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Research

The impact of fruit and vegetable intake on healthcare costs and preventive care in older adults: evidence from SHARE data

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Abstract

Purpose This study aims to investigate the association between daily fruit and vegetable consumption and healthcare utilization among older European adults. Our findings inform policies aimed at optimizing healthcare resource allocation and promoting healthy ageing in Europe's growing elderly population.

Methods Leveraging data from the 8th wave of the Survey of Health, Ageing and Retirement in Europe (SHARE) conducted in 2019–2020, this cross-sectional analysis examines associations between daily fruit and vegetable intake and hospitalization rates, hospital length of stay, visits to general practitioners, and specialist consultations.

Results Our results reveal no significant difference in hospitalization probability between individuals consuming fruits/vegetables daily versus less frequently. However, among hospitalized individuals, daily consumption is associated with fewer hospitalizations and shorter hospital stays. Moreover, daily fruit and vegetable intake is positively associated with increased likelihood of consulting general practitioners and specialists. This association may be indicative of a broader health consciousness and proactive approach to well-being management among individuals who prioritize dietary choices.

Conclusion These findings suggest that while fruit and vegetable consumption alone may not prevent hospitalizations in this segment of the population, it is linked to reduced re-hospitalization risk and shorter inpatient durations when hospitalized. Additionally, a diet rich in fruits and vegetables appears to promote greater engagement with preventive primary and speciality care among older European adults. Overall, the study highlights dietary behaviour as a potential factor influencing healthcare utilization and expenditures for ageing populations.

1 Background

The global population is ageing rapidly, with the number of older adults aged 60 and above expected to surge from 1 billion to 1.4 billion by 2030, representing one in six people worldwide [1]. Maintaining a healthy lifestyle becomes crucial yet challenging for public health initiatives as this demographic grows [2]. A balanced and nutritious diet is vital for promoting overall well-being in older adults [3]. However, the specific dietary factors influencing healthcare utilization in older adults remain under investigation. As populations worldwide grow older, understanding the impact of nutritional status and dietary patterns on health outcomes and healthcare utilization has become increasingly critical [4, 5]. A specific concern revolves around the increased risk of malnutrition in the ageing population due to a potential decline in both the quality and quantity of their diet [4, 6, 7]. Several studies have consistently demonstrated the nutritional

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benefits of fruits and vegetables, which are rich sources of vitamins, minerals, and antioxidants. Consuming an adequate quantity of fruits and vegetables is essential for preventing age-related diseases [8, 9] and reducing chronic conditions and healthcare utilization [8]. Diets abundant in these nutrient-dense foods are associated with a reduced risk of cardiovascular diseases [8, 10–12], including a lower incidence of strokes [11, 13]. Observational epidemiological research has also linked the consumption of fruits and vegetables, with their antioxidant and potassium content, to a decreased risk of mortality from cardiovascular diseases [14–16].

Numerous studies have already shown the clear benefits of fruits and vegetables for overall health. They are packed with vitamins, minerals, and antioxidants that can help prevent a variety of chronic illnesses, including heart disease, cancer, and even cognitive decline [8–10, 12, 14–19, 21–23]. However, for older adults in Europe, there is a surprising gap in our understanding of how much fruit and vegetable consumption impacts their healthcare utilization patterns.

Specifically, very few studies have looked at the connection between fruit and vegetable intake and how often older adults in Europe end up in the hospital. Similarly, the impact of a diet rich in fruits and vegetables on how often they visit the doctor has not been thoroughly investigated. Even more surprisingly, no research has yet examined the link between dietary habits and how likely older adults are to participate in preventive care activities like regular check-ups and screenings [20, 24, 25].

This paper aims to bridge these critical gaps. We aim to investigate the association between the consumption of fruit and vegetables by older adults in Europe and the frequency of utilization of healthcare services. To do this, we will be analyzing data from the large-scale, multidisciplinary SHARE survey conducted in 2019–2020. This comprehensive study will allow us to examine three key areas: (i) how fruit and vegetable consumption is linked to hospitalization rates among older European adults; (ii) the impact of a diet rich in fruits and vegetables on the frequency of doctor visits for older adults in Europe; (iii) the relationship between dietary habits and how likely older adults in Europe are to engage in planned preventive care behaviours like regular check-ups and screenings.

