Determinants of Self-Rated Health among the Elderly Living in a Big City Environment

Irena Maniecka-Bryła*, Wojciech Drygas, Marek Bryła, Elżbieta Dziankowska-Zaborszczyk

Departament of Social and Preventive Medicine, Medical University in Łódź,
Żeligowskiego 7/9, 90-752 Łódź, Poland

Abstract

Our paper aims to analyze the impact of factors determining self-rated health (SRH) at an early elderly age. The research study was conducted in a demonstrative area of the CINDI WHO program in the Górna district of Łódź. The program has been running since 1991. 768 study subjects aged 65-74 were qualified for the statistical analysis. In a multiple-factor logistic regression model, we found a statistically significant impact of the following variables on poor self-rated health at the confidence interval (CI) of 95%. Tertiary and secondary education contributed to a lower chance of poor SRH compared to primary education. A low number of medical consultations per year contributed to a lower chance of poor SRH compared to more than 10 medical consultations per year. High body mass index contributed to a higher chance of poor SRH compared to BMI<25. Coronary heart disease contributed to a higher chance of poor SRH compared to the lack of this disease. On the basis of a multiple logistic regression model, we found that good SRH depended on sex (less likely among females), education (more likely among university graduates), the number of reported medical consultations (more likely if fewer than 10 per year), BMI (more likely for overweight, but less likely for obese subjects), diabetes (negative impact), hypertriglicerydemia (negative impact), and coronary heart disease (negative impact). The subjective perception of one's own health status is strongly correlated with the health results of the early elderly subpopulation in a big city environment.

Keywords: self-rated health, early elderly, risk factors, big city environment

Introduction

An assessment of the health situation of the elderly based on clinical and epidemiological diagnoses in the context of concurrent multiple diseases and changes related to the ageing process is unable to reflect the entirety of perception of their psychophysical status [1, 2]. A subjective assessment of the health situation seems a better measure, especially in reference to large groups of the population. It is emphasized in the bibliography that a self-assessment expressing the perception of health takes into account the objective aspects. Furthermore, there is a complex relationship between the physiological and psychological components of health and illness and between the subjective and objective determinants of these elements. Since the elderly tend to suffer from multiple health problems depending on their physical, psychological, and social health, the perceived subjective health is an important measure of their

*e-mail: irena.maniecka-bryla@umed.lodz.pl

health status [3-6]. The paper aims to analyze the impact of factors determining self-rated health at age 65-74, i.e. among the early elderly.

The epidemiological transition and the progressing process of population aging result in the prominent role of non-communicable diseases, especially cardiovascular diseases (CVD), in the morbidity and mortality models covering the elderly subpopulation. As evidenced in previous studies (including the famous Framingham studies) [7, 8], the incidence and mortality due to CVD are largely influenced by the prevalence of such risk factors as: hypertension [9, 10], excess body mass [11], low physical activity [12], high concentration of glucose (diabetes) [13], hypercholesterolemia, hypertriglicerydemia, and tobacco smoking. That is why we included these variables in addition to data on the socio-economic status in our research framework that aimed to estimate their impact on the self-rated health (SRH).

Material and Methods

Our research was conducted in the framework of the CINDI (Countrywide Integrated Noncommunicable Diseases Intervention) WHO program in the demonstrative area of Łódź-Górna, where it has been running since 1991. Sampling was randomized in strata and proportional to sex and 5-year age groups. The response rate was 57.4%. The invitations were sent by post. Overall, 768 study subjects were included in the sample. We carried out a questionnaire interview with blocks of questions on socio-demographic situation, health status, lifestyle, and health care use. Subsequently, there were medical examinations and laboratory tests for blood samples taken from the elbow vein. We used definitions, methods, and conditions of measurements as well as registration and coding procedures in conformity with the CINDI WHO program guidelines [14].

