim čimbenicima te životnim stilom među odraslom populacijom u Hrvatskoj

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Cilj je ovog rada bio analizirati povezanost samoprocijenjenoga lošeg zdravlja s demografskim i socioekonomskim čimbenicima te životnim stilom na temelju podataka iz Europske zdravstvene ankete. Prilikom primjene modela multiple logističke regresije dva demografska (muškarci, starija dob), sva četiri socioekonomska (niska razina obrazovanja, nezaposleni i umirovljeni, osobe koje žive u kućanstvima s najnižim dohotkom, slaba socijalna podrška) i jedan čimbenik životnoga stila (osobe koje ne piju alkohol) prepoznati su kao povezani sa samoprocijenjenim lošim zdravljem. Povezanost socioekonomskih čimbenika sa samoprocjenom zdravlja među odraslom populacijom u Hrvatskoj izravna je i nije posredovana isključivo kroz životni stil.

Ključne riječi: samoprocjena zdravlja, Europska zdravstvena anketa, socioekonomski čimbenici, životni stil