Socio-demographic and health-related factors affecting depression of the Greek population in later life: an analysis using SHARE data

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Published online: 11 August 2007
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Abstract Depression in later life is one of the most prevalent conditions forecasted to rise to the second most burdensome health condition worldwide by 2020. Using data from the 2004 Study of Health Ageing and Retirement in Europe (SHARE: release 1) on 857 Greek males and 1,032 females aged 50 or higher this study explores, firstly, associations of socio-demographic and health related indicators with depressive symptoms (EURO-D) and, secondly, attempts to identify patterns and structures among them. To achieve the first objective, the 12-item summated EURO-D scale is used in binary form with a cut-off point clinically validated by the EURODEP. Use of logistic regression pinpoints strong associations with gender, years of education, co-morbidity, disability, cognitive function and past depression. Women, less educated persons, those with poor physical health, declining cognitive function and a history of depression are significantly more at risk of scoring higher than three at the EURO-D scale. The role of age is not as clear. To achieve the second objective, multiple correspondence analysis is used in the first instance and factor analysis for binary data subsequently; two components are identified within EURO-D and continuous factor scores are produced. These factors are called

“affective suffering” and “motivation”. Linear regression models reveal that the first component is responsible for the gender while the second for the age differentials in EURO-D; additionally we find that, apart from physical health indicators which are strongly related to both factors, other associations differ. Further exploration of this differentiation seems of interest, particularly as there is an indication that “motivation” may be an affectively neutral condition.

Keywords Depression · Socio-demographic factors · Physical functioning · EURO-D · SHARE

Introduction

The recent developments in the EU have raised population ageing as an issue of great importance for policy makers and researchers from various disciplines. The demographic changes that prevailed over the last 25 years—in particular the persistence of fertility at levels below replacement (Billari 2005)—suggest that the population of the EU region will decrease in absolute numbers and become older (Coleman 2005). Population projections, even under different assumptions, indicate that by 2050 the proportion of population 65 and over in the EU-25 is expected to almost double (from 16.4% in 2004 to 29.9%) while the proportion of the very old people (aged 80 or higher) is expected to nearly triple, from 4.0% in 2004 to 11.4% (Eurostat 2005; Lisiankova and Wright 2005). Since the Second World War, Greece, as the other southern European countries, has undergone an ageing process at a high pace. Census data show that between 1951 and 2001 the share of population aged 65 and over increased from 6.7 to 16.7% (NSSG 2007) and is expected to reach 32.5% by the year 2050 (Eurostat 2005).

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The possible impact of ageing on the well-being and living standards of the older population is a warning to social decision making (Palacios 2002). The availability of detailed and reliable statistical information is indispensable to improve our understanding of causal interrelationships between demographic, socio-economic and health related factors affecting the quality of life of aged people. This task has been fulfilled recently by the Survey of Health, Ageing and Retirement in Europe (SHARE) which is the first European attempt to provide extensive cross-national comparable micro data on a very wide range of variables including socio-demographic characteristics and self-rated health.

Depression is one of the most prevalent psychiatric conditions in later life (Blazer 1989) forecasted to rise to the second most burdensome health condition worldwide by 2020 (Murray and Lopez 1997). It is related to a decline in well-being (Wells et al. 1989; Gurland 1992) and to an increase in functional disabilities, mortality and use of health care services (Beekman et al. 1999).

It has been consistently found that women suffer more from depression than men (Pahkala et al. 1995; Prince et al. 1999b; Osborn et al. 2002). Many studies also show an increase in depressive symptoms with age (Newman and Engel 1991; Prince et al. 1999b; Schoevers et al. 2000). This association, however, is not always clear (Weissman et al. 1988). Marriage is a source of emotional and financial support and acts protectively (Ross et al. 1990; Wyke and Ford 1992). Hence, married people fare better than the never-married, who in turn are followed by the widowed, divorced and separated (Prince et al. 1999b). Bereavement, on the other hand, is considered one of the main determinants of depression in old age (Braam et al. 2004).