To measure the SRH of the study subjects, we used the following question: "Please evaluate your current health status? Do you think it is: good, rather good, neither good, nor bad, rather bad, bad?" We combined the answer categories in order to obtain a 3-grade scale with the following health status assessments: good, fair, poor. We aimed to estimate the impact of selected variables on SRH in the period of socio-economic transition in Poland, taking into consideration a considerable improvement in the health situation perceived by the respondents. This enabled us to distinguish the impact of multiple variables on poor, fair, and good SRH of the examined subpopulation in our models of single and multiple-factor regressions. The regressions were run separately for each answer category (poor, fair, and good SRH) in order to capture all possible impacts. These groups contained, respectively, all those who evaluated their health status as good (262 subjects), fair (212 subjects), or poor (294 people). In order to examine correlations among variables, we used the χ^2 independence test. The strength of correlations was estimated with the use of the C-Pearson coefficient. The analysis of the relationship between SRH (dependent variable) and selected socio-

demographic variables, risk factor prevalence, and selected diseases was carried out first on the basis of single-factor logistical regressions. If a given variable turned out to be statistically significant in a single-factor regression model, we included it subsequently in the multiple-factor logistic regression model for a given type of SRH. The data were presented as odds ratios (OR) with a ±95% confidence interval (CI). The zero hypothesis on the lack of impact of analyzed variables on good SRH was rejected at the level of significance p<0.05. Analysis was made with the use of Statgraphics 5.1 software.

Results

Table 1 presents the characteristics of the study subjects according to the variables examined in our study.

Eight variables out of 14 under consideration influenced in a statistically significant way the positive perception of one's own health status among the study subjects (Table 2). Being a female reduced the chance of good SRH compared to male subjects (OR=0.59, CI:0.43-0.80, p<0.001). Education level also correlated significantly with good SRH. The better educated (i.e. having at least secondary education) assessed their health status as good more frequently than those having a low level of education. Having tertiary education gave rise to 3 times more likely good SRH than primary education. This correlation was significant for tertiary (OR=3.01, CI:1.97-4.60) and secondary education (OR=1.82, CI:1.20-2.77) at p<0.001. Subjects making use of health services infrequently, i.e. with no medical consultations or a maximum of 2 consultation per year, evaluated their health status 4 times more often as good (OR=4.37, CI:2.80-6.83, p<0.001) compared to the study subjects often using this form of health care (more than 10 consultations during the previous 12 months). Regarding the analyzed risk factors for coronary heart disease, a significant correlation with good SRH was displayed by the correct BMI<25, as these subjects assessed their health as good more than twice as often as the obese subjects (BMI≥30) (OR=0.45, CI:0.30-0.68, p<0.001). Furthermore, subjects with the right concentration of glucose more often indicated good SRH compared to those suffering from diabetes (OR=0.29, CI:0.16-0.53, p<0.001). People with correct blood pressure more often evaluated their health status as good than those with hypertension (OR=0.70, CI=0.49-0.99, p<0.05). Hypertiglicerydemia (OR=0.65, CI:0.45-0.96, p<0.03) and coronary heart disease (OR=0.62, CI:0.45-0.84, p<0.003) gave rise to a lower chance of good SRH. Marital status, professional activity, physical activity, infarction, hypercholesterolemia, and tobacco smoking did not correlate significantly with good SRH in our study.

In a single-factor logistic regression model, we found the statistically significant impact of the following variables on poor SRH: education (the higher the education level, the less likely poor SRH), professional activity (not working increased the chance of poor SRH threefold), the number of medical consultations (the lower, the less frequent negative SRH), BMI (the higher, the more likely poor SRH), having

Table 1. Characteristics of the study subjects (in %).