By gaining a deeper understanding of these associations, this research can provide valuable insights into how promoting a diet rich in fruits and vegetables can improve the health and well-being of older adults across Europe.

2 Methods

2.1 Data

The individual data employed in this study are drawn from the Survey of Health, Ageing and Retirement in Europe (SHARE). SHARE is a multidisciplinary, longitudinal survey on ageing which focuses on individuals aged 50+ and their spouses. The survey began in 2004 and is conducted every two years. Initially implemented in 11 countries, it has gradually expanded to include 27 countries (all European Union countries except the United Kingdom and Ireland, plus Israel). The "regular" waves (1–2 and 4–9) collect information on various aspects of participants' current lives, including accommodation, health, employment, social networks/relations, economic situation/assets, behavioural risks, and expectations. In the third and seventh waves (SHARELIFE, 2008 and 2017), respondents provided retrospective information on numerous aspects of their past, such as health, healthcare, accommodation, work history, household situation, and educational performance during childhood, as well as details about children and childbearing for women. We utilize data from Wave 8, which covers the period from October 2019 to March 2020. The final sample consists of 45,788 individuals living in 26 European countries plus Israel. We focus on various healthcare utilization indicators which encompass both hospitalization and primary care services. Regarding hospitalization, we observe whether respondents have been in the hospital in the last 12 months, the number of nights they spent there and the number of times they experienced hospitalization. Nearly 16% of respondents reported being hospitalized in the last 12 months. Among them, approximately 63.55% were hospitalized once, around 18% twice, with lower percentages observed for higher hospitalization rates. When considering the duration of hospitalization, around 16% stayed for one night, with a decreasing percentage observed as the number of nights increased.

We have the same information for both specialist visits and visits to the General Practitioner (GP) (seen/talked with a specialist/GP in the last 12 months, and the number of visits). Nearly all of our sample (90.79%) have consulted or spoken with a GP at least once in the last 12 months, while approximately 68% have visited a specialist. All these variables serve as a reliable proxy for assessing access to and utilization of healthcare services.

2.2 Variables

Our variable of interest pertains to the dietary habits of respondents, specifically focusing on their fruit and vegetable consumption. More precisely, individuals were asked to indicate how often they consume fruits or vegetables weekly: daily, 3–6 times a week, twice a week, once a week, or less than once a week.[1] In our analysis, we incorporate both the categorical variable representing frequency and a binary dummy variable set to 1 if an individual consumes fruits and vegetables every day. Approximately 73% of our sample reported consuming fruits or vegetables daily, while only 1% stated they consume these foods less than once a week. Interestingly, there is important heterogeneity across countries. Eastern European nations, including Hungary, Bulgaria, Romania, and Slovakia, report the lowest percentages of older adults consuming fruits and vegetables daily. In contrast, countries such as Italy and Spain have the highest rates, with over 80% of individuals reporting daily consumption of fruits and vegetables.

We include a rich set of individual-level controls. Among demographic variables, we consider gender and age. Females represent 57.51% of the sample, with an average age of 70.76. Regarding the socio-economic characteristics, we control for employment status, level of education, and marital status of respondents. Employment status includes two groups: retired, constituting 69% of all individuals, and other status, including unemployed and disabled. The International Standard Classification of Education (ISCED) is used to classify the education variable. Three levels of education are considered: (1) low education (no educational certificates or primary school certificates or lower secondary education) as a reference category; (2) medium education (upper secondary education or high school graduation); and (3) high education (university degree or postgraduate). Marital status is categorized as 'living with a spouse or a partner in the same household' vs 'living as single' (reference category). About 67% of respondents are married or living with a partner. Finally, we include a proxy for risky behaviours, which takes a value of 1 if the respondent has ever reported smoking daily, and 0 otherwise. In our sample, approximately 41% of individuals currently smoke or have smoked daily.

Suffering from health conditions is one of the most common reasons for accessing healthcare services, particularly among elderly populations. In our models, we incorporate a dummy variable to capture individuals' limitations in daily living activities. Specifically, we refer to a range of functional limitations, encompassing both Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL), which are recognized as reliable proxies for assessing the dependency status of older individuals. Our indicator takes value 1 if a respondent reports at least one limitation in ADL or IADL, and 0 otherwise. Approximately 23% of our sample reports suffer from at least one ADL or IADL limitation.

