The determinants of health among the population aged 50 and over: evidence from Croatia

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Abstract

The aim of this paper is to explore the association between demographic, socio-economic and physical health variables and self-assessed health (SAH) of people aged 50 years and over in Croatia. Cross-sectional data was collected in 2012 in the survey "The Economics of Ageing in Croatia" that was based on the SHARE (Survey of Health Ageing and Retirement in Europe) study. Altogether 761 individuals aged 50 and over were included in the working sample that has been used in statistical analysis. Data were analysed in an ordered logistic regression model. The results show that females were more likely to report a higher category of SAH than males. Higher educational level was a statistically significant predictor of higher SAH, when controlled for other variables. This study, unlike other studies in Croatia, introduces a set of physical health variables as the determinants of health. Our results suggest that people aged 50 and over with fewer limitations, health related symptoms and diagnosed chronic conditions were more likely to report higher levels of SAH. These findings could be beneficial to policymakers in their efforts to improve health among elderly in Croatia.

Keywords: self-assessed health (SAH), Croatia, SHARE, population ageing, health determinants

1 INTRODUCTION

Population health status and health care systems have always been of strategic importance for a country. Health care is a key determinant in maintaining good health, which in turn affects a country's productivity and the level of social well-being. Western countries have experienced a significant increase in total health care expenditures since the 1980s, and its share in GDP will continue to rise in the future. This increase is mainly spurred by population ageing (Harper, 2006; Dormont, Grignon and Huber, 2006), and improvements in medical technology (Okunade and Murthy, 2002; Bodenheimer, 2005). Health care expenditure trends could become a great challenge for the public health care systems in developed countries, seriously threatening their sustainability (Newhouse, 1992; Follette and Sheiner, 2005; Stuckler, Basu and McKee, 2013).

The Croatian health care system is built on the principle that virtually all legal residents have equal access to health care. It is a mixed system financed from both public and private sources. The majority of the funds to finance health care provision is pooled via compulsory health insurance contributions. Co-payments are applied to certain statutory services, and these have either to be paid out-of-pocket (OOP) or covered by complementary health insurance (Džakula et al., 2014). There is also voluntary supplementary health insurance for higher standards of health care services (Vončina et al., 2006). The World Health Organisation (WHO) (2016a) estimated that the total Croatian health expenditure was 7.8% of GDP, which is approximately 1,650 PPP$ per capita. When compared to other European Union countries Croatia is among countries with the lowest health expenditure per capita just ahead Bulgaria, Romania and Latvia. Private expenditures are

mainly in the form of OOPs, but in 2014 they amounted only to 18% of total spending on health in Croatia (WHO, 2016a).

If we look at the general health status of the Croatian population, we can see it continued to improve during 21st century at a relatively moderate pace. Life expectancy at birth rose from 73 years in 2000 to 78 years in 2014. The increase was larger for males (from 69.1 to 74.8 years) than for females (76.7 to 81.1 years) (WHO, 2016a). At the same time healthy life expectancy (HALE) at birth reached 69.4 years in 2015 for both sexes, an increase of 3 years from 2000 (WHO, 2016b). We can observe a steady increase in the gap between HALE and life expectancy at birth, which indicates that people in Croatia spend on average more years in poor health. Indeed, the high prevalence of cardiovascular diseases and increase of cancer incidence rates could be the reasons for a decrease in health quality and consequently in healthy life expectancy. Most recent data from 2014 show that ischaemic heart and cerebrovascular diseases were the leading cause of 35% of deaths in the general population and nearly 40% of deaths among the population aged 65 and over, followed by malignant neoplasms in second place (CNIPH, 2016). Therefore, we can state that the efficiency of the Croatian health care system should be questioned since health care systems should strive to improve health status, compress morbidity and disability, especially in advanced ages, and thus extend HALE.

Recent empirical research use self-assessed health status as a common measure of health and health system performance. In order to improve our understanding of the general health of older Croatian citizens we explore several determinants of the most important measure of health at an individual level, i.e. self-assessed health status (SAH). SAH is easy to measure, and is widely used to measure health in many international studies, e.g. European Values Study (EVS), European Community Household Panel (ECHP) or the Survey of Health Ageing and Retirement in Europe (SHARE). In general respondents are asked to assess their own health status using a four or five-point scale, either from "excellent" to "poor" (US version of SAH) or from "very good" to "very bad" (European version of SAH) (Idler and Benyamini, 1997; Jürges, Avendano and Mackenbach, 2008). SAH is considered to be the most feasible, inclusive and informative measure of health status (Idler and Benyamini, 1997; Jylhä, 2009). In addition, SAH has proven to be a strong and valid predictor of future mortality and morbidity or even disability (see e.g., Bailis, Segall and Chipperfield, 2003; Franks, Gold and Fiscella, 2003; Nicholson et al., 2005; McFadden et al., 2009; Kaplan et al., 1996; Dominick et al., 2002).

