

# Social Determinants of Self-reported Health Among Population in Republic of Macedonia – Results from a Case-control Study

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## ABSTRACT

**Introduction:** Studying self-reported health is considered an indicator for morbidity and mortality that may be used in primary health care to detect poor health in certain population groups that predicts health care utilization. **Goal:** The goal of the survey is to assess the socioeconomic self-rated health gradient and to describe contribution of behavioral risk factors to this gradient among population in Republic of Macedonia. **Material and methods:** Data is collected through a “nested case-control study”, conducted in the period March – December, 2013. “Cases” are households with TB patient(s) registered in the period July, 2012 – June, 2013 and “controls” are households randomly chosen in cases’ immediate vicinity. **Results:** The total study population is 562 households with total of 2720 respondents. Self-rated health was reported as excellent or good by only half of the respondents, with slightly less positive answers among cases compared to controls and evident differences in responses for poor or extreme difficulties in everyday life. Positive association was found between poor rated health and long-standing diseases and education was associated with poor self-rated health. Adding questions on mobility, self-care, pain, cognition, interpersonal activities and affect has only reaffirmed the findings, with statistically significant differences among study groups along all six dimensions. **Conclusion:** The ease of use of simple questions to ask for self-rated health makes it an extremely beneficial tool in health care planning.

**Key words:** self-rated health, social determinants, Macedonia.

## 1. BACKGROUND

Inequities in the health status are global problem, equally affecting rich and poor countries (1) and numerous attempts to quantify economic impact of health inequities have shown significant opportunities for savings if these inequities are reduced (2), such as calculations that lost lives due to inequities in health account to 700.000 deaths annually and 33 million diseased across EU (3, 4). Studying self-reported health is expanding over the past 15 years (5) and is considered as an indicator for morbidity and mortality in the population that may be used in primary health care to detect poor health in certain population groups and predicts the health care utilization (6). Surveys conducted in EU countries show that individuals systematically rank their health status above all other aspects of their everyday life (7). Answers on simple questions on self-assessed health status have shown significant independent association between health status indicators and specific covariates that predict mortality (8), even after adjustment for comorbidity (9), such as cardiovascular diseases (10), and self-rated health is correlated with physical

health, functional capacity and psychological well-being (11). Self-rated health is also an independent predictor of survival that controls for other related health indicators and it is recommended that these types of research should be conducted not only in Western countries (12). Prognostic value of self-rated health is particularly important among older adults (13) and literature acknowledge self-rated health as lying at the crossroads of culture and biology, therefore it needs a collaborative effort between different disciplines to improve understanding of this key measure of health status (14).

## 2. GOAL

The goal of the survey is to assess the socioeconomic self-rated health gradient and to describe contribution of behavioral risk factors to this gradient among population in Republic of Macedonia.

## 3. METHODS

The study was conducted in 8 statistical regions in Republic of Macedonia with population of 2 065 769 inhabitants (State

Statistical Office, 2013) in the period March – December, 2013. The study was approved by Doctors Chamber in March, 2013. Informed consent was an integral part of the questionnaire and was obtained from each survey participant, explaining the objectives, process and expected outcomes of the research and their right to withdraw at any point of answering the questions, as well as ensuring confidentiality of the information gathered before, during and after finishing the study.

By the means of case-control study, households of registered TB cases in the period July, 2012 – June, 2013 were recruited as “cases” and one control household was randomly chosen in cases’ immediate vicinity and who agreed to participate in the study, to provide for comparison with the general population. Study sample has been calculated with statistical program for determining sample size (PEPI 4.04x), by using the following parameters: *average household size 4.5* (State Statistical Office, 2012), *urban/rural ratio 1.5*, *poverty line 28.7* (Index Mundi, 2008), the study power of 80%, 95% confidence interval and maximum acceptable difference 0.05. The calculated sample of 530 households was increased by 10% to allow for non-response. Data is collected with selected modules from World Health Survey questionnaire (15), modified to provide data for survey objectives, in accordance with guidelines for developing countries (16). Self-reported health is assessed through the question *How will you rate your health status today?* with a five-point scale ranging from 1 – very satisfied, 2 – satisfied, 3 – neither satisfied nor dissatisfied, 4 – dissatisfied, 5 – very dissatisfied). Social determinants are assessed by collected data on gender, place of residence (urban-rural), educational and employment status, ethnicity and the region where the patient lives. Health behavior is measured with two questions related to tobacco and alcohol consumption.