Poor physical health is an important risk factor precipitating poor mental health among older persons (Lenze et al. 2001; Yang and George 2005). Braam et al. (2005) using data from 14 research groups in 11 European countries (EURODEP consortium) found that suffering from chronic illnesses and functional disabilities was related to higher chances of suffering from depression, even after controlling for age, sex, marital status and education. Prince et al. (1998) suggest that disablement and in particular handicap are the principal causes of the onset of depression in later life. This relationship is reciprocal; disabilities reinforce depressive symptoms over time and vice versa (Ormel et al. 2002; Braam et al. 2004). This is also the case with cognitive decline, another factor associated strongly with depression in later life (Austin et al. 2001; Braam et al. 2004).

Another persistent finding is a strong inverse relationship between depression and various indicators of socio-economic status (SES) such as education, social class, income, type of housing and crowding (Hudson 2005;

Murphy 1982; Reynolds and Ross 1998; Warheit et al. 1973). Reviewing research carried out in the 1980s, Hudson (1988) reported that this relationship held regardless of the indicator used or the specific mental illness examined.

Depression in Greece has never been studied in a nationwide representative sample of older adults. There have only been a limited number of studies based on small samples of patients in clinics, hospitals and private practices. SHARE has provided for the first time detailed information on a large enough scale to allow a reliable exploration of factors affecting depressive symptoms among persons aged 50 or higher. The main aims of this study are:

- (a) to assess the impact of selected socio-demographic factors and health indicators on depressive symptoms among older Greeks and
- (b) to apply multivariate techniques in order to identify patterns and structures in the self-reporting of depressive symptoms

Methods

Data

The data used in the analysis come from the Survey of Health, Ageing and Retirement in Europe, release 1. The baseline of the survey was conducted in 2004 and the sampling was carried out initially in 11 countries, covering about 23 thousand individuals (Börsch-Supan et al. 2005a, b). SHARE has a longitudinal, multidisciplinary and infrastructural design, modeled on the previous experience of the US Health and Retirement Survey (HSR; see Juster and Suzman 1995) and the English Longitudinal Survey of Ageing (ELSA; see Marmot et al. 2003). It has been mainly funded by the European Commission and is coordinated centrally at the Mannheim Research Institute for the Economics of Ageing. An extended report on survey methodology is presented in Börsch-Supan et al. (2005a).

Data collection in Greece was carried out during the period May–October 2004. The field work was conducted by a private survey company following an established statistical protocol. Due to the lack of a population register or similar records at national level, the telephone directory was used as sampling frame. A stratified two-stage sampling design was used; the final sampling unit of selection was the household. The target population was non-institutionalized persons aged 50 or higher at the time of the survey. The Greek sample includes 1,983 persons; our analysis, however, focuses on 1,889 of them for which there is non-missing information on their mental health and socio-economic covariates.

Measures

EURO-D

Respondents at the survey were asked to report the presence or absence of 12 symptoms of depression. The EURO-D scale results from the summing up of these responses and ranges from 0 (no depression at all) to 12 (very depressed person). This measure was introduced and validated by Prince et al. (1999a; b) at the EURODEP study and has been used by SHARE researchers as an indicator of current depression prevalence (Börsch-Supan et al. 2005). In our analysis the reliability of the EURO-D scale was tested using Cronbach's alpha (Cronbach 1951); the statistic was estimated at 0.722, implying satisfactory internal consistency. To measure depression we use a binary variable, taking the value 1 for EURO-D scores above 3 (clinically significant depression) and 0 otherwise. That cut-off point has also been validated at the EURODEP study, across Europe, against a variety of clinically relevant indicators (Dewey and Prince 2005).