In Croatia, only few studies cover the topic of SAH determinants and further research as from the international studies should be encouraged. A study done by Čipin and Smolić (2013a) explored the demographic and economic determinants of SAH in Croatia from four different cross-sectional data sets. Their findings suggest that age is the most important determinant of SAH in Croatia, followed by educational level. The effects of household income and employment status, when combined with other variables, were ambiguous and even statistically insignifi-

cant in some data sets. Other research papers explored the association between lower income and educational level and individual health status (Šućur and Zrinšćak, 2007) or financial resources and health of unemployed people in Croatia (Galić, Maslić Seršić and Šverko, 2006). Unlike the previously mentioned research on health determinants in Croatia, this study emphasizes variables of physical health, e.g. (instrumental) activities of daily living, chronic health conditions and physical limitations, and exposure to risk behaviors like tobacco use and alcohol consumption. Indeed, physical health measures were significantly associated with SAH among persons aged 50 and over. Respondents who reported fewer (I)ADL limitations, chronic health conditions and distressing symptoms were more likely to report higher category of SAH. In addition, we found statistically significant association between the variables "gender", "educational level", "household income", "help received" and SAH.

The rest of this paper is organized as follows: in section 2 of the literature review SAH is explained and linked with key determinants of health. In section 3 we describe the methodology and data. Following in section 4 we present the results of ordered logistic regression and in section 5 we discuss policy implications, study limitations and suggestions for future studies of SAH in Croatia.

2 LITERATURE REVIEW

2.1 SELF-ASSESSED HEALTH

In a detailed review of twenty-seven studies Idler and Benyamini (1997) detected SAH as an independent predictor of mortality. Many other studies since the 1980s revealed this consistency in conclusions about SAH. The SAH measure is simple, inexpensive, widely used, reliable and a predictive indicator of mortality even when many other determinants are controlled for (Kaplan and Camacho, 1983; Idler and Angel, 1990; Idler and Kasl, 1991; Kaplan et al., 1996; Reile and Leinsalu, 2013; Schnittker and Bacak, 2014; Meng and D'Arcy, 2016). SAH is easy to measure (Bobak et al., 2000), predicts longevity (Mossey and Shapiro, 1982) and is a powerful predictor of future health and health services utilization (Jylhä, 2009). In the longitudinal framework, Bailis, Segall and Chipperfield (2003) have found that present SAH significantly predicted a respondent's future SAH. Nevertheless, we still poorly understand the association of SAH with mortality because there is no single, universal agreement upon a definition or direct measure of "health" or "health status" (Jylhä, 2009:309). However, the lack of its definition is viewed, in part, as the strength of self-rated health (Schnittker and Bacak, 2014). Idler and Angel (1990) argued about the inability of self-reports unambiguously to control for objective health status. They say that assessing the medical significance of SAH is difficult, while Jylhä (2009) questions the comparability of SAH distributions across cultural groups and distant age groups. Idler and Banyamini (1997) conclude that cross-cultural differences affect the consistency of international studies of SAH, and Jylhä (2009) proposed the use of qualitative approaches in studying how respondents reason about their health, and pointed out the role of experience and bodily sensations and biomarkers to better understand a biological basis of SAH.

We find a similar conclusion in the study of Lindeboon and van Doorslaer (2004: 1084) where, e.g. age, sex, education, language and personal experience of illness can influence the answers on SAH in different sub-groups of the population even though they have the same level of "true" health. Desesquelles, Egidi and Salvatore (2009) noticed the following problems with the comparability of SAH data for people in France and Italy: different wording of SAH questions, the order in which response categories were listed in questionnaires, and the different time the surveys were carried out. In addition, Jürges, Avendano and Mackenbach (2008: 779) conclude that "differences in the wording of response categories could lead to bias in comparisons of SAH between countries". Peersman et al. (2012) revealed the importance of another approach in understanding what a global SAH item measures by asking people to elaborate their assessment of health. Several studies (see e.g., Crossley and Kennedy, 2002; Zajacova and Beam Dowd, 2011) also found that respondents tend to give different answers when asked standard SAH question twice or on two different occasions.

Idler and Banyamini (1997) proposed more detailed investigation of this issue which is related closely with the survey instrument and survey methods (e.g., responses to the SAH question could be affected by their context in the survey instrument). The differences in responses can be quite significant, e.g. 28% of respondents changed their answer after a set of health questions in the study of Crossley and Kennedy (2002), and nearly 40% between two interviews one month apart (Zajacova and Beam Dowd, 2011). To conclude this part, we have to mention studies reporting SAH as nonsignificant or a not so strong predictor of mortality. They usually include only older (old and old-old) people in the samples (Idler and Angel, 1990; Banyamini et al., 2003) or study only certain populations (Idler and Banyamini, 1997, call these "special populations"), e.g. African Americans (Ferraro and Kelley-Moore, 2001).

2.2 THE DETERMINANTS OF SELF-ASSESSED HEALTH

There is a strong commitment of many cross-sectional and longitudinal studies to exploring important determinants of SAH. Many researchers since the 1980s have endeavoured to understand the complexity of health assessment influenced by different socio-economic, demographic, cultural, psychological or political factors. Idler and Banyamini (1997) detected a wide range of SAH determinants in studies from all over the world. Among them age and gender, variables of socioeconomic status, e.g. educational level and income, measures of chronic conditions and functioning, health practice risk factors (smoking and alcohol consumption), and measures of social networks and life satisfaction were the most common.