Variable		SRH				χ^2	p
		Poor n=294	Fair n=212	Good n=262	Total N=768		
Sex	Female	61.6	65.1	64.5	63.6	0.821	p>0.05
	Male	38.4	34.9	35.5	36.4		
Marital status	Single	28.2	65.6	32.1	40.0	**81.683**	**p<0.001**
	Married	71.8	34.4	67.9	60.0		
Education	Tertiary	17.7	23.4	23.3	21.2	**17.990**	**p<0.01**
	Secondary	24.8	35.8	32.4	30.5		
	Vocational	7.5	7.1	7.3	7.3		
	Primary	50.0	33.7	37.0	41.0		
Professional activity	Working	7.1	2.8	7.6	6.1	5.573	p>0.05
	Not working	92.9	97.2	92.4	93.9		
Medical consultations	0-2	20.4	27.4	42.8	30.0	**51.408**	**p<0.001**
	3-5	20.1	23.1	22.5	21.8		
	6-10	23.5	24.5	20.6	22.7		
	>10	36.1	25.0	14.1	25.5		
BMI	<25	17.7	25.4	32.1	24.8	**19.079**	**p<0.001**
	25-29.9	43.3	40.8	43.1	42.4		
	≥30	39.1	34.0	24.8	32.8		
Physical activity	High	13.6	16.3	19.1	16.2	3.063	p>0.05
	Low	86.4	83.7	80.9	83.8		
Infarct	No	81.6	88.7	89.7	86.6	**6.278**	**p<0.05**
	Yes	18.4	10.3	10.3	13.4		
Diabetes	No	86.4	86.8	93.9	89.1	**9.546**	**p<0.009**
	Yes	13.6	13.2	6.1	10.9		
Hypercholesterolemia	No	35.4	32.5	31.3	33.2	0.171	p>0.05
	Yes	64.6	67.5	68.7	66.8		
Hypertriglicerydemia	No	78.2	73.1	82.1	78.1	**6.373**	**p<0.05**
	Yes	21.8	26.9	17.9	21.9		
Coronary heart disease	No	54.4	67.9	67.2	62.5	**13.294**	**p<0.002**
	Yes	45.6	32.1	32.8	37.5		
Tobacco smoking	Non-smoker	66.0	63.7	66.4	65.5	1.874	p>0.05
	Former smoker	14.3	17.9	14.0	15.2		
	Current smoker	19.7	18.4	19.8	19.4		
Hypertension	No	16.0	26.4	26.0	22.3	**10.866**	**p<0.005**
	Yes	84.0	73.6	74.0	77.7		

Source: own research

Table 2. The relationships between selected socio-demographic characteristics, risk factors, diseases, and SRH in a single-factor logistic regression model.