Socio-demographic controls

Age is considered in the analysis in three broad age groups: 50–64, 65–74 and 75 or higher. Marital status is represented by a dichotomous variable that distinguishes divorced, separated and widowed persons from all the others. The socio-economic status of the respondents is assessed on the basis of years in education and home ownership. Years in education is grouped in two categories: 0–12 years which includes persons with no qualifications and those who have completed primary or secondary education, and 13 years of schooling or more which includes all those who have attained higher or tertiary education. Home ownership is used as a proxy of a person's wealth. As proportions of missing cases for that variable are fairly high, they are flagged and included as a separate category in the regressions; thus, owners are compared only to tenants.

Health indicators

Three indicators of physical health are included in the analysis. The first one is based on the number of chronic diseases a respondent has ever suffered from, taken from a list of 14 conditions that range from very severe, such as heart attack, stroke, cancer etc., to milder ones, such as cataracts, osteoporosis etc. The variable used in the models indicates whether one has been diagnosed with two or more such conditions in his lifetime. The second indicator of

physical health status is a binary variable showing whether a respondent reports at least one limitation in activities of daily living (ADL). These activities comprise six tasks necessary for personal care, such as dressing, using the toilet etc. The third indicator is again binary, showing whether a respondent reports at least one limitation in instrumental activities of daily living (IADL). These activities comprise seven tasks necessary to maintain a living environment, such as shopping for groceries, preparing a hot meal etc. As proxy for the cognitive function of the respondents a variable compiled from four questions on orientation on time is used; in the analysis we employ a binary version of this variable with 1 denoting persons who answered correctly to all questions and 0 otherwise. Finally, an indicator of whether the respondent suffered in the past from depression is used in the analysis. The relevant question allows us to distinguish between persons who had been treated by a doctor or psychiatrist for their condition and those who did not seek or need medical attention.

Statistical analysis

Firstly we estimate four binary logistic regression models (Models 1, 2, 3 and 4). We assume that the observations are independent across households but not necessarily within households. Hence, a procedure allowing clustering of the characteristics of the members of the same household is used to provide robust standard errors for the estimated coefficients. The response variable is 0 if the respondent has scored less than four at the EURO-D scale and 1 otherwise. The goodness of fit of the models is assessed on the basis of the Hosmer–Lemeshow Chi-square test (Hosmer and Lemeshow 2000) which produces robust and reliable results in the case of large samples (Hosmer et al. 1997).

Subsequently, using appropriate statistical methods, we attempt to identify patterns and structures in the reporting of the items of the EURO-D scale. As a first step, we apply multiple correspondence analysis techniques (MCA) to the 12 binary variables of the scale to highlight correspondences between the underlying symptoms. The joint plot presented in Fig. 1 places depression measures that are associated close together. The first dimension (horizontal axis) discriminates perfectly the presence and absence of the symptoms. The second dimension (vertical axis) distinguishes two segments among them; the first one includes four variables (interest, enjoyment, pessimism and concentration) and the second one the remaining eight (depression, sleep, guilt, tearfulness, irritability, fatigue, appetite and suicidality). This is a first indication of the co-existence of two factors within the EURO-D scale. This finding is also consistent with results from the EUROPEDE

Fig. 1 Multiple correspondence analysis for EURO-D scale symptoms: joint plot. “n” denotes that the particular symptom of depression was not selected

study (Prince et al. 1999a, b; Copeland et al. 2004) where it was found that, across 14 European centres, these symptoms could be separated into two factors with loss of interest, poor concentration and lack of enjoyment loaded on the first one—called “motivation”—and depression, tearfulness and wishing to die comprising the second—called “affective suffering” or “depressed affect”. We also use these terms in our study.

As a second step of the statistical analysis, we estimate tetrachoric correlation coefficients that are the appropriate measures for describing bivariate relationships between dichotomous variables, as are the depression symptoms under study. These correlations can be conceived as manifestations of underlying psychological traits where the assumed latent variables are considered to be normally distributed (Divgi 1979). Using these coefficients, we then perform a factor analysis on these 12 dichotomous variables (Christofferson 1975; Muthén 1978; Joreskog and Sorbom 1996). The procedure also results in a two-factor solution with each factor consisting of the same symptoms identified by the MCA technique. In addition, two sets of scores in continuous form are produced, expressing “motivation” and “affective suffering” for each respondent. High motivation and high affective scores correspond to high values in the summated EURO-D scale (Fig. 2); the scores increase with age. Application of appropriate statistical tests (ANOVA) reveals that the difference in mean motivation as well as in mean affective scores between different age groups (50–64, 65–74, 75+) and different depression categories (EURO-D scores 0–3 and 4+) are highly statistically significant (Table 1).