Face-to-face interview was performed by 20 trained DOT nurses who visit TB patients 3 times/week; all data on variables is based on self-reported information. The instrument has been pre-tested on 10% of the sample, with appropriate corrections following feedback from the pre-test, mainly additional explanations for better understanding of questions. The instrument has been also translated into Albanian language, as to allow for interviewing ethnic minorities in RM into their mother tongue. Data has been analyzed with IBM SPSS Statistics, version 19.0 (IBM Corporation, Somers, NY, USA), using descriptive statistics to calculate frequencies and mean values. Percentages are used to express values and chi-square test to analyze differences between cases and controls for categorical variables. Multiple logistic regression was used to assess the relationship between self-reported health as single categorical response and age, gender, place of residence, region, educational and employment status, as well as smoking and alcohol consumption as categorical explanatory variables (17, 18).

#### 4. RESULTS

The total study population is 562 households with total of 2720 respondents, 53.5% households with TB patient and 46.5% households as controls. Characteristics of study population are presented in Table 1.

Respondents are represented in all 8 regions, as per statistical division of the country, most of them interviewed in the North-West region, 47.6% in Skopje region, 14.9% in Polog, South-West 8.4%, South-East and North-East with 7.4% and 7.2%,

	Cases	Controls	p
<b>Region (%)</b>			
Skopje	47.5	47.6	0.923
Polog	15	14.9	
South-West	8.5	8.4	
South-East	7.4	7.5	
North-East	7.3	7.2	
Pelagonija	6	5.9	
East	5.2	5.3	
Vardar	3.1	3.2	
<b>Place of residence (%)</b>			
Urban	52.1	53.8	0.412
Rural	47.9	46.2	
<b>Gender (%)</b>			
Female	36.8	47.9	<0.01
Male	63.2	52.1	
Mean age of respondents (years)	45.17	47.28	0.084
<b>Ethnicity (%)</b>			
Macedonian	37.3	44.8	0.63
Albanian	50.6	43.8	
Roma	7.5	6.2	
Turkish	4.2	4.1	
<b>Education (%)</b>			
No formal education	2.6	3.1	0.032
Unfinished primary school	10	9.7	
Completed primary school	41.7	30.7	
Completed high school	39.5	43.4	
Completed university education	4.5	9.3	
<b>Employment status (%)</b>			
Public administration	7	9.5	<0.01
Self-employed	9.1	13.1	
Employer	11.2	23	
Unemployed	72.4	52.2	
NGO	0.3	2.2	
<b>Smoking (%)</b>			
Yes	35.6	43.9	<0.01
Yes, but not every day	10.4	6.9	
No	54	49.1	
<b>Alcohol (%)</b>			
Yes	40.07	55.75	0.0043
Never	59.93	44.25	

Table 1. Means, proportion and distribution of explanatory variables in controls (n=1455) and cases (n=1275)

respectively, Pelagonia 5.9%, East 5.3% and the lowest number in Vardar region (3.2%), which corresponds to distribution of TB patients registered in the period July, 2012 – June, 2013, as the main inclusion criterion for cases. Due to the study design, percentage of controls in the regions is identical, or negligibly lower or higher compared to cases.

Distribution of respondents by place of residence is quite proportional with 50.9% living in urban and 49.1% in rural areas, with both cases and controls dominantly living in urban areas. Statistically significant difference is observed in gender, with dominance of male TB cases (63.2% vs 52.1% in the control group). Members of households with TB cases are slightly younger (mean age of 45.17 years  $\pm$  15.7 SD, compared to controls with mean age of 47.28  $\pm$  14.1 SD) and live in statistically significant bigger households of average 4.66 members than HH size of 4.36 in controls. By ethnicity, most of the cases are Albanians (50.6%) or Macedonians (37.3%), followed by Roma (7.5%) and Turkish (4.2%) and, given the study design, there is no statistically significant differences between the groups ( $\chi^2=3.458$ , df=5, p=0.63).