Variable		Poor self-rated health			Fair self-rated health			Good self-rated health		
		OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Sex	Female	1.31	0.96-1.78	p>0.05	1.34	0.96-1.88	p>0.05	0.59	0.43-0.80	**p<0.001**
	Male	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Marital status	Single	1.19	0.89-1.61	p>0.05	0.86	0.62-1.19	p>0.05	0.95	0.70-1.23	p>0.05
	Married	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Education	Tertiary	**0.40**	**0.26-0.61**	**p<0.001**	0.80	0.51-1.27	p>0.05	**3.01**	**1.97-4.60**	**p<0.001**
	Secondary	**0.54**	**0.37-0.81**	**p<0.003**	1.10	0.71-1.69	p>0.05	**1.82**	**1.20-2.77**	**p<0.001**
	Vocational	0.84	0.55-1.27	p>0.05	1.48	0.94-2.32	p>0.05	0.81	0.49-1.33	p>0.05
	Primary	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Professional activity	Not working	**3.07**	**1.41-6.68**	**p<0.005**	0.87	0.46-1.66	p>0.05	0.46	0.25-0.82	p>0.05
	Working	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Medical consultations	0-2	**0.27**	**0.18-0.41**	**p<0.001**	0.98	0.62-1.56	p>0.05	**4.37**	**2.80-6.83**	**p<0.001**
	3-5	**0.35**	**0.22-0.54**	**p<0.001**	1.29	0.81-2.06	p>0.05	**2.80**	**1.73-4.56**	**p<0.001**
	6-10	**0.54**	**0.36-0.81**	**p<0.004**	1.09	0.69-1.72	p>0.05	**2.09**	**1.30-3.36**	**p<0.003**
	>10	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
BMI	≥30	**2.16**	**1.43-3.26**	**p<0.001**	1.03	0.67-1.59	p>0.05	**0.45**	**0.30-0.68**	**p<0.001**
	25-29.9	**1.77**	**1.19-2.62**	**p<0.005**	0.91	0.60-1.37	p>0.05	**0.64**	**0.44-0.96**	**p<0.02**
	<25	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Physical activity	High	0.94	0.65-1.35	p>0.05	**0.45**	**0.29-0.71**	**p<0.001**	1.93	1.35-2.76	p>0.05
	Low	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Infarction	Yes	**1.70**	**1.11-2.60**	**p<0.02**	0.82	0.49-1.33	p>0.05	0.65	0.41-1.05	p>0.05
	No	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Diabetes	Yes	**2.11**	**1.35-3.29**	**p<0.001**	1.21	0.75-1.96	p>0.05	**0.29**	**0.16-0.53**	**p<0.001**
	No	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Hypercholesterolemia	Yes	1.00	0.90-1.10	p>0.05	0.94	0.67-1.32	p>0.05	1.06	0.77-1.47	p>0.05
	No	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Hypertriglicerydemia	Yes	1.04	0.73-1.49	p>0.05	**1.47**	**1.02-2.13**	**p<0.04**	**0.65**	**0.45-0.96**	**p<0.03**
	No	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Coronary heart disease	Yes	**2.12**	**1.57-2.87**	**p<0.001**	**0.69**	**0.49-0.96**	**p<0.03**	**0.62**	**0.45-0.84**	**p<0.003**
	No	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Tobacco smoking	Non-smoker	1.48	0.98-2.25	p>0.05	0.83	0.54-1.27	p>0.05	0.77	0.52-1.15	p>0.05
	Former smoker	1.09	0.64-1.84	p>0.05	1.04	0.61-1.78	p>0.05	0.89	0.53-1.46	p>0.05
	Current smoker	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Hypertension	Yes	**1.87**	**1.29-2.71**	**p<0.001**	0.76	0.53-1.10	p>0.05	**0.70**	**0.49-0.99**	**p<0.05**
	No	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG

Note: RG – reference group
Source: own research

Table 3. The relationships between selected socio-demographic characteristics, risk factors, diseases, and SRH in a multiple logistic regression model.

