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Abstract

In this study we provide evidence on the health status and the role of gender and socioeconomic inequality in self-reported health and morbidity status amongst the elderly in Portugal. We find a negative self-perception of health status amongst the elderly; high prevalence of chronic diseases since an earlier age; high level of depression problems reported by women; and high levels of disability amongst the oldest old. There are, nonetheless, substantial differences in health status between age groups that suggest a potential for health gains in the future.

The prevalence of chronic diseases, mental problems and high disability requires an adequate (re)organization of healthcare delivery to the elderly. Moreover, the evidence presented clearly calls for a gendered perspective on health policy, particularly in mental health policy.

JEL classification: I1, I14, I18

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I. Introduction

Demographic trends are a key factor for the future of Portugal. Portugal has one of the fastest ageing populations in the European Union as a result of a combination of very low fertility rate, higher life expectancy and high rate of emigration [1]. Demographic projections anticipate that 1/3 of the population will be 65 years and over (henceforth 65+) by 2045, and the dependency ratio (people aged 65+ relative to those aged 15-64) is expected to be 83% (which compares with 52% in 2013). Another important trend is the increase of older individuals aged 80 or over (henceforth 80+). These so called “oldest old” represented about 27.7% of the older population in 2013, and are expected to be about 35.4% by 2045 [2]. The economic and social stakes of this demographic transition will greatly depend on how individuals age, and how the health system responds to changing health demand conditions.

There is a growing concern in developed countries over ageing both in the research and policy agendas. A higher dependency ratio means fewer contributors thus creating a challenge for the financing of public health systems. The impact of population ageing on the health care costs is however not consensual [3] [4] [5]. The discussion is centered on whether higher life expectancy leads to compression or to expansion of morbidity. Existing empirical evidence is conflicting. While severe disability amongst the elderly has been decreasing over time, the prevalence of chronic disease and less severe disability [6] [7] [8], as well as the complexity of health problems have been increasing [9]. Furthermore, ageing is not a homogenous social phenomenon and is affected by gender and social conditions. Gender and socioeconomic inequality among the elderly is well documented in developed countries [10] [11] [12] [13] [14] [15] [16] [17]. The inequality does not follow a uniform trajectory varying across different health dimensions, and it tends to narrow at older ages due to “survival selection” [11] [16] [17].

Cross-sectional evidence shows that, in Portugal, the elderly report declining subjective health and a high level of disability [18] [19]. The predictions of rapid growth in health care expenditures based on the growing ageing are not reflected in the data [9] [20]. High socioeconomic-related health inequality in Portugal [21] [22] [23] [24] [25] [26] persists at older ages [13] [27] [25] [28]. Moreover, there is evidence of gender inequality: despite longer life expectancy, women are more likely to experience poorer health outcomes than men [19] [28].

The purpose of this paper is twofold: first, we present an overview of Portuguese elderly health status. Second, we explore the variation in self-reported health status across age,

gender and socioeconomic status. It is beyond the scope of the paper to move to explanatory frameworks on health and health inequality. Consequently, no causal inference can be drawn concerning the association of socioeconomic status and health. Moreover, in a cross-sectional design, age effects cannot be distinguished from cohort effects. This is particularly troublesome when interpreting findings on age differences and should be kept in mind while interpreting the evidence.

The identification of health patterns amongst the older population in Portugal is an essential step to base policy guidelines concerning healthcare for this age group. Using the most up-to-date data collected at the European level in the rich SHARE database, we present a portrait of health status amongst the elderly in Portugal and identify inequalities that should ultimately be taken into consideration by policy-makers. The study shows that, despite the recent improvement on life expectancy, more needs to be done to promote a healthy ageing in Portugal. The elderly experience lower and rapid deterioration of their health stock. Therefore, the results of this exploratory study call for a policy agenda to track gender and socioeconomic inequalities.