Overall in the past 30 days, how difficult it was for you to move around?		None	Mild	Moderate	Severe	Extreme/ Cannot do	P
Cases	# (%)	124 (40.5%)	88 (28.8%)	58 (19%)	29 (9.5%)	7 (2.3%)	<0.001**
Controls	# (%)	165 (56.9%)	67 (23.1%)	47 (16.2%)	11 (3.8%)	0 (0%)	
Overall in the past 30 days, how much difficulty did you have with self-care, such as washing or dressing yourself?							
Cases	# (%)	154 (50.2%)	70 (22.5%)	58 (18.6%)	20 (6.4%)	7 (2.3%)	<0.001**
Controls	# (%)	205 (70.7%)	50 (17.2%)	29 (10%)	6 (2.1%)	0 (0%)	
Overall in the past 30 days, how much of bodily aches or pain did you have?							
Cases	# (%)	98 (31.8%)	118 (38.3%)	58 (18.8%)	33 (10.7%)	1 (0.3%)	0.005**
Controls	# (%)	122 (42.1%)	118 (40.7%)	29 (10%)	20 (6.9%)	1 (0.3%)	
Overall in the past 30 days, how much difficulty did you have with concentrating or remembering things?							
Cases	# (%)	128 (41.4%)	97 (31.4%)	55 (17.8%)	24 (7.8%)	5 (1.6%)	<0.001**
Controls	# (%)	171 (59.2%)	84 (29.1%)	26 (9%)	8 (2.8%)	0 (0%)	
Overall in the past 30 days, how much difficulty did you have with personal relationship or participating in the community?							
Cases	# (%)	149 (48.4%)	81 (26.3%)	59 (19.2%)	17 (5.5%)	2 (0.6%)	<0.001**
Controls	# (%)	204 (70.6%)	50 (17.3%)	31 (10.7%)	4 (1.4%)	0 (0%)	
Overall in the past 30 days, how much of a problem did you have with feeling sad, low or depressed?							
Cases	# (%)	86 (27.8%)	127 (41.1%)	58 (18.8%)	37 (12%)	1 (0.3%)	<0.001**
Controls	# (%)	149 (51.6%)	106 (36.7%)	23 (8%)	11 (3.8%)	0 (0%)	

Table 2. Distribution of answers on questions on mobility, self-care, pain, cognition, interpersonal activities and affect

Most of the cases have completed primary school education (41.7%) or high school (39.5%), compared to controls with 30.7% and 43.4%, respectively; the percentage of controls who have completed university education is more than double (9.3%) compared to cases with 4.5% and the difference among groups is statistically significant. Education, in turn, is reflected in employment status with majority of cases reporting unemployment (72.4%), although this percentage is also high in controls (52.2%), with high statistically significant difference among groups. Percentage of regular smokers among cases is lower (35.6%) compared to cases who regularly smoke in 43.9% cases, but the percentage is similar if we add those who smoke, but are not doing it every day (46% cases vs 50.8% among controls), with statistically significant differences among groups. Percentage of regular alcohol users is also higher in controls, with 55.75% reporting alcohol consumption ever in life, compared to 40.07% cases doing so. Half of respondents in our study have assessed their health status (including physical and mental health) as good (49.9%), 24.4% have stated their health status is moderate, 17.9% think their health status is very good and only 7.2% and 0.7% assessed their health status as bad or vary bad, respectively.

Analyzed by group of respondents, 50.8% cases and 49.1% controls assess their health status as good or moderate (27.6% cases and 21.1% controls), but differences are significant in categories *bad* with dominant cases with 9.3% vs. 4.9% controls and *very bad* with 1.3% positive answers among cases vs. no such response in controls with statistically significant difference in answers among groups ( $X^2=26.410$ ,  $df=4$ ,  $p<0.001$ ). Assessment of self-reported health status is complemented with six questions on mobility, self-care, pain, cognition, interpersonal activities and affect (Table 2). To all six questions, percentage of answers *none* is higher in controls, 56.9% vs 40.5% cases on the question for mobility, 70.7% vs 50.2% cases for self-care, 42.1% vs 31.8% for pain, 59.2% vs 41.4% for concentration and remembering things, 70.6% vs 48.4% for interactions with community, but high 51.6% in cases vs 27.8% controls in answers to question on feeling sad, low or depressed. Percentage of answers *moderate*, *severe* and *extreme/cannot do* is higher in cases along all six dimensions and these differences are statistically significant.

Logistic regression shows that gender was strongly associated with self rated health status, with higher odds of males to report poorer health, compared to women as a reference group. Although there was no statistically significant difference in answers on self-rated health in different categories of marital status, it was associated with poorer health only in widowed individuals. Statistically significant are also answers according to education category, except for respondents who have completed high school education. By ethnicity, Macedonians and Roma were twice as likely to report poor health and answers differ according to employment status, unemployed being 3 times more likely to report poor health, compared to other employment categories. Place of residence also shows statistically significant differences in self-rated health, rural respondents having 6 times higher odds to report poor health compared to respondents residing in urban areas. As for behavioral variables, odds to report poor health were 8 times higher in regular smokers, 5 times higher for irregular smokers and alcohol was associated with 5 times higher odds for reporting poor health. Positive association was found between long-standing illnesses and reporting poor health, such as angina pectoris and mental illness, while no association has been found for comorbidity with arthritis and asthma (Table 3).