2.3 Empirical strategy

We first estimate a set of logit and OLS models, depending on the outcome variable considered:

$$y_i = \alpha_i + \beta fruit\_veg_i + X_i + \varepsilon_i$$

where y_i refers either to hospitalization in the last 12 months or to general practitioner and specialist visits. Specifically, in relation to the former, it captures (i) the probability of being hospitalized at least once; (ii) the number of nights spent in the hospital, conditional on being hospitalized; (iii) the number of times respondents were hospitalized, conditional on being hospitalized. Regarding GP and specialist visits y_i represents (i) the probability of seeing or speaking with them, and (ii) the number of visits. $fruit\_veg_i$ is a dummy variable which refers to the consumption of fruit and vegetables,[2] while X_i is a vector of control variables. Finally, ε_i is the error term. Secondly, we focus on the frequency of healthcare utilization and replicate the previous analysis using count model regressions. Specifically, we estimate a series of zero-truncated negative binomial regressions that account for data overdispersion and explicitly handle the absence of zero counts.

3 Main results

In Table 1, we report the first set of findings on the association between fruit and vegetable consumption and hospitalization rates in older adults. Interestingly, our analysis shows no statistically significant difference in the probability of being hospitalized between older adults who reported consuming at least one daily serving of fruits and vegetables

[1] Below is the exact wording of the SHARE question: "I*n a regular week, how often do you consume a serving of fruits or vegetables? 1. Every day. 2. 3-6 times a week. 3. Twice a week. 4. Once a week. 5. Less than once a week*".

[2] In the Appendix we show the results obtained using the categorical version of the variable.

Table 1 Probability of hospitalization and hospitalization rates (logit and OLS)

	Probability of being in a hospital	Number of times in hospital	Number of nights in hospital
Fruit and vegetable daily	0.015	− 0.48***	− 0.047**
	(0.034)	(0.016)	(0.022)
Female	− 0.188***	− 0.045**	− 0.010***
	(0.036)	(0.017)	(0.028)
Age	0.017***	0.001***	0.005**
	(0.002)	(0.000)	(0.002)
Living limitation	0.888***	0.131***	0.465***
	(0.051)	(0.017)	(0.029)
Married	− 0.098***	0.001	− 0.063**
	(0.029)	(0.014)	(0.027)
Retired	0.195***	0.022	0.020
	(0.044)	(0.013)	(0.038)
Medium education	− 0.026	0.037	0.001
	(0.031)	(0.022)	(0.024)
High education	− 0.103***	0.020	− 0.076**
	(0.036)	(0.018)	(0.032)
Ever smoked daily	0.184***	− 0.005	0.025
	(0.031)	(0.014)	(0.026)
Country dummies	Yes	Yes	Yes
N	45,788	7191	7191

Standard errors are clustered at country level. Significance levels: *p<0.1, **p<0.05, ***p<0.01

and those who did not (Column 1). This suggests that the overall dietary intake may not be a robust predictor of hospital admissions within this age group.

To gain a more nuanced understanding of the potential protective effects of dietary behaviour, we perform an intensive margin analysis, focusing on the frequency of healthcare utilization (Table 1, Columns 2–3). Our analysis reveals a significant inverse association between the frequency of fruit and vegetable consumption and the number of times individuals have been hospitalized in the past 12 months conditional on being hospitalized at least one time (Column 2). Older adults who reported consuming fruits and vegetables more regularly exhibited lower hospitalization frequencies. Furthermore, a deeper analysis of hospitalization events among those who did utilize hospital services at least once suggests that individuals who consume fruits and vegetables at least once daily may also experience shorter hospital stays, measured as the number of nights spent in the hospital (Column 3). Results are robust to the estimation of alternative models for count data (zero-truncated negative binomial), as shown in Table 2.

Building upon prior research that links age-related metabolic decline and poor dietary intake to increased prevalence of chronic diseases in older adults [26], this study also investigates the association between dietary habits and utilization of planned healthcare. We specifically examine the influence of fruit and vegetable consumption on the probability of visiting a physician (intensive margin) and the frequency of consultations (extensive margin) for both general practitioners (GPs) and specialists.