Fig. 2 Mean motivation and affective suffering scores by EURO-D summated scale

These estimated scores are then used as dependent variables in OLS regression models to assess the effects of socio-demographic and health related factors on “motivation” and “affective suffering”. In these models, age, chronic conditions, ADLs, IADLs and orientation on time are used in numerical form instead of categorical. The multiple correspondence analysis was carried out using SPSS 15.0. The estimation of the tetrachoric correlation coefficients and the factor analysis were performed using LISREL 8.7. The logistic and linear regression models were estimated using STATA 9.2.

Results

Descriptive findings

On average, 24.9% of the Greek respondents score higher than three at the EURO-D scale. Depression, tearfulness and fatigue have among the highest reporting rates while suicidal tendency has among the lowest. Males, on average, report symptoms in lower proportions than females. Sex differentials are greatest for depression, tearfulness, fatigue and sleep problems; irritability is the only item with a slight excess for males (Fig. 3).

The distribution of the respondents in broad age groups and by their other characteristics is shown on Table 2. 53.4% of our sample is aged 50–64, compared to 49.5% for the Greek population in 2004 (NSSG 2006); the respective proportions for the 75+ age group are 18.6 and 20.0%. 54.7% of the respondents are women; their proportions

Table 1 Descriptive statistics for numerical variables

	<i>N</i>	Mean	SD
Age in years	1,889	64.412	10.377
Number of chronic diseases	1,889	1.441	1.354
Number of ADL limitations	1,889	0.142	0.631
Number of IADL limitations	1,889	0.278	0.808
Number of correct answers in orientation on time	1,889	3.86	0.481
Affective suffering scores by age group			
50–64	1,019	−0.119	0.724
65–74	527	0.012	0.838
75+	343	0.311	0.911
Total	1,889	−0.005	0.809
Motivation scores by age group			
50–64	1,019	−0.154	0.736
65–74	527	0.048	0.857
75+	343	0.365	1.103
Total	1,889	−0.004	0.869
Affective suffering scores by EURO-D category			
EURO-D 0–3	1,417	−0.379	0.397
EURO-D 4+	472	1.118	0.681
Total	1,889	−0.005	0.809
Motivation scores by EURO-D category			
EURO-D 0–3	1,417	−0.264	0.58
EURO-D 4+	472	0.778	1.095
Total	1,889	−0.004	0.869

Testing differences in the mean affective and motivation scores (ANOVA):

Between age groups *F*-statistic (affective) = 37.8 ($p < 0.001$), *F*-statistic (motivation) = 49.5 ($p < 0.001$)

Between EURO-D categories *F*-statistic (affective) = 3,386.7 ($p < 0.001$), *p*-statistic (motivation) = 696.0 ($p < 0.001$)

increase with age. Separated, divorced and widowed persons correspond to 27.9% of the sample compared to 23.0% for the 2001 census older adult population of Greece (NSSG 2006). Proportions for the currently married are 67.5% compared to 72.0% based on census data. More than half of the respondents have at the most completed primary education while only 15.0% have had more than 12 years of schooling. Women have fewer qualifications and years in education than men (7.9 years on average, compared to 9.6 years for men). A total of 60.5% of the sample is homeowners, 11.7% are tenants and the remaining 27.8% represent non-response.

With respect to physical health, 40.6% of the respondents have ever suffered from two or more chronic conditions and 63.6% of them are women; proportions increase with age for both sexes. 7.4% of the persons in our sample report at least one ADL difficulty and 17.0% at least one IADL limitation. Again, the vast majority of these persons are women and about half are aged 75 or higher.