## 5. DISCUSSION

Our study shows that in the total study population, self-rated health was reported as excellent or good by only half of the respondents, with slightly less positive answers among cases compared to controls. Differences are evident in responses for poor or extreme difficulties in everyday life among cases with very low percentage of such answers in controls. A positive association was found between poor rated health and long-standing diseases such as angina pectoris and mental illness and this finding is consistent with study of self-rated health among women in Russia, Finland and Estonia (4). Education was also associated with poor self-rated health, with exception of respondents with university education, similar to surveys in the former Soviet Union and other European countries (19, 20).

Adding questions on mobility, self-care, pain, cognition, interpersonal activities and affect has only reaffirmed the findings,

Social determinant	OR <sup>1</sup>	95% CI <sup>2</sup>		p-value
		Lower	Upper	
Gender				
Female*	1			
Male	1.586	1.022	2.331.	0,048
Marital status				
Not married*	1			
Married	1,22	0,007	10,962	0,994
Separated	0,425	0,044	4,096	0,459
Divorced	0,295	0,055	1,592	0,156
Widowed	5,259	1,470	14,307	0,045
Education status				
No formal education	2,153	1,013	2,305	0,043
Uncompleted primary school	1,114	1,013	2,001	0,015
Completed primary school	1,259	1,041	1,780	0,050
High school	0,322	0,024	2,256	0,143
University education*	1			
Ethnicity				
Macedonian	2.535	1.112	5.780	0.027
Albanian	0,617	0,145	2,630	0,514
Turkish	1,917	0,107	5,252	0,440
Roma	1,817	1,481	8,319	0,014
Employment status				
Public administration*	1			
NGO <sup>3</sup>	1,351	0,127	7,217	0,578
Self-employed)	1,552	0,134	3,522	0,545
Employer	1,529	0,417	5,748	0,625
Unemployed	3,314	2.727	8.118	0.019
Place of residence				
Urban	1			
Rural	6,130	2,97	13,35	0,015
Smoking				
Yes	8.34	5.43	12.02	0.041
Yes, but not every day	5.25	2.832	7.354	0.022
No*	1			
Alcohol				
Yes	5.034	2.10	12.01	0.0121
Never	1.523	1.023	3.956	0.042
Arthritis				
Yes vs No	0.986	0.469	2.073	0.977
Angina pectoris				
Yes vs No	6.008	2.466	14.637	<0.01
Asthma				
Yes vs No	1.030	0.782	1.358	0.338
Mental illness				
Yes vs No	1.271	1.068	1.531	0.008

Table 3. Adjusted odds ratios for socio-demographic characteristics and explanatory variables associated with self-rated health \* =reference group IOR = Odds ratio 2CI = Confidence interval 3NGO=Non-governmental organisation

with statistically significant differences among study groups along all six dimensions. Diagnosis of angina pectoris or other cardiovascular diseases was associated with poorer self-reported health, similar to the Swedish study that has established evidence on association of cardiovascular disease and low self-rated health with higher mortality (7). Similar are also findings from a Danish study that as defined predictors of mortality, such as sociodemographic factors, smoking and obesity (21) implying the importance to include self-rated health when studying risk factors for mortality (22).

### Study strengths and limitations

Survey of this type has never been performed in Republic of Macedonia, thus we can emphasize this fact as a strength of the study, providing baseline information on possible factors that influence health of the population. Limitations are those typical of self-reported data and the nested case-control study design, with probability of oversampling respondents with similar characteristics, associated with TB disease as the main selection criteria of cases that can somehow act as confounder of the findings. Results cannot provide evidence on causality and selection bias as well cannot be estimated.

## 6. CONCLUSION

The study is the first step towards establishment of evidence that self-rated health is an important indicator to be followed by both clinicians and health planners in Republic of Macedonia. Further research is needed to determine if self-rated health assessment in routine clinical setting can be used to identify groups at risk for increased mortality and other important health outcomes. However, given the ease of use of simple questions to ask for self-rated health, recommendation for routine collection of these data may offer an extremely beneficial tool in health care planning.

CONFLICT OF INTEREST: NONE DECLARED.