Our findings, presented in Table 3, demonstrate a significant positive association between regular fruit and vegetable consumption and both aspects of planned healthcare utilization. Individuals who reported consuming at least one serving of fruits or vegetables daily exhibited a 12.6 percentage point increase in the likelihood of specialist consultation compared to those with no daily intake. Similarly, these individuals displayed an 18.3 percentage point increase in the probability of visiting their GP. Additionally, for both specialists and GPs, individuals with a healthy dietary pattern display a significantly higher average number of consultations per year. As for hospitalization rates, results are robust when we use count data models (zero-truncated negative binomial regression, Table 4).

These findings suggest a potential link between prioritizing a healthy diet and increased engagement with planned healthcare utilization among older adults. This observed association may be indicative of a broader health consciousness

Table 2 Hospitalization rates, zero-truncated negative binomial

	Number of times in hospital	Number of nights in hospital
Fruit and vegetable daily	− 0.076***	− 0.053*
	(0.026)	(0.032)
Female	− 0.043	− 0.133***
	(0.027)	(0.032)
Age	0.003**	0.001
	(0.001)	(0.003)
Living limitation	0.162***	0.635***
	(0.028)	(0.048)
Married	0.005	− 0.063**
	(0.022)	(0.032)
Retired	0.041*	0.009
	(0.022)	(0.051)
Medium education	0.058*	0.042
	(0.034)	(0.035)
High education	0.049	0.031
	(0.031)	(0.047)
Ever smoked daily	− 0.014	0.066*
	(0.020)	(0.039)
Country dummies	yes	yes
N	7191	7191

Standard errors are clustered at country level. Significance levels: *p<0.1, **p<0.05. ***p<0.01

Table 3 Primary and specialist care (logit and OLS)

	Probability to talk to a specialist	Number of visits to a specialist	Probability to talk to the family doctor	Number of visits to the family doctor
Fruit and vegetable daily	0.127***	0.060**	0.183***	0.036**
	(0.030)	(0.021)	(0.044)	(0.017)
Female	0.122***	− 0.015*	0.319***	0.047***
	(0.037)	(0.009)	(0.044)	(0.012)
Age	− 0.004*	− 0.001	0.017***	0.005***
	(0.002)	0.001	(0.004)	(0.001)
Living limitation	0.449***	0.329***	0.649***	0.418***
	(0.043)	(0.016)	(0.053)	(0.024)
Married	0.137***	0.004	0.195***	0.013
	(0.025)	(0.009)	(0.043)	(0.010)
Retired	0.204***	0.053***	0.357***	0.080***
	(0.036)	(0.017)	(0.059)	(0.014)
Medium education	0.217***	0.021	0.114**	0.002
	(0.038)	(0.017)	(0.058)	(0.014)
High education	0.398***	0.036*	0.217***	− 0.016
	(0.057)	(0.019)	(0.078)	(0.013)
Ever smoked daily	0.092**	0.054***	0.035	0.059***
	(0.034)	(0.012)	(0.039)	(0.013)
Country dummies	Yes	Yes	Yes	Yes
N	40,992	27,958	45,834	41,598

Standard errors are clustered at country level. Significance levels: *p<0.1, **p<0.05, ***p<0.01

and proactive approach to well-being management among individuals who prioritize dietary choices. People who prioritize a healthy diet might be more health-conscious overall and take a more active role in managing their well-being.

3.1 Sensitivity analysis

As mentioned in Sect. 2, the consumption of fruits and vegetables varies significantly across countries in Europe, reflecting differences in dietary habits, cultural preferences, and economic conditions. These disparities can be attributed to factors such as agricultural production, income levels, food availability, and public health policies promoting healthy eating. Understanding these patterns is essential for formulating targeted nutritional policy interventions across Europe.

To explore the differences in fruit and vegetable consumption in greater detail, we classify European countries into four distinct macro-regions: East, North, Centre, and South. This grouping allows for a more nuanced analysis of regional dietary habits and their underlying determinants. The East includes Poland, Hungary, and the Baltic states, where consumption of fruits and vegetables tends to be lower. The North comprises Sweden, Denmark, The Netherlands and Finland, which generally benefit from stronger public health initiatives. The Centre region, including Germany, Austria, Switzerland, Luxembourg, and France, presents moderate consumption patterns. Finally, the South, which includes Italy, Spain, and Greece, exhibits the highest levels of fruit and vegetable consumption, largely influenced by the Mediterranean diet. This regional classification provides a framework for assessing dietary trends and the socio-economic factors that drive these variations. We estimate the models using count variables for healthcare service utilisation, applying count model regressions. Results are reported in Table 5.