Fig. 3 Percentage of Greek respondents aged 50 and over by sex reporting symptoms of the EURO-D scale

89.7% of the sample has excellent orientation on time. Of the persons who have suffered from depression in the past (15.6%), 3.6% had received treatment for their condition; these persons are predominantly female (90%).

Analysis of EURO-D using logistic regression

Table 3 shows odds ratios and levels of significance for the four models describing associations of the explanatory variables with depressive symptoms. According to the Hosmer–Lemeshow test all models appear to fit the data reasonably well. Model 1 includes only demographic controls. The odds ratios indicate that chances of suffering from depression increase with age. Persons aged 65–74 are 40% more likely than the reference category (those aged below 65) to exhibit symptoms of depression. However, the propensity for persons aged 75 or higher is much more pronounced (2.5 times). Women are more vulnerable than men; they are nearly three times more likely to suffer from depression. According to exploratory analysis, single persons do not differentiate significantly from the married; thus, they constitute one category altogether. Separated, divorced and widowed persons are 43% more likely to exhibit depressive symptoms. All demographic variables are very significant at this stage of the analysis.

When controls for the respondents' socio-economic status are added (Model 2) odds ratios for age decrease and

Table 2 Percentage distribution of the respondents for variables used in the analysis

	Males (<i>n</i> = 857)	Females (<i>n</i> = 1,032)	Both sexes (<i>n</i> = 1,889)
<i>Dependent variables</i>			
EURO-D scores			
0–3	87.0	65.3	75.1
4+	13.0	34.7	24.9
<i>Independent variables</i>			
Demographic Characteristics			
<i>Age</i>			
50–64	56.6	50.7	53.4
65–74	27.3	28.6	28.0
75+	16.1	20.7	18.6
<i>Marital status</i>			
Currently married/single	88.1	58.8	72.1
Separated/divorced/widowed	11.9	41.2	27.9
Socio-economic status			
<i>Years in education</i>			
0–12	79.7	89.3	85.0
13+	20.3	10.7	15.0
<i>Home ownership</i>			
Owner	60.3	60.6	60.5
Tenant	9.8	13.2	11.7
Not stated	29.9	26.2	27.8
Health indicators			
<i>Chronic diseases</i>			
Less than two	67.2	52.9	59.4
Two or more	32.8	47.1	40.6
<i>ADL limitations</i>			
No limitations	95.0	90.6	92.6
At least one	5.0	9.4	7.4
<i>IADL limitations</i>			
No limitations	90.0	77.2	83.0
At least one	10.0	22.8	17.0
<i>Orientation on time</i>			
At least one wrong answer	9.3	11.1	10.3
All answers correct	90.7	88.9	89.7
<i>Past depression</i>			
No depression	91.3	78.7	84.4
Yes, untreated	7.9	15.5	12.0
Yes, treated	0.8	5.8	3.6

become only marginally significant for those aged 65–74. The difference between the 75 or more age group and the reference category remains pronounced but inclusion of additional controls pertaining to physical health, cognitive function and past depression (Models 3 and 4) cause that relationship to weaken, too. The association of gender with depression, however, remains very strong throughout the

whole analysis. The relationship of the separated/divorced/widowed status with depressive symptoms, which is very important in Model 1, gradually loses significance.

SES has an inverse association with depression (Model 2). Persons who have completed at least 13 years of schooling have less than half the chances of less educated persons to suffer from depression. This association remains strong and significant throughout the analysis. Home ownership is also inversely related to poor mental health compared to being a tenant. However, that variable loses significance when physical health and past depression are included in the models. Inclusion of other indicators of SES in Model 2, such as the respondent's personal and household income and household net worth either as continuous or categorical variables in exploratory analysis did not produce any significant estimates and income was dropped.