We present major findings of national and cross-country studies of SAH determinants in the following part of the paper. In the study for seven post-communist countries (Russia, Estonia, Lithuania, Latvia, Hungary, Poland and Czech Republic), Bobak et al. (2000) found a strong association between educational level and material deprivation and SAH, i.e higher educational levels and lack of material

deprivation were associated with higher category of SAH. Similar analysis done in Russia concluded that education, marital status, ability to rely on informal care or absence of informal social networks affect SAH (Bobak et al., 1998). In order to investigate the SAH in Estonia, Reile and Leinsalu (2013) included age, gender, ethnicity, educational level, and income, measures of physical health (chronic and long-term illnesses) and psychological health (depression) as predictors. The strongest associations were found for indicators of physical health, i.e. Estonians without any chronic illnesses or restrictions on their daily activities reported better health, *ceteris paribus*. A longitudinal study in Canada revealed the effects of determinants like gender, age, place of residence, education, marital status, etc. on SAH status change. The most important findings however were related to daily functioning and number of chronic illnesses that were consistently associated with SAH at each wave of the study (Meng and D'Arcy, 2016).

Pirani and Salvini (2012) focused on SAH of Italian population 65 and over by employing age, gender, diagnosed chronic illnesses, socioeconomic status, measures of lifestyle, family structure and social network. They found a slightly lower effect of education on SAH than similar studies, and they were discreet in conclusions about the effects of the economic situation on SAH. However, they stress the strong association between poor health and inadequate social networks (e.g., spouses, relatives or friends) among elderly Italians. From the seven-country study of Mackenbach et al. (2005) we realize that higher household income is associated with better SAH among men and women. This result has been confirmed in Estonia (Reile and Leisalu, 2013), Canada (Meng and D'Arcy, 2016), Croatia (Šućur and Zrinšćak, 2007).

Marital status is very often a significant predictor of SAH because the availability of spousal support is considered an important determinant of health outcomes (Dominick et al., 2002). Conclusions on the association of this variable and SAH are not homogeneous however. They still range from being complex, especially in the multinational studies (e.g., Huijts, Monden and Kraaykamp, 2010; Desesquelles, Egidi and Salvatore, 2009), notably nonsignificant for older age groups (Bobak et al., 1998; Nicholson et al., 2005), and significant for men and women and people aged 65 and over (e.g., Leinsalu, 2002; Meng and D'Arcy, 2016). A report on the elderly Spanish population found age, chronic conditions and functional status to be the main determinants of SAH (Damian et al., 1999). Peersman et al. (2012) confirmed that physical health problems are the dominant determinant among the respondents who were rating their health, but other reasons beyond physical functioning have been detected too, e.g. prior health experience or educational background. Prior health experience and socioeconomic situation over the life course have been detected as very important determinants of SAH in one study of Russians aged 50 and over made by Nicholson et al. (2005).

In Croatia, we found only a few studies where the determinants of SAH have been analysed. Šućur and Zrinšćak (2007) examined the differences in SAH and access

to health care, controlling for different income groups, urbanization level, and regional distribution in Croatia and European Union countries. In addition, Galić, Maslić Seršić and Šverko (2006) examined the financial situation and health of unemployed individuals, while Čipin and Smolić (2013a) analyse four cross-sectional data sets available in Croatia (ESS, EVS and ISSP) to explore the extent to which individual health is related to demographic and socio-economic determinants. More work on SAH determinants in Croatia is thus required. Currently there are only cross-sectional frameworks in use, but in the future, there will be longitudinal data sets available from studies like SHARE.

3 DATA AND METHODS

The data used in this paper come from the survey "The Economics of Ageing in Croatia" that was based on SHARE questionnaires from waves 1 and 2. SHARE is a unique longitudinal database of micro data on the health, socio-economic status and social and family networks of respondents aged 50 and over covering most of the European Union, Switzerland and Israel (Börsch-Supan et al., 2013). Croatia formally joined the SHARE study for wave 6 in 2014. Respondents in this survey were all members of randomly selected households present in 221 settlements in Croatia, aged 50 and over at the time of the interview (i.e., they were born in 1962 or before), and their partners irrespective of their age. The sample was designed as a two-level random sample, where the first level of the selection was the selection of sampling points with corresponding addresses of persons aged 50 and over in all Croatian counties. Sampling points were settlements stratified by size (population aged 50 and over) in four categories: 30,000 and over, 5,000 – 29,999, 500 – 4,999 and 499 or less. By simple random selection from each stratum, we have selected as many addresses that proportionally correspond to the size of the individual strata in total population.

Each respondent had a 70-minute face-to-face interview (CAPI) with our interviewers. Interviews were conducted from July to December 2012. Most respondents (86%) filled in an additional short drop-off questionnaire, which they returned to the interviewer or mailed to the agency shortly after the interview. In total, 1,180 respondents aged 50 and over were interviewed in 855 households. The response rate of sampled households was 53% (Čipin and Smolić, 2013b). For the purpose of this paper, we have excluded partners who were born in 1963 or later. Complete data on all variables were available for 761 respondents. In the next steps, the determinants found to be associated with SAH were included in the analysis. We use ordered logistic regression to determine the association between SAH, the outcome variable, and already theoretically established a set of socio-economic, health status and demographic variables. Ordered categorical variables like SAH, measured on an ordinal 5-point Likert type scale are appropriate for ordered regression models (see e.g., Agresti, 2002; Liu and Agresti, 2005; Long and Freese, 2006). In addition, the SAH scale has been modified so that higher numbers correspond to better health. The data set contains a single-item measure of SAH, which assessed individual health perception measured on an ordinal

5-point scale. Respondents were asked this question: "Would you say your health is... very good, good, fair, bad or very bad?"