II. Methods

Data

We use data from Survey of Health Ageing and Retirement in Europe (SHARE) Wave 6, as of 31st March 2017 (DOI: 10.6103/SHARE.w6.600). The SHARE dataset provides comprehensive cross-sectional information about people's health and socio-economic status.³ Based on probability samples in participating countries, SHARE represents the non-institutionalized population aged 50 and older. The methodological aspects are discussed in Börsch-Supan *et al.* [29] and Malter and Börsch-Supan [30].

Health status variables

Health is a multidimensional concept encompassing amongst other aspects self-assessed well-being and health status, absence or presence of disease, functional status (e.g. mental health, cognitive status, sensory status) and disability. The SHARE dataset contains an array of

³ For details of Portuguese version of the survey, see http://www.share-project.org/fileadmin/pdf_questionnaire_wave_6/SHARE_paperversion_PT.pdf [Last access: September 2017]

variables to cover the different dimensions of health⁴. We focus on the following SHARE variables, which are then adapted for the present study (the names of the variables used are in italics):

(1) Self-perceived health (US scale) (*SPHUS*): SPHUS is a subjective and comprehensive measure of health, which is widely used in the literature. Individuals were asked to classify their health status using ordered scale ranging from "excellent" to "poor". By collapsing responses, we were able to construct a dichotomous indicator of "lower than good" (poor or fair) vis-à-vis good health (good or excellent) (*DSPHUS*).

(2) Number of chronic diseases (*nChronic*): participants are asked whether a doctor has diagnosed them with any of the following conditions: hypertension, diabetes, cancer, lung disease, heart disease, stroke and arthritis. Adults with two or more chronic diseases are especially vulnerable to adverse outcomes [31] [32], therefore we also created a dummy variable identifying those diagnosed with two or more chronic diseases (*DChronic2*).

(3) Mental health status. Mental health is assessed using a self-report 12-item EURO-D scale⁵ (*EURO_D*). We dichotomize the EURO-D scale information, and create a variable that captures whether clinical depression is present or absent (*Depression*), using the cutoff score of 4 or greater [33].

(4) Prevalence of disability. Severe disability (*DisabilityS*) is defined as difficulty in performing any activities of daily living (based on ADL scale⁶) as it represents an indicator of the difficulty to live independently [34].

Socioeconomic status variables

Socioeconomic status is evaluated with two indicators:

(1) Level of education: based on the International Standard Classification of Education (ISCED) [35]. ISCED Levels 0-2 (none, pre-primary, primary and lower secondary education)

⁴ Such as self-reported health and life satisfaction, self-reported diagnosed chronic conditions, self-reported mental health, self-reports on mobility sensory functioning, and other aspects of physical functioning, daily limitations, grip strength, walking speed, and various cognitive tests.

⁵ EURO-D scale 12 items: feelings of depression, pessimism, wishing death, guilt, irrationality, tearfulness, fatigue, sleeping troubles, loss of interest, loss of appetite, reduction in concentration, and loss of enjoyment over the previous month [33]

⁶ ADL scale 6 items: refers to personal functional activities, performed daily required by an individual for continued wellbeing, such as eating, getting in and out of bed, bathing, dressing, toileting, and getting around indoors.

correspond to the variable ISCED1, *Level 3* (upper secondary education) corresponds to the variable ISCED2 and *Levels 4-6* (post-secondary education) correspond to the variable ISCED3.

(2) Household adjusted net income: income is measured as disposable household income defined as the sum of the income of each individual member of the household (*Thinc* variable in Share database). In order to adjust for the household size, the value of income was divided by the square root of the number of persons in the household [36]. For further analyses, we have split the adjusted per-capita income into quartiles, creating 4 different dichotomous variables (*Income1, Income2, Income3, Income4*).

There is no chronological age for ageing, but most developed countries have accepted for statistical purposes 65 years and over (65+) has a definition of elderly, and more than 80 years old (80+) for old oldest. We follow that convention to determine the number and the boundaries of the age groups considered in the analysis, which will focus on the population of 50 or more years of age (50+).

Statistical methods

We start by describing our data. To that end, we use Kruskal-Wallis tests to examine the statistical significance of differences between groups of people.