Interestingly, significant heterogeneity is observed across macro-regions. In Nordic countries, daily consumption of fruits and vegetables appears to significantly reduce both the number of hospital visits and the number of nights spent in the hospital. This is also the case in Southern countries, although to a less extent. In the other two regions, this effect is not statistically significant. When examining the other outcomes—visits to a specialist and a family doctor—daily consumption of fruits and vegetables is positively and significantly associated with the number of visits to both healthcare professionals in Eastern countries. We also find an increased number of visits to a specialist in Eastern and Central countries and an increased number of visits to a family doctor in Southern countries.

Table 4 Primary and specialist care, zero-truncated negative binomial

	Number of visits to a specialist	Number of visits to the family doctor
Fruit and vegetable daily	− 0.079**	− 0.046**
	(0.033)	(0.022)
Female	− 0.051***	− 0.005
	(0.017)	(0.015)
Age	− 0.002	0.002
	(0.002)	(0.002)
Living limitation	0.459***	0.541***
	(0.029)	(0.039)
Married	− 0.002	− 0.013
	(0.021)	(0.015)
Retired	0.025	0.053***
	(0.034)	(0.017)
Medium education	0.052*	0.006
	(0.027)	(0.015)
High education	0.039	− 0.027
	(0.025)	(0.016)
Ever smoked daily	0.059***	0.061***
	(0.021)	(0.017)
Country dummies	Yes	Yes
N	27,958	41,598

Standard errors are clustered at country level. Significance levels: * p<0.1; **p<0.05; ***p<0.01

Table 5 Results by macro-region. Zero-truncated negative binomial

	Number of times in the hospital	Number of nights in the hospital	Number of visits to a specialist	Number of visits to the family doctor
Northern countries				
Fruit and vegetable daily	− 0.149***	− 0.147*	0.010	− 0.023
	(0.044)	(0.083)	(0.090)	(0.031)
Central countries				
Fruit and vegetable daily	− 0.040	0.016	0.112**	0.013
	(0.044)	(0.052)	(0.055)	(0.062)
Southern countries				
Fruit and vegetable daily	− 0.010*	− 0.130	− 0.017	0.063*
	(0.060)	(0.098)	(0.084)	(0.036)
Eastern countries				
Fruit and vegetable daily	− 0.079	− 0.054	0.124***	0.076***
	(0.048)	(0.038)	(0.034)	(0.030)

Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

These results reflect the complex relationship between dietary habits and healthcare utilization across different European macro-regions. In Nordic countries, the significant reduction in hospital visits and nights spent in the hospital linked to daily consumption of fruits and vegetables may be associated with the combination of an efficient public health system and higher health awareness, which may amplify the positive effects of a healthier diet. Regular consumption of fruits and vegetables could improve overall health, thus reducing the need for more intensive healthcare interventions like hospital stays. In contrast, the lack of statistically significant effects in other regions may point to structural differences in healthcare systems, dietary patterns, or broader socioeconomic factors that mediate the relationship between diet and health outcomes. For instance, healthcare access or quality, cultural preferences for other dietary staples, and differences in healthcare-seeking behavior may play a role [27]. The positive association between daily fruit and vegetable consumption and higher visits to specialists and family doctors in Eastern, Central and Southern countries suggests that individuals who maintain healthier diets may be more proactive about seeking regular check-ups or specialist consultations. This could reflect a growing health consciousness or greater emphasis on preventive care in these regions.

4 Conclusions

This study offers a comprehensive analysis of the relationship between fruit and vegetable consumption and healthcare utilization among older adults. Our findings demonstrate a significant inverse association between the frequency of fruit and vegetable intake and hospitalizations among older adults who had been hospitalized at least once in the past 12 months. This suggests that regular consumption of fruits and vegetables may help reduce both the frequency and duration of hospital stays. The robustness of this relationship across various statistical models reinforces the potential protective effects of a healthy diet.

Furthermore, our analysis highlights a positive association between regular fruit and vegetable consumption and increased physician consultations. Older adults who consume fruits and vegetables daily are more likely to engage with both general practitioners and specialists, reflecting a broader health-conscious behaviour and a proactive approach to healthcare.