Age was measured in years, and categorized into two groups: "50-64" and "65 and over". Educational level is presented at three levels: primary education or below (ISCED 0-2), secondary level of education (ISCED 3-4) and tertiary education (ISCED 5-6) as the reference category. We categorized marital status in four groups while the reference group is "Married". In addition, the variable of social support was included that indicates if the respondent received help from outside the household or from a helper in the household. To capture the lifestyle of respondents, we use BMI equal or greater than 30 indicating obese respondents, share of smokers, ex-smokers and non-smokers, and lastly the share of those who had one or more drinks per week. Asking respondents to answer whether they were suffering from, e.g. back or joint pain, angina or chest pain, breathlessness, sleeping problems, etc. we found out more about symptoms, which is another important determinant of SAH.

The economic situation is described by employment status of respondents containing five categories. Moreover, respondents in this survey (financial respondents) were asked to think of household's total monthly income. Household financial situation was assessed using a question: "Thinking of your household's total monthly income, would you say that your household is able to make ends meet..." with the answer options "with great difficulty", "with some difficulty", "fairly easily" and "easily". Answer options were categorized in two "some or great difficulty" and "no difficulty". We did not obtain precise data about income on an individual level, and only the reported financial situation of households was included our model.

4 RESULTS AND DISCUSSION

Table 1 represents the distribution of outcome and predictor variables. On average 38.4% of respondents reported their health as "Fair", and around one out of three assessed their health as good or very good. However, almost every fifth man and every third woman reported a bad or very bad category of SAH. A descriptive analysis of the sample revealed that the share of females is somewhat higher, while the majority of the respondents have completed secondary education. The proportion of married respondents in the sample was very high, and one out of four individuals aged 50 and over is widowed, mainly females (37.4% of females vs. 8.4% of males). Every fourth respondent lived alone, one third of them with a spouse or partner only and the rest of the sample respondents with others only (e.g., children, other relatives and non-relatives). Around 35% of respondents received a number of different types of help (e.g., care, help with practical tasks and administrative tasks) from either outside or inside the household.

Table 1

Socio-economic, health and demographic variables, and SAH (percentages) among individuals aged 50 and over in Croatia from "The Economics of Ageing in Croatia" survey in 2012

Variable		Weighted %
SAH	Very bad	6.67
	Bad	20.74
	Fair	38.42
	Good	22.35
	Very good	11.82
Age[a]	50-65	50.05
	65 and over	49.95
Gender	Male	40.88
	Female	59.12
Educational level	Primary or below	34.75
	Secondary	45.84
	Tertiary	19.41
Marital status	Married	62.91
	Widowed	25.52
	Never married	5.47
	Divorced/separated	6.10
Help received	No help received	65.69
	Help from household member(s)	23.12
	Help outside household	11.18
Living with	Living alone	23.07
	Living with spouse/partner	32.95
	Living with others	43.98
BMI[b]	Less than 30	71.82
	Equal to or greater than 30 (obese)	28.18
Smoking	Current smoker	23.69
	Ex-smoker	23.75
	Non smoker	52.26
Drinking	At least once per week	34.06
Conditions	No diagnosed condition	26.15
	One or two conditions	48.95
	Three or more conditions	24.90
Symptoms	No symptom	25.16
	One or two symptoms	43.46
	Three or more symptoms	30.38
(I)ADL	No (I)ADL limitation	56.45
	One or two(I)ADL limitations	26.24
	Three or more (I)ADL limitations	17.31
Employment status	Employed	16.37
	Unemployed	9.30
	Retired	60.30
	At home	12.65
	Other	1.38
Household financial situation[c]	Some or great difficulty	78.50
	No difficulty	21.50

[a] Mean age = 65.45 years. [b] Categories: underweight = BMI ≤ 18.49; normal weight = BMI 18.50-24.99; overweight = BMI 25.00-29.99; obese = BMI ≥ 30.00. [c] Reported income at the household level only.

Source: Author calculations.

Table 2

Odds ratios (OR) with p-values and 95% confidence intervals (CI) from the ordered logistic regression of the self-assessed health (SAH) of men and woman aged 50 and over in Croatia (N=761); "The Economics of Ageing in Croatia" survey