Variable		Poor self-rated health			Fair self-rated health			Good self-rated health		
		OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Sex	Female	E	E	E	E	E	E	0.32	0.16-0.64	p<0.001
	Male	E	E	E	E	E	E	1.00	RG	RG
Education	Single	0.44	0.27-0.69	p<0.001	E	E	E	1.98	1.25-3.13	p<0.004
	Married	0.53	0.34-0.82	p<0.005	E	E	E	0.57	0.33-0.97	p<0.05
	Tertiary	1.10	0.69-1.76	p>0.05	E	E	E	0.63	0.44-0.89	p<0.01
	Secondary	1.00	RG	RG	E	E	E	1.00	RG	RG
	Vocational	1.94	0.82-4.58	p>0.05	E	E	E	E	E	E
	Primary	1.00	RG	RG	E	E	E	E	E	E
Professional activity	Not working	0.33	0.21-0.53	p<0.001	E	E	E	2.63	1.55-4.47	p<0.001
	Working	0.40	0.25-0.66	p<0.001	E	E	E	2.03	2.22-3.40	p<0.007
Medical consultations	0-2	0.60	0.39-0.93	p<0.03	E	E	E	2.80	1.77-4.45	p<0.001
	3-5	1.00	RG	RG	E	E	E	1.00	RG	RG
	6-10	1.83	1.16-2.88	p<0.01	E	E	E	0.80	0.53-1.21	p>0.05
	>10	1.65	1.07-2.55	p<0.03	E	E	E	4.38	2.65-7.22	p<0.001
BMI	≥ 30	1.00	RG	RG	E	E	E	1.00	RG	RG
	25-29.9	E	E	E	0.47	0.30-0.71	p<0.002	E	E	E
	<25	E	E	E	1.00	RG	RG	E	E	E
Physical activity	High	1.32	0.82-2.13	p>0.05	E	E	E	E	E	E
	Low	1.00	RG	RG	E	E	E	E	E	E
Infarction	Yes	1.20	0.72-2.00	p>0.05	E	E	E	E	E	E
	No	1.00	RG	RG	E	E	E	E	E	E
Diabetes	Yes	E	E	E	1.44	0.99-2.09	p>0.05	0.46	0.23-0.91	p<0.03
	No	E	E	E	1.00	RG	RG	1.00	RG	RG
Hypertriglicerydemia	Yes	E	E	E	E	E	E	0.66	0.43-1.01	p=0.05
	No	E	E	E	E	E	E	1.00	RG	RG
Coronary heart disease	Yes	1.99	1.41-2.81	p<0.001	0.69	0.49-0.96	p<0.04	0.69	0.48-1.00	p<0.05
	No	1.00	RG	RG	1.00	RG	RG	1.00	RG	RG
Tobacco smoking	Non-smoker	E	E	E	E	E	E	E	E	E
	Former smoker	E	E	E	E	E	E	E	E	E
	Current smoker	E	E	E	E	E	E	E	E	E
Hypertension	Yes	1.46	0.96-2.24	p>0.05	E	E	E	1.03	0.69-1.52	p>0.05
	No	1.00	RG	RG	E	E	E	1.00	RG	RG

Notes: RG – reference group, E – excluded from the multiple logistic regression model because this variable was not significant in the single-factor logistic regression model (Table 2).
Source: own research

a medical history of infarction (increasing the chance of poor SRH), diabetes, coronary heart disease, and hypertension. The fair SRH was influenced in a single-factor logistic regression model by: physical activity (reverse relationship with high levels of physical activity), hypertriglicerydemia (contributing to a higher chance of fair SRH), and coronary heart disease (less frequent fair SRH).

Independent variables influencing the dependent variable for a given type of SRH were included in a multiple logistic regression model in order to estimate their simultaneous impact on the dependent variable – SRH (Table 3). We examined the combined effect of these variables, which individually turned out to be statistically significant determinants of good, poor, or fair SRH. This second procedure in our research protocol confirmed that: being a male, having tertiary education, low use of medical consultations, being overweight (but not obese), having no diabetes, having no hypertriglicerydemia, and a lack of coronary heart disease were significantly correlated with a good evaluation of their health status by the study subjects. The fair SRH was impacted by physical activity and coronary heart disease (reverse relationships). We found a statistically significant impact of the following variables on poor self-rated health at the confidence interval (CI) of 95%. Tertiary (OR=0.44, CI:0.27-0.69, p<0.001) and secondary (OR=0.53, CI:0.34-0.82, p<0.005) education contributed to a lower chance of poor SRH compared to primary education. A low number of medical consultations per year: 0-2 (OR=0.33, CI:0.21-0.53, p<0,001), 3-5 (OR=0.40, CI:0.25-0.66, p<0.001), 6-10 (OR=0.60, CI:0.39-0.93, p<0.03) contributed to a lower chance of poor SRH compared to over 10 medical consultations per year. A high body mass index: BMI≥30 (OR=1.83, CI:1.16-2.88, p<0.01) and 25<BMI<30 (OR=1.65; CI:1.07-2.55; p<0.03) contributed to a higher chance of poor SRH compared to BMI<25. Coronary heart disease (OR=1.99, CI:1.41-2.81, p<0.001) contributed to a higher chance of poor SRH compared to the lack of this disease. Our results point out that the subjective perception of one's own health status is strongly correlated with the health results of the early elderly subpopulation in a big city environment.