We then proceed with a detailed study of multivariate relationships between gender and socioeconomic self-reported health status of people aged 50 years or more. We model the probability of bad outcomes (binary health variables) by means of separate multivariate logistic regression models for the full set of the socioeconomic variables, marital status (= 1 if individuals are married or in a civil partnership; = 0 otherwise) and age group. We report the odds ratio estimates. We explore the differences between gender and age groups by estimating the logistic regressions by gender and age groups.

To deal with the nonresponse problem, SHARE provides five different datasets (since there are five imputed values for each missing value, thus creating five datasets). Therefore, when making inference and descriptive analysis, we use the five independent imputations of the missing values⁷, in order to obtain the coefficients and standard errors by multiple imputation. [37] The model is estimated using *mi commands* provided by Stata® [38] [39].

⁷ *mi commands* do not accept all the Stata commands. Therefore, in some estimates we use only the first imputation (the results are not sensitive to whichever imputation is considered).

We report and discuss only the unweighted multivariable regression results [40]. The descriptive statistics reported are computed using the individual weights in the database.

III. Results

Old, poor and uneducated

The socio-demographic profile of Portuguese aged 50+ shows a poor and low educated population (Table 1). More than half are women (55.6%) and the average age is 67.4 years. About 75% are married or live in civil partnership. The average household net income is 13,000 euros, which is lower than national average [24]. Regarding education, the average number of years of schooling is 6.3, which means that the majority of individuals reached only the “lower secondary education or less”. Furthermore, women are overrepresented among the lowest educational and income levels. Old oldest are more concentrated on the lowest level of education. On other hand, the youngest group has the lowest average household adjusted income.

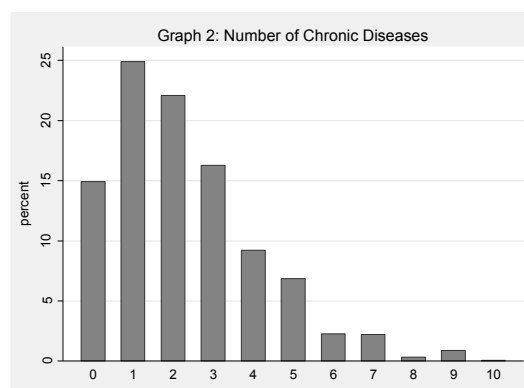
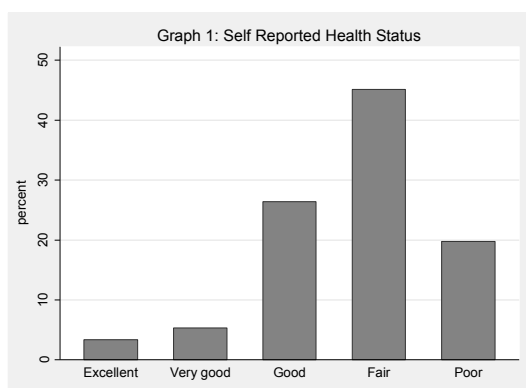
Table 1- Socioeconomic variables