	OR	95% CI	
Age (50-64)			
65 and over	0.82	0.57	1.19
Gender (Male)			
Female	1.61**	1.15	2.26
Educational level (Tertiary)			
Primary or below	0.39***	0.25	0.62
Secondary	0.54***	0.37	0.78
Marital status (Married)			
Widowed	0.89	0.54	1.48
Never married	0.70	0.33	1.49
Separated/divorced	0.60	0.31	1.17
Help received (No help received)			
Help from household member(s)	0.51**	0.32	0.83
Help outside household	0.73	0.51	1.03
Living with (Living alone)			
Living with spouse/partner	1.30	0.73	2.34
Living with others	1.32	0.82	2.14
BMI equal to or greater than 30	1.04	0.76	1.42
Smoke (Never smoker)			
Ex-smoker	1.13	0.79	1.62
Current smoker	1.03	0.72	1.49
Drink	0.84	0.61	1.16
Conditions (Three or more)			
No diagnosed condition	3.86***	2.42	6.15
One or two conditions	1.78**	1.23	2.58
Symptoms (Three or more)			
No symptom	6.21***	3.84	10.05
One or two symptoms	2.05***	1.41	2.99
(I)ADL (Three or more)			
No limitation	7.46***	4.51	12.36
One or two limitations	3.65***	2.28	5.86
Employment status (Employed)			
Unemployed	0.77	0.43	1.39
Retired	0.84	0.53	1.33
At home	0.83	0.44	1.58
Other	0.33	0.09	1.16
Household financial situation (Some or great difficulty)			
No difficulty	2.07***	1.46	2.93

*Note: * p<0.05; ** p<0.01; *** p<0.001. Reference category is in the brackets.*

A very small proportion of respondents reported being underweight, but more than seven out of ten fit in the overweight and obese groups. One out of four respondents smoked every day while 24% of them stopped smoking. More than 34% respondents had at least one drink per week whereas 15% have been drinking every day in the last six months. From table 1 we notice that almost every second respondent has been diagnosed with, or currently has, one or two health problems (conditions), e.g. high blood pressure or hypertension, high blood cholesterol, diabetes, osteoporosis, etc.

Only one out of four respondents did not report problems with the symptoms presented on the showcard during interviews. Problems with activities of daily living (ADL), e.g. dressing, eating, bathing, and instrumental activities of daily living (IADL), e.g. cooking, shopping, etc. were observed for almost every second respondent aged 50 and over in the sample. As expected, employment rate among elderly individuals was low. Nonetheless, one out of three individuals aged 50 and over in the working contingent age group was employed, and another 16% of them were looking for a job. We noticed a bulk of households (almost 80%) having at least some difficulty in making ends meet in a typical month.

As mentioned earlier, 761 cases were included in the working sample, and the SAH scale has been modified so that higher numbers correspond to better health. The parallel regression assumption in the ordered logistic model has not been violated, and the results are displayed as proportional odds ratios in table 2. Inferential findings are explained separately by each or a group of the SAH determinants.

4.1 GENDER

We found a statistically significant association between gender and SAH. Men aged 50 and over were less likely to report higher categories of SAH than women were, after controlling for other variables in the model. Conclusions on gender differences with respect to SAH from previous research are not clear enough (McDonough and Walters, 2001). In many cases, the determinants of SAH are explored separately for men and women. Gender gap in SAH is observed in the general population, e.g. from the EU-SILC data in 2014 for all EU member states. For the Croatian population aged 16 years and over, men were more likely to rate their health as very good or good, whereas women tended to rate their health lower. In addition, healthy life expectancy based on self-perceived health at the age of 50 was 17.8 years for males and 19.2 years for females in 2014 (Eurostat, 2016a). Another striking indicator available from the EU-SILC is "self-perceived long-standing limitations in usual activities due to a health problem". Among the population aged 65 and over 27.7% of males and 30.5% of females reported severe levels of activity limitation due to health problems in 2015. The proportions of men and women aged 65 and over who reported some or severe level of activity limitation were 68.5% and 75.9%, respectively (Eurostat, 2016b). Čipin and Smolić (2013a) used four different data sets to explore SAH determinants in Croatia, and did not find statistically significant gender differences in SAH in the European

Social Survey data sets. Benyamini, Leventhal and Leventhal (2000) argue that men's SAH judgments reflect mainly serious, life threatening, whereas women's SAH judgments reflect both life-threatening and non-life-threatening diseases.

Furthermore, while reporting their SAH respondents' perceptions of health status seem to be holistic, e.g. they also include information on medical status. Also, men and women in different social positions evaluate such information differently with different reference groups providing different social comparisons (Idler and Benyamini, 1997). On the other hand, a follow-up study of sociodemographic factors of SAH and mortality in the US show that women report lower health status but exhibit lower mortality (Franks, Gold and Fiscella, 2003). Poor health ratings among male respondents could indicate prevalence of more serious health conditions, but their poor ratings are more predictive of mortality than women's poor rating (Idler and Benyamini, 1997). After all, we should not forget that SAH could be affected by respondents' subjective perception, their social and cultural background as well as by their previous health experience.

4.2 EDUCATIONAL LEVEL

Educational level proved to be strongly associated with better SAH. Individuals who have completed primary education or lower (e.g., who finished elementary school only or did not complete elementary school) and secondary education, were significantly less likely to report higher category of the SAH than those with tertiary education, controlling for other variables. This finding comes as no surprise, as it was already confirmed in many previous studies. Low educational level is often found to be an important determinant of poor health and systematically higher morbidity and mortality rates (Leinsalu, 2002; Mackenbach, 2006; Beam Dowd and Zajacova, 2007). Education is generally the most basic variable in improving the health of the population. The Grossmans' theory of demand recognized the central role of education implying that better-educated persons tend to be economically more efficient producers of health status (Grossman, 1972).