The relationship between fruit and vegetable consumption and reduced hospitalizations can be explained through several mechanisms. These foods are rich in essential nutrients, antioxidants, and fibers, which support immune function, cardiovascular health, and chronic disease management, reducing the need for hospitalization. Additionally, the anti-inflammatory properties of fruits and vegetables help prevent chronic inflammation, a key contributor to many

age-related diseases. Individuals who prioritize a diet rich in fruits and vegetables may also engage in other healthy behaviours, such as regular exercise and adherence to medical advice, further minimizing the risk of hospital care. This proactive approach to health encourages frequent preventive care visits, promoting early detection and management of potential health issues. Collectively, these factors contribute not only to fewer hospitalizations but also to more proactive and preventive healthcare utilization.

We acknowledge several limitations of this study. Our focus was limited to fruit and vegetable consumption, without considering broader lifestyle and dietary patterns that were not captured in the data. Additionally, we lacked detailed information on the specific quantities of fruits and vegetables consumed. Finally, unobserved confounding factors could influence both dietary habits and healthcare usage. Despite these limitations, our study makes a valuable contribution to the literature and lays the groundwork for future research in this area.

The empirical evidence from this study carries important policy implications for promoting healthy ageing and reducing healthcare costs among older adults. Public health initiatives should prioritize nutritional education to raise awareness about the benefits of increased fruit and vegetable consumption, fostering proactive health management. Fiscal measures, such as subsidies or voucher systems, could also be introduced to make nutritious foods more affordable and accessible. Furthermore, integrating nutritional counselling into standard geriatric care could ensure that dietary assessments become routine in elderly care. Promoting fruit and vegetable-rich diets could significantly ease the burden on healthcare systems by reducing hospitalization rates and lowering the costs of managing chronic diseases. These interventions are particularly urgent in light of the ageing population and the expected increase in healthcare demand.

Future research, especially region-specific studies in Europe, is needed to quantify the economic benefits and inform the development of effective health policies.

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Data availability No datasets were generated or analysed during the current study.

Code availability (Software application or custom code) Available upon request.

Declarations

Competing interests The authors declare no competing interests.

Appendix

See Tables 6 and 7.

Table 6 Descriptive statistics

	Mean	Sd	N
Fruit and vegetable daily	0.733	0.442	45788
Female	0.575	0.494	45788
Age	70.76	9.437	45788
Living limitation	0.231	0.421	45788
Married	0.674	0.468	45788
Retired	0.689	0.462	45788
Low education	0.345	0.475	45788
Medium education	0.420	0.493	45788
High education	0.233	0.423	45788
Ever smoked daily	0.409	0.491	45788
Dependent variables			
Hospitalisation (d)	0.159	0.365	45788
# Times in hospital (if any)	1.963	1.975	7191
# Nights in hospital (if any)	10.555	18.19	7191
Seen specialist (d)	0.681	0.465	45788
# Visits specialist (if any)	4.339	7.916	27958
Seen the doctor	0.907	0.289	45788
# Visits the doctor (if any)	7.902	13.84	41598

Table 7 Probability of hospitalisation, talking with a GP and with a specialist

	Probability of hospitalisation	Probability to talk with GP	Probability to talk with specialist
Fruit and vegetable			
3–6 times	− 0.123	− 0.133**	− 0.075*
	(0.042)	(0.055)	(0.032)
Twice	− 0.013	− 0.217***	− 0.241***
	(0.057)	(0.076)	(0.071)
Once	− 0.191**	− 0.394**	− 0.370***
	(0.089)	(0.165)	(0.130)
Less than once	0.196	− 0.553***	0.138
	(0.126)	(0.151)	(0.138)
Female	− 0.235***	0.307***	0.096***
	(0.033)	(0.049)	(0.034)
Age	0.015***	0.017***	− 0.005*
	(0.002)	(0.004)	(0.002)
Living limitation	0.892***	0.656***	0.455***
	(0.051)	(0.052)	(0.043)
Married	− 0.106***	0.189***	0.130***
	(0.028)	(0.043)	(0.025)
Retired	0.206***	0.358***	0.210***
	(0.044)	(0.058)	(0.037)
Medium education	− 0.019	0.109*	0.217***
	(0.032)	(0.058)	(0.038)
High education	− 0.104***	0.206**	0.391***
	(0.036)	(0.078)	(0.057)
N	45788	45834	40992
Country dummies	Yes	Yes	Yes

Standard errors are clustered at country level. Significance levels: *p<0.1; **p<0.05; ***p<0.01

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