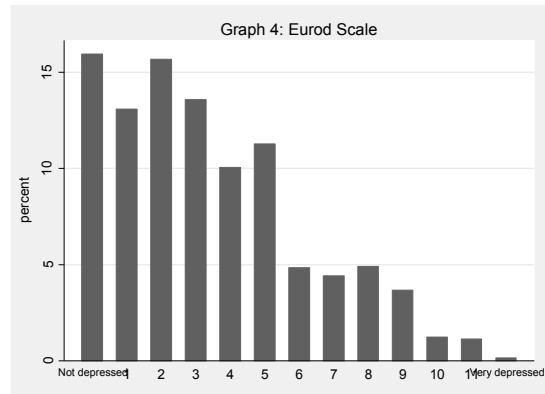
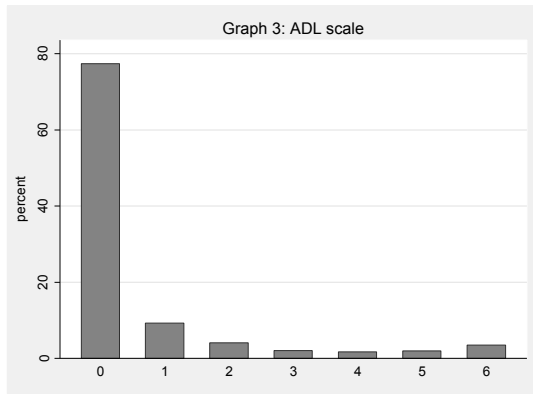
Variable	Mean/ Frequencies (Standard Error)
Age	67.41 (0.53)
Age group	
50-65	46%
65-80	38%
80+	15%
Male	44%
Employed	16%
Years of education	6.32 (0.24)
<i>ISCED</i>	
Lower secondary education or less (<i>Isced1</i>)	0.63
Upper secondary education (<i>Isced2</i>)	0.07
Post-secondary education (<i>Isced3</i>)	0.31
Married/Civil partnership	75%
Adjusted annual income (in euros)	8601 (377)
Annual household income (in euros)	12954 (597.3)
1 st Quartile (Income1)	0.45
2 nd Quartile (Income2)	0.33
3 th Quartile (Income3)	0.19
4 th Quartile (Income4)	0.03

Ageing unhealthy

Table 2 presents data on the health status of Portuguese aged 50 or more, stratified by age groups (for non-institutionalized individuals). Graphs 1 to 4, characterize the distribution of the ordinal/ nominal health variables among individuals aged 50 and older (estimates using first imputation data).

The prevalence of self-reported physical and mental health problems by those aged 50 + are common. Almost 65% rate their health as “lower than good” which contrast with just 3.3% that report an “excellent” general health status.





Almost 85% of individuals aged 50+ report at least one chronic disease diagnosed, and 60% report two or more diagnosed chronic diseases. About 13% report five or more chronic diseases (Graph 2). The mean number of chronic diseases is 2.3.

More than 1 in 5 (22%) individuals report severe disability; 3.5% of the elderly report limitation in all dimensions of ADL scale (Graph 3). There is also a significant share of individuals reporting depressive problems (Graph 4). The mean EURO-D score is about 3.4. The prevalence of clinical depression reaches approx. 42% of the elderly.

Table 2 – Descriptive statistics for health variables by age groups

Variables	All	50-65	65-80	80+
<i>Sphus</i>	3.73 (0.55)	3.42 (0.09)	3.86 (0.05)	4.30 (0.08)
<i>Dsphus</i>	0.65 (0.03)	0.25 (0.05)	0.70 (0.03)	0.88 (0.03)
<i>Chronic</i>	2.29 (0.10)	1.72 (0.14)	2.57 (0.10)	3.36 (0.31)
<i>Dchronic</i>	0.85 (0.02)	0.76 (0.05)	0.92 (0.11)	0.94 (0.02)
<i>Dchronic2</i>	0.60 (0.03)	0.44 (0.04)	0.73 (0.02)	0.76 (0.05)
<i>Euro_D</i>	3.41 (0.17)	2.98 (0.31)	3.44 (0.18)	4.67 (0.49)
<i>Depression</i>	0.42 (0.03)	0.33 (0.05)	0.42 (0.04)	0.67 (0.07)
<i>Disability</i>	0.23 (0.02)	0.15 (0.03)	0.19 (0.03)	0.57 (0.06)
<i>No. obs.</i>	1660	647	815	198
<i>imputations</i>	5	5	5	5

It is not surprising that the deterioration of health, morbidity and disability show a steep age-gradient. Moreover, the oldest individuals accumulate, on average, more health problems. There is a higher fraction of those self-reporting “lower than good” health status across age

and age groups. Amongst the group of individuals aged 80+, 88% reported “lower than good” health. With respect to chronic diseases, they appear to be diagnosed relatively early in life. Amongst the 55-64 year olds, 76 % report suffering from at least of one chronic illness, and 44% report suffering from two or more. The percentage of people who report at least two chronic diseases increases to 77% amongst the “oldest old”. Severe disability is also strongly associated with age, but rapid deterioration seems to start later in life. The majority the “oldest old” (57%) suffer from severe disability, which contrast with 18.5% among the individuals aged 65-80 years. The mean of EURO-D, as well as clinical depression prevalence increases across age groups, suggesting that mental health, measured by depression symptoms, deteriorates as individuals become older. While 33% of individuals between 50-64 years old seem to suffer from clinical depression, the prevalence of clinical depression is above 67% amongst the “oldest old”.

