Socio-economic position and health inequalities in Mediterranean countries: an exploratory analysis using SHARE data

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Introduction

A persistent and strong inverse relationship between socio-economic status and health has been observed in a multitude of studies. Such an association is evident with respect to both mortality and morbidity and to both physical and mental health. Mortality rates are higher among persons with lower income, lower educational attainment and lower occupational status. That holds true for morbidity, too (Mackenbach and Kunst, 1997); chronic illnesses, impairment, disability and depression are more prevalent among the less prosperous segments of a population. In most studies, socio-economic status is represented by educational attainment, income, family wealth and occupation; the mechanisms, however, through which socio-economic status operates on health, are not clear.

In this paper we use data from three Mediterranean countries, Greece, Italy and Spain, which have similar demographic histories, socio-cultural characteristics and climate conditions, with the following objectives. Firstly, we apply Principal Components Analysis (PCA) to construct a composite, continuous index of socio-economic position (SEP) based on three key variables, namely years in education, household income and household net wealth. Secondly, the magnitude of socio-economic inequalities in health in the countries of interest is assessed on the basis of estimates derived from logistic regression models. Finally, we apply multinomial logistic regression techniques to compare the effects of three socio-economic indicators (education, income and wealth) on self-perceived health, controlling for demographic and behavioural risk factors.

Data

The data used in the analysis come from the Survey of Health, Ageing and Retirement in Europe (SHARE), release 2. The baseline of the survey was conducted in 2004 and the sampling has been carried out in 12 countries. SHARE has a longitudinal, multidisciplinary and infrastructural design, modeled on the previous experience of the US Health and Retirement Survey and the English Longitudinal Survey of Ageing. It has been mainly funded by the European Commission and is coordinated centrally at the Mannheim Research Institute for the Economics of Ageing. The target population is non-institutionalized persons aged 50 or higher at the time of the survey. The Greek sample includes 2,671 persons (46% males) with non-missing information on socio-demographic variables; the Italian sample includes 2,502 persons (45% males) and the Spanish 2,343 (42% males).

Methods

In this work we apply multivariate techniques in order to highlight different aspects of health and to assess the impact of selected risk factors with particular reference to the socio-economic conditions of the individuals.

Dependent variables

SHARE provides information on a wide range of physical and mental health indicators and summary measures on chronic diseases, physical ill-health symptoms, limitations in physical functioning, activities in daily living and depression symptoms. Among the summary measures, a single-item question on self-perceived health was included; we use the European version with answers ranging from "very good" to "very bad". For the purposes of the analysis, we introduce a dichotomous variable for self-rated health taking the value of 1 for those with less than good health (fair, bad, very bad) and 0 otherwise (good, very good). Another version is also used, a four-category variable which only combines together persons with bad and very bad health, due to very small numbers in the latter category.

The SHARE questionnaire has included extended lists of 14 named chronic diseases, 11 symptoms, 6 ALD limitations, 7 IADL limitations, 10 mobility difficulties and 12 depression symptoms. The variables used in the models are in binary form and indicate whether a respondent reports two or more diseases diagnosed in his lifetime, two or more symptoms lasting six months or longer, at least one limitation in activities of daily living (ADL), at least one limitation in instrumental activities of daily living (IADL), at least one mobility difficulty and 4 or more depression symptoms (Börsch-Supan *et al*. 2005; Prince *et al*. 1999; Verropoulou and Tsimbos 2007). These indicators are used as response variables in logistic regression models, to explore associations of different aspects of health with selected explanatory variables.

Constructing a continuous measure for SEP

In this study we also consider whether the socio-economic position (SEP) of the respondents can be described in terms of three variables; namely, years in education, household income and household net wealth. In this context, we apply Principal Component Analysis (PCA) to restructure the observed variance by forming linear combinations of these variables. Our scope is to estimate factor scores representing an exact level of SEP for each individual. The goodness-of-fit of the procedure is evaluated on the basis of the Kaiser-Meyer-Olkin measure (Kaiser, 1974). The results reveal that the method is appropriate for all countries under study, although it works better for the Greek sample. The estimated SEP measure has always a mean value equal to zero and variance equal to unity and ranges from -1.6 (Greece) to 11.8 (Spain). High SEP scores correspond to more years of formal education and greater economic resources (income, wealth), denoting higher socio-economic position. This part of the analysis was conducted using SPSS 15.0.

Independent variables

Age is used in the models both in continuous and categorical form. To assess the impact of the derived continuous SEP indicator on health, age and gendered are controlled for. Age is considered in four broad age-groups. In connection to self-perceived health, apart from the respondent's demographic characteristics (including sex and age in continuous form), behavioural risk factors (including smoking habits,

physical activity and body-mass index) and objective health indicators (depression, chronic conditions and mobility) are also included in the models. Socioeconomic conditions in this case are represented by the number of years of formal education attained, household income and household net wealth. The values of variables representing economic resources are based on observed as well as imputed data and, in order to maintain comparability across countries, they are purchasing-power-parity adjusted; the exact definitions and the imputation methods used by the SHARE researchers are presented in Börsch-Supan and Jürges (2005) and Börsch-Supan et al (2005).

Logistic regression analysis
To assess the strength and magnitude of associations between a dichotomous response variable (health status) and SEP logistic models were applied. We assume that the observations are independent across households but not necessarily within households; thus, 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 overall goodness of fit of the models was assessed on the basis of the Hosmer-Lemeshow Chi-square test (Hosmer & Lemeshow 2000). The Likelihood-ratio test is used to determine how the fit of the models change as additional variables are introduced to equations. The effect of the independent variables on the health status was evaluated on the basis of the corresponding odd-ratios and the significance level of the estimated parameters provided by the Wald statistic. The logistic models were estimated using STATA 9.2.

Multinomial logistic regression analysis
An advantage of this technique is that the estimated relative risk ratios (RRRs) compare separately persons having good, fair and poor health to the reference category, in this case very good self-perceived health. The goodness of fit of the models was evaluated on the basis of Pearson's Chi-square and of the Deviance tests (Chan 2005). The Multinomial logistic regression models were estimated using STATA 9.2.

Results
Our findings indicate that co-morbidity and self-perceived health is worse among the older-old; odds ratios show a very sharp increase in health problems with age for all populations under study. The gradient is steeper for ADL, IADL and mobility difficulties and for the Greek population. The odds ratios are especially large for persons aged 80 or higher. Female sex is also significantly associated with worse health and, in particular, depression. Greek females are 3 times more likely than males to experience ill mental health. As expected, a strong inverse relationship can be observed between socio-economic covariates and health. Having controlled for the aforementioned demographic characteristics, persons of higher SEP fare better in relation to all health indicators and in all countries. The degree of socio-economic inequalities in health seems least in Spain, followed by Italy and Greece.
The multinomial logistic regression analysis also indicates that higher SEP is significantly related to better self-perceived health. In addition, education is a better and more robust indicator of SEP than either income or wealth for all three countries under investigation. The findings show that the worse one's health is, the stronger is the impact of SEP on that individual's health. The effects of SEP on self-perceived

health are reduced once other health indicators, such as depression, chronic conditions, mobility difficulties and physical symptoms have been taken into account.

Of the different health indicators, number of chronic conditions has the greatest effect on self-perceived health in all countries, though it is more pronounced for Greece. Of the behavioural risk factors, smoking and weight were not significant and were dropped from the analysis. Physical activity, on the other hand, seems a very important predictor.

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