Poor physical health (Model 3) is strongly associated with poor mental health. Having had two or more chronic conditions nearly doubles one's chances of having depression as does having reported at least one ADL limitation. IADL limitations also increase one's chances by about 60%. These odds ratios decrease slightly when cognitive function and past depression are included in the analysis (Model 4) but associations remain significant at the 1% level. Cognitive function itself has a strong inverse relationship at the 1% level; good orientation on time halves one's chances of depressive symptoms. Having suffered from depression in the past is a very significant predictor of current depression and increases chances for those whose condition was severe enough to require treatment by 4.4 times and for those who were not treated by 2.8 times.

Analysis of “affective suffering” and “motivation” using linear regression

The results of the OLS regression models for “affective suffering” and “motivation”, for the whole sample and for persons aged 65 or more, are shown in Table 4. A positive coefficient indicates that the regressor causes the relevant score to increase. The estimates reveal substantial differences between these two components of the EURO-D. Firstly, for the whole sample, older age is related significantly, at the 5% level, to higher “motivation” scores but not to “affective suffering”. The same is true for persons who are separated/divorced/widowed. Being female, on the other hand, is a significant risk factor but only for “affective suffering”. Having attended education for at least 13 years acts protectively in relation to both components of the EURO-D; home ownership, however, does so only for “affective suffering”. Poor physical health significantly

Table 3 Logistic regression results: estimated odds ratios on the EURO-D binary response variable

Predictors	Odds ratios			
	Model 1	Model 2	Model 3	Model 4
<i>Demographic characteristics</i>				
Age (50–64: reference category)				
65–74	1.392**	1.259*	0.903	0.973
75+	2.452***	2.183***	1.210	1.298
Sex (male: reference category)				
Female	3.132***	2.985***	2.670***	2.469***
Marital status (married/single: reference category)				
Separated/divorced/widowed	1.430***	1.364**	1.303*	1.162
SES				
Years in education (0–12 years: reference category)				
13 years or more		0.382***	0.401***	0.425***
Home ownership (tenant: reference category)				
Owner		0.679**	0.727*	0.788
Ownership not stated		0.692*	0.745	0.840
<i>Health indicators</i>				
Chronic conditions (less than two: reference category)				
Two or more			2.153***	1.954***
ADL limitations (no limitations: reference category)				
At least one			2.006***	1.764**
IADL limitations (no limitations: reference category)				
At least one			1.623***	1.564***
Orientation on time (at least one wrong answer: reference category)				
All answers correct				0.526***
Past depression (no depression: reference category)				
Yes, treated				4.371***
Yes, untreated				2.792***
Log pseudolikelihood	–963.30	–949.28	–910.34	–872.62
Hosmer–Lemeshow test ^a	5.33	8.16	4.52	7.23

* $p < 0.1$, ** $p < 0.05$,*** $p < 0.01$

^a The values of the Hosmer–Lemeshow Chi-square test are not significant implying that the models fit the data well

increases chances of developing depressive symptoms in both cases; the measurable effect of an additional chronic condition on “affective suffering” is very substantial. Better orientation on time scores significantly lower for both components of depression though the outcome is more important for “motivation” than for “affective suffering”. Having had depression in the past substantially increases scores of “affective suffering”.

Considering persons aged 65 or higher the statistical associations differ somewhat compared to the whole of the sample. SES loses importance for both components of depression while the differentiation with respect to gender, marital status, past depression and the different indicators

of physical health is maintained. The adjusted R -squared coefficients indicate that the independent variables included in the models explain around 29% of the variance for “affective suffering” but only 13–17% for “motivation”. Hence, particularly in the latter case, it seems that there is a great number of unobservable characteristics of the respondents that are not included in the models.