One-to-one correlations between the health variables are, as expected, positive, but the associations are statistically weak, illustrating the complexity of the health concept and measurement (Table 3).

Table 3 – Correlation between health measures

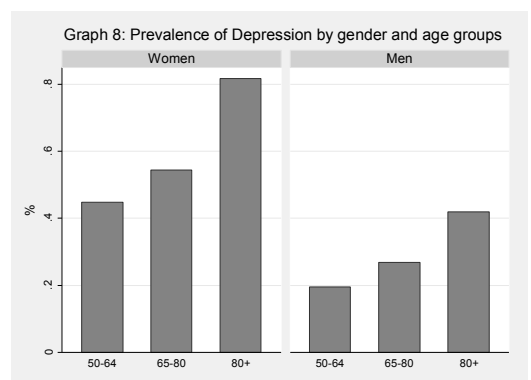
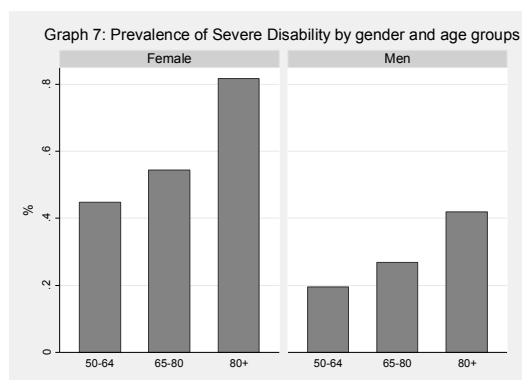
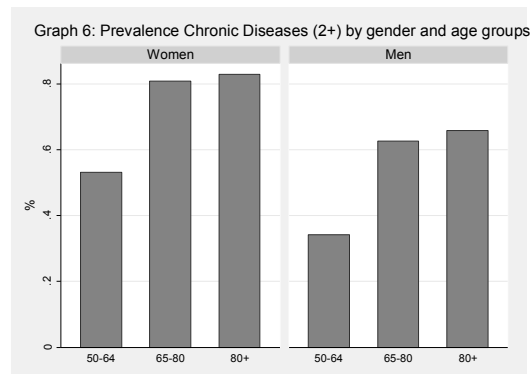
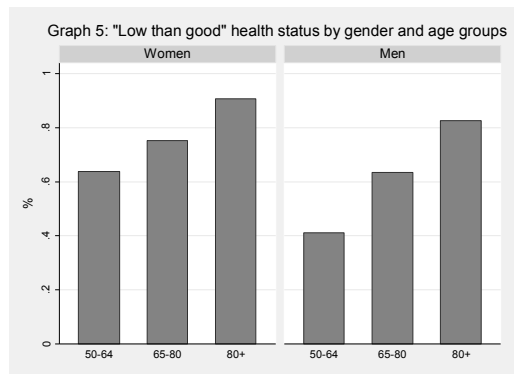
	Sphus	Dspus	DChronic	Dchronic2	Euro_D	Depression	ADL	Disability
Sphus	1.00							
Dspus	0.82***	1.00						
DChronic	0.48***	0.40***	1.00					
DChronic2	0.40***	0.37***	0.73***	1.00				
Euro_D	0.37***	0.30***	0.34***	0.22***	1.00			
Depression	0.33***	0.28***	0.29***	0.19***	0.83***	1.00		
ADL	0.37***	0.25	0.33***	0.18***	0.25***	0.22***	1.00	
Disability	0.39***	0.29***	0.34***	0.21***	0.30***	0.25***	0.79***	1.00

Note: *** significant at 1%; estimates using data from the first imputation

Ageing unequally: gender inequality

Graphs 5 to 8 characterize the distribution of health variables by gender and age groups. The prevalence of bad health outcomes is significantly higher among women. Women also appear to experience, on average, earlier decline in the health status during the ageing process. Perhaps the most striking result is the excess of clinical depression among women relative to men; 55% report Euro-D level consistent with clinical depression, almost 30 percentage

points higher than men. Moreover, the gap appears to increase with age; 67% women 80+ report suffering from depression, which contrasts with 42% of men in the same age group.