4.3 LIVING ARRANGEMENTS AND SUPPORT

Widowed, non-married and separated/divorced versus married subjects were less likely, but non-significantly, to report a higher SAH category. Huijts and Kraaykamp (2011) proved that the strength of the relationship between marital status and the SAH differs substantially among nations, and that is affected by the national marital status composition. Because of the high proportion of married persons aged 50 and over in Croatia, health selectivity into marriage, i.e. selection of healthy people in the marriage and of unhealthy people into widowhood or divorce (Huijts and Kraaykamp, 2011:284), seems to play a stronger role.

We also analysed the association between household size and the SAH of respondents. Living with spouse/partner only or living with other family members only was positively associated (but statistically non-significant) with better health. Individuals, who were living with spouse/partner only or with others only as com-

pared to people living alone, were more likely to report a higher category of SAH, *ceteris paribus*. A variable "help received" is employed to understand who provided the support or a help to respondents. Respondents who have received help from (a) household member(s) were significantly less likely to report a higher category of SAH. A similar finding accounts for a category "help received outside the household"; however, the association between it and SAH was not statistically significant.

4.4 RISK BEHAVIOURS AND PHYSICAL HEALTH

Ex-smokers and current smokers had a non-significantly slightly higher likelihood of reporting higher levels of SAH, while drinkers were less likely, and again non-significantly, to report higher SAH, holding all the other variables constant. Descriptive analysis showed that functional status deteriorates with age, e.g. almost 70% of respondents in the 50-64 age group had no limitation (combined ADL and IADL) as compared to 43% of those aged 65 and over. Moreover, we can see that multi-morbidity is prevalent in older age groups, i.e. one out of three persons aged 65 and over reported being diagnosed with or suffering from three or more illnesses, but only one out of seven respondents reported the same in the youngest age group. Even though previous research in Croatia confirmed that SAH deteriorates with age (e.g., Čipin and Smolić, 2013a) we are not able confirm these findings. When analysing covariates of physical health, i.e. daily functioning, number of chronic conditions and number of symptoms that distress people in their everyday life, we found consistency in association with the SAH. Average odds ratios (OR) ranging from 1.78 to 7.46 indicate a several times higher likelihood of respondents who reported one or two symptoms and no symptom, respectively, versus respondents having three or more symptoms to be in higher category of the subjective health status measure, controlling for the rest of model variables. In addition, people with no diagnosed condition were significantly more likely to report a higher SAH category.

Comparing the categories of (I)ADL limitations, people without any (I)ADL limitation were significantly more likely to report higher categories of the SAH than individuals with at least three (I)ADL limitations. For a better SAH, fewer limitations on physical and instrumental daily functioning and fewer diagnosed chronic conditions proved very important. This conclusion has been confirmed in the study of Meng and D'Arcy (2016) on longitudinal data, for each of three observed waves. Reile and Leinsalu (2013) established it in one Estonian study where those who had limitations in their daily activities were 4.5 times more likely to assess their health as bad or very bad. They conclude that "the SAH scale demonstrates continuity in respect to physical health measures", i.e. association for physical variables was statistically significant across all SAH levels (Reile and Leinsalu, 2013:561). Lima-Costa et al. (2012) investigated the socioeconomic inequalities in health and concluded that physical functioning is a key measure of successful ageing. Similar findings came from the studies in Japan (Sun et al., 2007), France and Italy (Desesquelles, Egidi and Salvatore, 2009), etc.

4.5 EMPLOYMENT STATUS AND INCOME

In the working sample, about 57% of respondents who were employed reported very good or good health compared with slightly less than half of those who were not employed. Previous studies confirmed significant association between unemployment and poor SAH (e.g., Giatti, Sandhi and Cibele, 2010; Desesquelles, Egidi and Salvatore, 2009), while financial deprivation could lead to the poor health of unemployed persons (Galić, Maslić Seršić and Šverko, 2006). Unemployed, retired and persons at home were less likely to report better health, but we could not confirm that any category is significantly associated with SAH.

A better household financial situation, i.e. referring to those households that are able to make ends meet with their monthly income easily or fairly easily is significantly associated with better SAH among both men and women. Respondents from the households with no difficulty in making ends meet with their monthly income were 2.1 times more likely to be in a higher category of SAH than individuals living in households that experienced some or great difficulty in making ends meet, controlling for the rest of the model variables. Our findings clearly support previous conclusions that income is an important predictor strongly associated with health among men and women.

5 CONCLUSION

Findings in this paper can be considered useful for policymakers within health and social care systems in Croatia. They should foster evidence-based public policy measures that could increase the physical functioning of the older population. Social security is already a large part of government spending in Croatia, and costs of pensions, disability allowances and long-term health care are becoming a great problem. One of the most challenging issues in the next decade will probably be a serious increase in the demand for long-term care services. This will occur because of the higher incidence of chronic disease in the cohorts moving into older ages and morbidity expansion. The negative consequences could be curtailed if a more efficient health care system could reduce morbidity and disability by improving general health of the population and increasing healthy life expectancy. This paper also revealed the positive effects of education on the health of an individual. Policymakers should realize that education is associated with health inequality, and encourage policies for more years of schooling and supporting early childhood education that may have health benefits (Adler and Newman, 2002). Governments should support education institutions and programs, e.g. lifelong learning programs among the elderly especially for “older workers”. Finally, following the paper’s findings we saw that financial situation could have an important role in an individual’s health status. We found that a better financial situation is significantly associated with better health among the population aged 50 and over. A disadvantaged financial situation, which is highlighted among today’s older population in Croatia, may have detrimental effects on health status. Nevertheless, the perspectives for the improvement of their current living standards are not so bright, even in the long run. The number of pensioners will con-

tinue to grow, and combined with inadequate income from pensions, could lead to a further decline in the average health of the elderly.