## REFERENCES

1. OECD Health working papers No.43. Measuring disparities in health status and in access and use of health care in OECD countries. DELSA/HEA/WD/HWP, 2009.
2. Mackenbach JP, Stirbu I, Roskam AJ, Schaap M, Menvielle G, Leinsalu M, et al. Socioeconomic inequalities in mortality and morbidity: a cross-European perspective. Chapter 2. In: Tackling Health Inequalities in Europe: an Integrated Approach. Eurothine Final Report. Rotterdam: Department of Public Health, University Medical Centre Rotterdam, 2007.
3. Mackenbach JP, Meerding WJ, Kunst AE. Economic Costs of Health Inequalities in the European Union. J Epidemiol Community Health. 2011 May; 65(5): 412-419.
4. Blas E, Sivasankara Kurup A. Equity, social determinants and public health programmes. Available from [http://www.who.int/publications/2010/9789241563970\\_eng.pdf](http://www.who.int/publications/2010/9789241563970_eng.pdf) Farmer M, Ferraro K. Distress and perceived health: mechanisms of health decline. Journal of Health and Social Behavior. 1997 Sep; 39: 298-311.
5. Wiking E, Johansson S, Sundquist J. Ethnicity, acculturation, and self-reported health. A population based study among immigrants from Poland, Turkey, and Iran in Sweden. J Epidemiol Community Health. 2004; 58: 574-582. doi: 10.1136/jech.2003.011387.
6. EuroFound, 2012. Quality of Life Survey. Достапен на <http://www.eurofound.europa.eu/surveys/eqls/index.htm>, прегледан на 25.05.2014
7. Idler LE, Benyamini Y. Self-rated health and mortality: A Review of Twenty Seven Community Studies. Journal of Health and Social Behavior. 1997 Mar; 38: 21-37.
8. De Salvo et al. Self-rated Health and Mortality. Journal of General Internal Medicine. Volume 21 Issue 3, Достапен на <http://onlinelibrary.wiley.com/doi/10.1111/j.1525-1497.2005.00291.x/pdf>
9. Bardage C, Isacson D, Pedersen NL. Self-rated health as a predictor of mortality among persons with cardiovascular disease in Sweden. Scand J Public Health January. 2001; 29(1): 13-22.
10. Dubikaytis T. et al. Socioeconomic differences in self-rated health among women: a comparison of St. Petersburg to Estonia and Finland. International Journal for Equity in Health. 2014; 13: 39.
11. Kawada T. Self-rated health and life prognosis. Arch Med Res. 2003; 34: 343-347.
12. Bernard SL. et al. Predicting mortality from community surveys of older adults: the importance of self-rated functional ability. J Gerontol B Psychol Sci Soc Sci. 1997 May; 52(3): S155-163.
13. Jylhä M. What is self-rated health and why does it predict mortality? Towards a unified conceptual model. Soc Sci Med. 2009 Aug; 69(3): 307-316. doi: 10.1016/j.socscimed.2009.05.013.
14. World Health Survey Questionnaire. Available from <http://www.who.int/healthinfo/survey/instruments/en/>
15. Glewwe P. Household Sample Surveys in Developing and Transition Countries. Available from [http://unstats.un.org/unsd/HHSurveys/pdf/Chapter\\_3.pdf](http://unstats.un.org/unsd/HHSurveys/pdf/Chapter_3.pdf)
16. McCrum-Gardner E. Which is the correct statistical test to use? The British Journal of Oral & Maxillofacial surgery. 2008 Jan; 46(1): 38-41.
17. Lang T. Documenting Research in Scientific Articles: Guidelines for authors. CHEST. 2007; 131: 628-632. Available from <http://www.archive.thoracic.org/sections/meetings-and-courses/mecor-courses/resources/Lang2007:628.pdf>
18. Bobak M, Pikhart H, Rose R, Hertzman C, Marmot M. Socioeconomic factors, material inequalities and perceived control in self-rated health: cross-sectional data from seven post-communist countries. Soc Sci Med. 2000; 51:1343-1350.
19. Elkemo TA, Bamba C, Joyce K, Dahl E. Welfare state regimes and income-related health inequalities: a comparison of 23 European countries. Eur J Public Health. 2008; 18: 593-599.
20. Nybo H, Petersen H, Chr Gaist D, Jeune B, Andersen K, McGue, M, Vaupel JW, Christensen K. Predictors of Mortality in 2,249 Nonagenarians - The Danish 1905-Cohort Survey. Journal of the American Geriatrics Society. 2003; 51: 1365-1373. doi: 10.1046/j.1532-5415.2003.51453.x
21. Bosworth HB. et al. The association between self-rated health and mortality in a well-characterized sample of coronary artery disease patients. Med Care. 1999 Dec; 37(12): 1226-1236.