Discussion

Numerous longitudinal studies show that negative SRH is a satisfactory predictor of mortality and life expectancy, even better than objective measures like assessment by doctors [6, 15-19]. In a study based on an Israeli national representative sample of 622 elderly women and 730 men, it was found that SRH correlated more with short-term mortality (during 4 years) than with long-term mortality, which was estimated in a follow-up after 9 years [2]. The same research team discovered in another longitudinal study, concerning 830 subjects of retirement age, that subjects negatively evaluating their health status were 5 times more likely to die within 2 to 13 years than those characterized by high SRH [1]. A study conducted in Canada from 1971 to 1977 by J. Mossey and E. Shapiro [20] indicated that SRH

is a better predictor of 7-year survival of the elderly than all measures of objective health status stemming from the medical documentation made by doctors. The study was based on a random sample of 3,128 subjects aged 65 and older. The risk of early (1971-73) and late (1974-77) mortality of subjects with poor SRH was higher than among those who assessed their health status as good by a factor of 2.92 and 2.77. A study carried out among the elderly men in a medium-sized Brazilian city [21] showed that elderly men with fair or poor SRH showed a higher risk of dying as compared to those with excellent or good SRH. In the final model, the variables fair/poor SRH (hazard risk=HR=1.88, 95% confidence interval=95%CI=1.29-2.72), age (HR=1.05, 95%CI=1.03-1.08), public health system as the regular source of care (HR=1.69, 95%CI=1.10-2.60), current smoking (HR=1.94, 95%CI=1.24-3.04), and acute cardiovascular disease (HR=1.62, 95%CI=1.06-2.47) were associated with mortality. It concluded that SRH proved to be a predictive variable for mortality in elderly men after 2 years of follow-up, with nearly a twofold risk of death among men who reported fair or poor health, after adjusting for age, regular use of the public health system, current smoking, and acute cardiovascular disease. Given the importance of poor SRH for predicting mortality in elderly men, health services should incorporate this indicator into health assessments in this population. In a 17-year study conducted in Kraków, Poland, by B. Tobiasz-Adamczyk et al. [22], whose aim was to examine and identify the determinants most responsible for the relationship between self-rated health and mortality in non-institutionalized elderly people, base-line data were collected in a simple random sample of 2,605 Kraków residents aged 65 years and over. The vital status of all individuals under study was established by monitoring city records. Death certificates were obtained for the deceased and coded according to the underlying cause of death. Predictors related to self-rated health, developed using the results of principal component analysis, were modelled on three indexes: individual predisposition (to disease based on family history), caring about health in the past, and attitudes toward health. Cox multivariate analysis confirmed the significant role of self-rated health in the mortality patterns of women (HR=1.18).

The impact of sex, education, disease symptoms, frequency of medical consultations, and the ability to perform the activities of daily living (ADL) on SRH were analyzed in Polish literature about the subject. Studies concerning SRH determinants conducted by J. Halik et al. [23, 24] deserve our particular attention. The research study was based on a nationwide survey in a representative sample of people 65 and over, which consisted of 1000 subjects. Males tended to evaluate their health status better than females, as a very good evaluation was mentioned by 8% of males and 5% of females, and a rather good one – by 42% of males and 34% of females. The differentiation of results was also due to education level. Among those with tertiary education, 18% of subjects assessed their health status as very good and 63% as good, whereas in the group with incomplete primary education it was respectively 3%

and 32%. The cited results are similar to ours. Another Polish study [25] showed a very strong positive correlation between higher education and better health status. Determinants of SRH were defined in a sample of 1,371 subjects. The greatest impact on SRH was attributed to the number of disease symptoms. Among males, they were due to cardiovascular diseases (CVD). The second rank in the list of factors determining SRH was taken by the ability to perform the activities of daily living (ADL), expressed in a Likert scale. Other determinants of the described variable included the frequency of medical consultations (the higher the number, the worse the SRH). Furthermore, an active way of spending one's free time contributed to a better perception of one's health. Similarly to our Łódź study, the cited results exhibited in a multiple regression model did not indicate a statistical significance for marital status. Unlike our results, sex was not a statistically significant predictor of good SRH in the cited study.