Like many other studies, this study exhibits several limitations. One of them is the cross-sectional data that are not adequate to explore the causal relationship between education and health, or any other health determinant. Longitudinal data sets are thus necessary to improve our understanding of health and health changes in Croatia. In addition, we excluded other determinants of the SAH in our model that might also help to explain health inequalities. Forthcoming research of the SAH determinants in Croatia, besides the longitudinal data, could include a set of country-specific variables, e.g. exposure to the homeland war of certain populations or address the regional differences in SAH properly. The low response rate (e.g., household response rate of 53% and individual response rate of 42% in this survey) could also be an issue. Additional concern arises from the discovery that respondents tended to give different answers when asked standard SAH question twice or on two different occasions, and this is especially the case with older individuals. Lastly, despite the subjective nature of outcome variable and predictors, the results presented in this paper should be considered relevant and reliable estimators of the health status of the elderly in Croatia as well as good predictors of future health care needs.

Disclosure statement

No potential conflict of interest was reported by the author.

APPENDIX

SUMMARY OF SELECTED STUDIES OF THE SAH DETERMINANTS

Author(s)	General research strategy	Time period	Countries included	Main findings
Bobak et al. (1998)	Cross-sectional study in a national sample of the Russian population of social and psychosocial determinants of two self-reported health indicators: self-rated health and physical functioning. Logistic regression for two dichotomised outcomes: poor self-rated health and low physical functioning.		Russia	Material deprivation is strongly related to both outcomes. Education was inversely related to self-rated health. Unmarried men reported poor physical functioning substantially more often. Subjects not approving the economic changes reported poorer health. Subjects who could not rely on informal social structures when in problems reported worse health.
Bobak et al. (2000)	Study examined the association between perceived control and several socioeconomic variables and self-rated health in seven post-communist countries. The associations between poor health and socioeconomic factors were estimated by logistic regression.	1996-1998	Russia, Estonia, Lithuania, Latvia, Hungary, Poland, Czech Republic	Education and material deprivation are strongly related to self-rated health.
Damian et al. (1999)	The five-category dependent variable was grouped into two categories: good and poor self-assessed health. Age, sex, social class, use of physician services, number of chronic conditions, and functional capacity were included as main explanatory factors. Adjusted odds ratios were estimated through multiple logistic regression models.	1994-1995	Spain	Age, chronic conditions, and functional status were the main determinants of perceived health among the Spanish elderly. The effect of social class on perceived health markedly decreases with age.
Desesquelles, Egidi and Salvatore (2009)	The prevalence of self-rated bad health is studied in a cross-national comparative study based on the data of National Health Surveys conducted in France and Italy. Logistic regression models were applied.	2002-2003 (France); 1999-200 (Italy)	Italy, France	Differences in population structure regarding the individual characteristics (sociodemographic characteristics, diseases and disabilities, lifestyle, and others) significantly affected the SAH in two countries.

Author(s)	General research strategy	Time period	Countries included	Main findings
Franks, Gold and Fiscella (2003)	Ordinary linear regression analyses were used in this study of adjusted relationships among baseline self-reported health, derived from SF-20 subscales (health perceptions, physical function, role function and mental health) and sociodemographics (age, sex, race/ethnicity, income and education) and subsequent mortality.	1987	USA	Physical function showed the greatest decline with age, whereas mental health increased slightly. Women reported lower health for all scales except role function. Greater income was associated with better health. Greater education was associated with better health. Compared with whites, blacks reported lower health, whereas Latinos reported higher health.
Hujits and Kraaykamp (2011)	Multilevel regression analyses exploring the extent the often found association between marital status and self-assessed health is influenced by the marital composition of the country people live in.	2002, 2004, 2006	29 European countries	Living in a country with a high proportion of married people appears to be beneficial to the health of never married persons, but detrimental for widowed people. Divorced, widowed, and never married persons may be worst off when living in countries with high proportions of people who are in the same situation. The never married are worst off in countries with a high proportion of cohabitants.
Hujits, Monden and Kraaykamp (2010)	Multilevel regression analyses is applied to examine whether own educational level and spouse's educational level are independently associated with self-assessed health throughout European societies.	2002, 2004, 2006	29 European countries	Educational level and the spouse's level of education positively affect SAH in Europe. The degree of educational heterogamy does not influence the average level of self-assessed health in a country.
Idler and Benyamini (1997)	Review of 27 international studies	1982-1997	Sweden, Lithuania, Israel, UK, The Netherlands, France, Poland, Hong Kong, Japan, Australia, Canada, USA	Global self-rated health is an independent predictor of mortality in nearly all of the studies, despite the inclusion of numerous specific health status indicators and other relevant covariates known to predict mortality.