Discussion

In this study multivariate techniques were applied to micro-data provided by SHARE (release 1) aiming firstly at

Table 4 Comparative models for the affective suffering and motivation groups: beta coefficients estimated by OLS regression

Predictors	Beta coefficients			
	The whole sample		Aged 65+	
	Affective	Motivation	Affective	Motivation
<i>Demographic characteristics</i>				
Age				
Continuous	−0.026	0.067**	−0.005	0.064*
Sex (male: reference category)				
Female	0.175***	0.017	0.134***	0.016
Marital status (married/single: reference category)				
Separated/divorced/widowed	0.028	0.058**	0.052	0.083**
<i>SES</i>				
Years in education (0–12 years: reference category)				
13 years or more	−0.067***	−0.059***	−0.062**	−0.038
Home ownership (tenant: reference category)				
Owner	−0.073**	−0.005	−0.010	0.019
Ownership not stated	−0.079**	0.044	−0.021	0.056
<i>Health indicators</i>				
Chronic conditions (0–14)	0.240***	0.059**	0.278***	0.084**
ADL limitations (0–6)	0.060**	0.080***	0.062*	0.126***
IADL limitations (0–7)	0.081***	0.111***	0.117***	0.086**
Orientation on time (0–4)	−0.090***	−0.147***	−0.098***	−0.196***
Past depression (no depression: reference category)				
Yes, treated	0.146***	0.042*	0.128***	0.037
Yes, untreated	0.178***	0.049**	0.137***	0.043
Adj. <i>R</i> -squared	0.2855	0.1340	0.2864	0.1656

* $p < 0.1$, ** $p < 0.05$,
 *** $p < 0.01$

exploring associations of socio-demographic and health related indicators with depressive symptoms and secondly at identifying patterns and structures among them. It is the first time, to the best of our knowledge, that such an analysis is carried out based on a fairly large national sample of the older population of Greece.

Regarding the first objective, the findings of our analysis are consistent with most of the international literature; hence, additional evidence is offered on the validity of one of the most recently established measures of depression, EURO-D. The study also shows that use of logistic regression instead of an OLS model is well-founded and more appropriate. The EURO-D summated scale takes positive, discrete values and is heavily skewed, with very small number of observations for scores over 5; thus, it does not conform to the basic assumptions of the OLS method, namely the normality of the response variable.

To meet the second objective we apply Multiple Correspondence Analysis and Factor Analysis for binary data to the 12 dichotomous variables (depression symptoms) comprising the EURO-D scale, in order to portray the

self-perceived mental health of the Greek respondents. Our results re-confirm Prince et al.'s (1999a, b) suggestion that the EURO-D scale contains two factors. The factors identified here resemble those found by Prince et al. analysing data from different European populations and are named accordingly ("affective suffering" and "motivation"). This is quite an important finding in itself, as our SHARE data, based on the general population, support results coming from a different and independent source, the EURODEP consortium. Moreover, the method applied allows us to produce continuous instead of discrete scores which can be further analysed with the use of appropriate statistical techniques such as OLS regression models or analysis of variance.

Many studies have found an increase in depressive symptoms with age (Newman and Engel 1991; Prince et al. 1999b; Schoevers et al. 2000). This association, however, may be spurious and mainly due to the older old suffering more from disabilities and stressful life events such as bereavement. Our evidence supports this hypothesis. We find that differentiation between 50–64 and 65–74 year

olds is minimal once factors other than demographic are included in the analysis. Moreover, the difference between the 50–64 and the 75+ year olds, while very substantial at first, is attenuated when physical health indicators enter the models. Hence, while initially depression seems more severe among the older old (persons aged 75 or more) nearly the whole of the observed differences among age groups can be accounted for by physical health indicators.

A consistent finding across studies is that depression is more prevalent among women (Pahkala et al. 1995; Prince et al. 1999b; Osborn et al. 2002). It has been suggested that this may be partly related to response bias, as women tend to report symptoms with greater frequency than men (Weissman and Klerman 1977). Though our analysis does not allow us to answer that particular question, our results also reveal a substantial disadvantage for women, maintained even after controlling for marital status, socio-economic and physical health indicators, cognitive function and past depression. The suggestion of Perry (1996) that the greater vulnerability of women to depression may be related to their lower socio-economic status is not supported by our evidence; effects of gender on symptoms of depression remain strong in spite of the addition of SES controls.