A Guatemalan study confirmed the relationship between SRH and mobility (physical functions) and emotional well-being [26]. It was a part of a bigger study initiated by the International Union of Nutrition Studies. The relationship between SRH and functionality in performing ADL adjusted for a set of anthropometric variables was under consideration. The average age of the research subject was 79.7 ± 8.2 years. The sample consisted of 30.5% of males and 69.5% of females. A 3-grade scale of SRH was used. The results were similar to ours, with 47.8% of males and 30.5% of females assessing their health status as good. However, the share of evaluations related to poor health status was lower than in the Łódź study, as only 13.0% of males and 16.2% of females gave such responses. Subjects with the highest index of well-being estimated their health status better than those with a weak and moderate index ($p<0.001$, CI: 1.31-1.67). Subjects with the highest level of mobility evaluated their health better than those with the lowest level more often by a factor of 1.15 ($p<0.05$, CI: 1.00-1.32).

Certain inconsistencies may happen between SRH and a medical assessment. Some studies indicate that respondents evaluated their health status as better compared to doctors, whereas other studies provide opposite results [5]. The research study of P. Kivinen et al. [27] carried out in Finland needs to be mentioned. The cohort of Finnish males participating in a Seven Countries Study in late 1950s was subject to a follow-up in 1989. The study aimed to assess mortality, morbidity, and risk factor prevalence in various cultures. The main objective of the follow-up was to check the conformity of SRH with doctors' assessments based on elaborated scales and adjusted for many variables available in the study. The sample consisted of 365 elderly males born from 1900 to 1919 (the average age was 76.2 ± 3.0 years). Significant differences between SRH and doctor assessments were observed. Only 25% of males with a good assessment of health by the doctor evaluated their own health status as good, whereas 23% perceived their health status as poor. A better conformity between SRH and the doctor assessments appeared in the category of poor health status, as 65% of subjects had the same

opinion as the doctor. There was a weak correlation between SRH of elderly males and the doctor assessments. In general SRH was better than the doctor assessments. The differences in SRH and medical opinions prove that being healthy has a different meaning for various people. It is worth noting that higher education was positively correlated with both good SRH and the doctor's assessment. There were no differences between SRH and the doctors' assessments due to marital status. Age was a very important factor for doctors assessing health status, whereas it was insignificant for SRH. Significant differences were observed for variables concerning diseases and symptoms. For instance, coronary heart disease and other chronic diseases (especially lung diseases) had a much more important impact on the doctor assessments in the category of "poor" than in the category of "good". Joint aches, tiredness during physical effort, disuria, weak eyesight, and depression more often had a negative impact on poor SRH of the male study subjects.

SRH may also depend on life satisfaction, according to a study conducted among primary health care adult patients in Sweden [15]. The sample consisted of 470 subjects drawn from the multi-ethnic Swedish population. The study aimed to assess the impact of socio-economic characteristics, somatic disorders and mental diseases, as well as life satisfaction on the perceived health. A logistic regression model proved that subjects born outside Europe had worse SRH than those born in Sweden or other Northern European countries. Furthermore, depression, the number of symptoms, and the degree of life satisfaction were significantly and independently correlated with SRH. However, it was low life satisfaction that had the strongest impact on poor SRH, as such subjects evaluated their health status as poor 15 times more often than people satisfied with their lives (OR=15.30; 95% CI).