Author(s)	General research strategy	Time period	Countries included	Main findings
Jürges, Avendano and Mackenbach (2008)	Ordered probit regression on SHARE data. Study compares the WHO recommended version (ranging from "very good" to "very bad") with the US version (ranging from "excellent" to "poor") in European countries.	2004	Germany, Spain, Greece, The Netherlands, Austria	Authors assessed the difference of answers of US and WHO version so the SAH questions. They found less than 10% of respondents provided discordant answers.
Jylhä (2009)	Paper presents model describing the health assessment process to show how self-rated health can reflect the states of the human body and mind. Based on the proposed model, it examines the association of self-rated health with mortality.	–	–	Analytic distinction is made between the different types of information on which people base their health assessments and the contextual frameworks in which this information is evaluated and summarized.
Mackenbach et al. (2005)	The proportion of respondents with SAH less than "good" was measured in relation to educational level and income level. Inequalities were measured by means of age-standardized prevalence rates and odds ratios.	1980s-1990s	Finland, Sweden, Norway, Denmark, England, The Netherlands, West Germany, Austria, Italy, Spain	Socioeconomic inequalities in self-assessed health showed a high degree of stability in European countries. The relatively favourable trends in the Nordic countries suggest that these countries' welfare states were able to buffer many of the adverse effects of economic crises on the health of disadvantaged groups.
Leinsalu (2002)	Study examined differences in self-rated health by eight main dimensions of the social structure on the basis of the Estonian Health Interview Survey, carried out in 1996/1997. A multistage random sample (N=4711) of the Estonian population aged 15-79 was interviewed. This study includes those respondents aged 25-79 (N=4011) with analyses being performed separately for men and women.	1996/97	Estonia	Low educational level, Russian nationality, low personal income, and for men only, rural residence were the most influential factors underlying poor health. Education had the biggest independent effect on health ratings. Material resources, in this study measured by personal income, were important factors in explaining some of the educational and ethnic differences in poor self-rated health. No differences between men and women in their health ratings were found.

Author(s)	General research strategy	Time period	Countries included	Main findings
Mackenbach et al. (2005)	Study examined the shape of the relationship between household equivalent income and SAH. Data were obtained from nationally representative health, level of living, or similar surveys and applied to men and women aged 25 years and older in the 1990s.	1990s	Belgium, Denmark, England, Finland, France, The Netherlands, Norway	A higher household equivalent income is associated with better self-assessed health among men and women in all countries, particularly in the middle-income range.
McFadden et al. (2009)	Study examined the relationship between SAH and mortality by occupational social class in a prospective study of 22,457 men and women aged 39-79 years, without prevalent disease.	1993-1997	Norfolk – UK	SAH was related to subsequent mortality. The prevalence of poor or moderate SAH was higher in manual than in non-manual classes. However, SAH was similarly related to mortality in manual and non-manual classes.
Meng and D'Arcy (2016)	Study compares determinants of SAH among a large community-dwelling cohort of Canadian seniors (N=3255) at three points in time (1991, 1996, and 2001), and examines the effects of determinants on change in SAH over a 10-year period. Multivariate ordinal logistic regression on Canadian Study of Health and Ageing data.	1991,1996, 2001	Canada	Factors including cognition, daily functioning, chronic disease, and availability of help were significantly linked to self-rated health over time.
Nicholson et al. (2005)	Study examined the influence of socioeconomic risk factors over the life course on the SAH of older Russian men and women. A random sample of the general population of the Russian Federation in 2002 included 1,004 men and 1,930 women aged 50 years and over in a cross-sectional study.	2002	Russia	Self-rated health in older Russians reflects social exposures accumulated over the life course, with the differentials observed only partially explained by current social conditions. Health behaviours were not involved in mediating social differences in self-rated health.

Author(s)	General research strategy	Time period	Countries included	Main findings
Pirani and Salvini (2012)	Stepwise multilevel logistic regression models using the data on health conditions which come from a survey conducted by the Italian National Statistics Institute (ISTAT).	2004-2005	Italy	Each component of the socioeconomic status is autonomously correlated with individual perceptions of health. The lack of a network of relationships was also found to be strongly associated with a poor health status for elderly Italians.
Reile and Leinsalu (2013)	Multinomial logistic regression analysis was used to study the association of socio-demographic, physical and psychological health and well-being characteristics with positive (good or very good) and negative (bad or very bad) SAH as compared to fair SAH.	2006	Estonia	Negative SAH was related to male gender, the presence of chronic illnesses, limitations in daily activities and physical functioning, emotional distress, an external locus of control, and to low satisfaction with life and physical fitness. Positive SAH was related to younger age, an Estonian ethnic identity, and to higher education and income.
Schnittker and Bacak (2014)	Cox regression of SAH predicting mortality on GSS data.	1980-2002	Germany	More schooling and more cognitive ability increase the predictive validity of SAH, but neither of these influences explains the growing association between SAH and mortality.
Sun et al. (2007)	Multivariate logistic regression was used to identify the factors associated with good SAH and sex specific effect was tested by stepwise logistic regression.	2005	Japan	Good SAH is correlated with "can go out alone to distant places", no depression, no weight loss, absence of self-rated chronic disease, good chewing ability, and good visual ability in men; whereas with "can go out alone to distant places", absence of self-rated chronic disease, no weight loss, no depression, no risk of falling, independent IADL, good chewing ability, good visual ability, and social integration (attend) in women.

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