Marriage is considered a factor protecting against mental illness; being separated, divorced or widowed, on the other hand, are significant risk factors differentiating depression in later life from early onset depression (Prince et al. 1999a; Braam et al. 2004). Exploratory analysis of our data shows that single and currently married persons do not differ significantly. Separated, divorced and widowed persons, on the other hand, constitute a selected group, mainly consisting of widowers (80.7%) and women (80.5%), whose chances of suffering from depressive symptoms are significant, even after controlling for age and gender. Further analysis reveals, however, that marital status effects are accounted for by physical health and cognitive function indicators.

The persistent inverse relationship between SES and mental health found in the literature (Hudson 1988, 2005; Perry 1996; Reynolds and Ross 1998; Warheit et al. 1973) is confirmed to a great extent by our findings. Reynolds and Ross (1998), in particular, found that years of education have a significant effect on psychological well-being which lies beyond the access it provides to privileged positions in the economy and higher income. This thesis is supported by our findings, as more years of education act as a strong protective factor independently of other socio-economic controls used in the analysis, such as home ownership, personal, household income and household net worth. In addition, its favourable effects remained strong throughout the analysis. By contrast, home ownership, the most important of the variables pertaining to income and wealth

included in the models, became virtually unimportant once physical health and other predictors were introduced.

Chronic conditions, disability and cognitive decline are very significant determinants of depression among the older old (Lenze et al. 2001; Braam et al. 2005). Our findings provide firm support for this hypothesis; effects of these predictors remain measurable and very strong in spite of the socio-demographic confounders included in the models. Although rarely presented in most analyses, our study examines the effects of the depression history of the respondents. Having suffered from depression in the past is a significant risk factor; odds ratios are very high, particularly among those who had received treatment for their condition.

This study also confirms that the EURO-D consists of two distinct components, “affective suffering” which includes the more severe symptoms of depression and “motivation”. Assessing predictors associated with each of these factors we re-confirm Prince et al.’s (1999a, b) and Copeland et al.’s (2004) results in that “affective suffering” is responsible for the gender effect on EURO-D while “motivation” seems responsible for the age effect. We further these analyses, also considering other predictors related to each of these components of depressive symptoms. Both factors are strongly related to physical health and cognitive function but SES and past depression have a more pronounced effect on “affective suffering” while marital status has a palpable impact on “motivation” alone. Comparing the whole sample with persons aged 65 or higher, it seems that SES loses importance among older people. The differentiation between the two components of the EURO-D scale has a strong potential for further exploration. Copeland et al. (2004) suggest that while symptoms of depression increase with age, prevalence in later life may be over-diagnosed due to an increase in complaints of lack of interest and motivation which may be affectively neutral and related to cognitive decline.

Some limitations of the current study should be addressed. When considering these results one should keep in mind that the institutionalised population, probably including most disadvantaged persons with a long history of depression, is excluded from the survey. Prevalence of depression within the Greek population aged 50 or higher may be underestimated in our sample. Another point of interest relates to the nature of the available data that are cross-sectional; neither the onset nor the progression of depression can be observed, while relationships can be identified but not the direction of causality. This will be amended, at least in part, once data from wave 2 of SHARE become available. Still, the results of our study can be used to detect protective and risk factors and, eventually, help formulate public health care policies to improve quality of life among older people.

Acknowledgments This paper uses data from the early Release 1 of SHARE 2004. This release is preliminary and may contain errors that will be corrected in later releases. The SHARE data collection has been primarily funded by the European Commission through the 5th framework programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life). Additional funding came from the US National Institute on Aging (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, Y1-AG-4553-01 and OGHA 04-064). Data collection in Austria (through the Austrian Science Fund, FWF), Belgium (through the Belgian Science Policy Office) and Switzerland (through BBW/OFES/UFES) was nationally funded. The SHARE data set is introduced in Börsch-Supan et al. (2005a); methodological details are contained in Börsch-Supan and Jürges (2005). The authors also gratefully acknowledge Irini Moustaki and two anonymous referees for their helpful comments and suggestions.

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