Education is an important determinant of SRH. We should mention the results of a study conducted in Northern Karelia and Kuopio in Finland [17] because of their value and a certain similarity to our studies in the Łódź demonstrative area of CINDI. Similarly to our findings, higher education was strongly correlated with good SRH. Therefore, it constitutes an important predictor of health. As a measure of socio-economic status, education does not evolve so much as the profession or income, which allows us to avoid certain research problems, e.g. linked to unemployment. Moreover, unlike our results in the early elderly age category, tobacco smoking and surviving a heart infarction were strongly associated with SRH, whereas the remaining variables had a less important, often insignificant, impact on SRH.

It is often stated in the literature that the inhabitants of Central and Eastern Europe tend to evaluate their health status worse than Western Europeans. There was a comparative study in 1994 by M. Szaflarski and L. A. Cubbins [28] devoted to the determinants of this situation. The survey was addressed to 1,588 subjects aged over 60 in Poland and 1,639 in the United States. Lower SRH and its deterioration after 60 was found in Poland compared to the U.S. In Poland, females tended to evaluate their health status

worse than males, whereas it was the opposite in the U.S. The authors suggested that this may result from another structure of employment and cultural differences. The relationship between education, income and SRH was stronger in the U.S. than in Poland. Therefore, gender and the socioeconomic status may have diverging impacts in both countries due to a gap in social development between the West and Eastern Europe, which is reflected in various standards of living and lifestyles, health care systems, and cultural conditions.

In a recent Chinese study [29], SRH was demonstrated to be an accurate reflection of a person's health and a valid predictor of incident mortality and chronic morbidity. The study aimed to evaluate the distribution and factors associated with SRH and its association with biomarkers of cardio-metabolic diseases among middle-aged and elderly Chinese. A survey of 1,458 men and 1,831 women aged 50 to 70 years, was conducted in one urban and two rural areas of Beijing and Shanghai in 2005. SRH status was measured and categorized as good (very good and good) vs. not good (fair, poor, and very poor). Determinants of SRH and associations with biomarkers of cardio-metabolic diseases were evaluated using logistic regression. Thirty-two percent of participants reported good SRH. Males and rural residents tended to report good SRH. After adjusting for potential confounders, residence, physical activity, employment status, sleep quality and the presence of diabetes, cardiovascular disease, and depression were the main determinants of SRH. Those free from cardiovascular disease (OR=3.68; 95% CI: 2.39-5.66), rural residents (OR=1.89; 95% CI: 1.47-2.43), non-depressed participants (OR=2.50; 95% CI: 1.67-3.73) and those with good sleep quality (OR=2.95; 95% CI: 2.22-3.91) had almost twice or more the chance of reporting good SRH compared to their counterparts.

The prevalence of risk factors, CVD morbidity, and the subsequent disability lead ultimately to mortality rates increasing with aging [30]. All these elements determine SRH, which therefore may be considered a good predictor of mortality especially in the elderly subpopulation [2, 4, 16]. Moreover, SRH influences behaviours impacting health status. Weak perceptions of health may lead to lower engagement in preventive practices or self-care. SRH is an important indicator of the health situation of populations, having an enormous impact on shaping the demand for health-care services. An assessment of the health situation of the elderly based only on clinical and epidemiological diagnoses may not reflect properly the entirety of their psychophysical state perception due to co-existence of multiple diseases and changes linked with the aging processes. The subjective evaluation of the health situation seems a better measure, especially in relation to big populations. SRH expressing health perceptions takes into account its objective aspects as well. Since the elderly tend to suffer from a number of health problems that depend on their physical, psychological and social health, perceived subjective health constitutes an important indicator of their health situation.

Conclusions

Our own results as well as numerous studies on SRH found in the bibliography provide empirical support for the thesis that the perception of one's health status is strongly correlated with the health situation of the population under study. A subjective evaluation of the health status among the elderly is a valuable epidemiological measure used to assess the health situation of this population. SRH may reflect the degree of control over one's own life. People with good SRH tend to work consciously toward this result by eliminating such behaviours that contribute to certain diseases, especially the CVD.

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