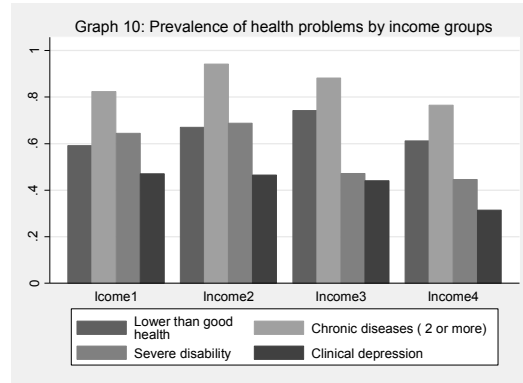
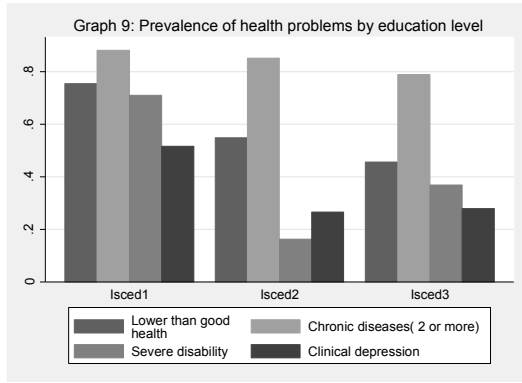


Note: estimates using data from the first imputation

Kruskal-Wallis statistics revealed statistical significant ($p < 0.05$) gender, as well age-groups differences in health outcomes [Details under request].

Ageing unequally: socioeconomic inequality

Graph 9 and 10 plots distribution of health variables by education and income education. The results suggest higher prevalence of health problems among those with lowest level of education. Similarly, there is higher prevalence of health problems amongst those on the lower half of income distribution.



Ageing unhealthy and unequal - Multivariate analysis

Table 4 reports odds ratio estimates for estimated multivariate models. Graphs 11 to 14 plot the relevant odds ratio estimates for our analysis.

Despite differences between health measures, our results consistently suggest that health status of the Portuguese population aged 50+ is at least partially explained by socioeconomic status⁸. The results also confirm the importance of age and gender on the self-reported health status. The magnitude of the socioeconomic inequality appears similar across health measures, but differs in terms of statistical significance. Moreover, differences amongst the Portuguese elderly by health status appear to be more consistently associated with respect to education levels (lowest versus higher) than with income levels.

The odds of perceiving a “lower than good” health status are more than twice higher amongst the lowest educated elderly compared to their highest educated counterparts (odds-ratio 2.26) (Table 4). The protective effect of education is evident regardless the health outcomes. The impact of upper secondary education is not statistically significant.

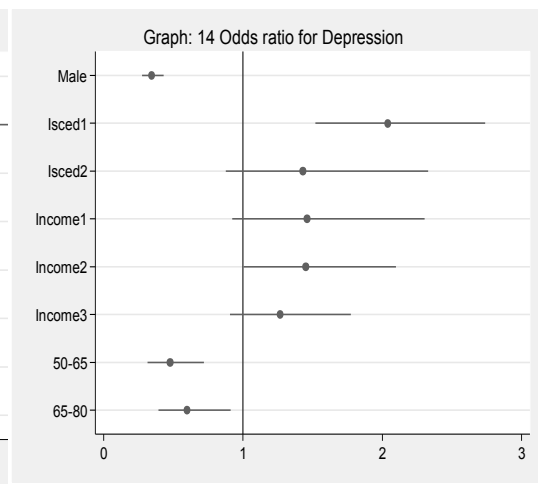
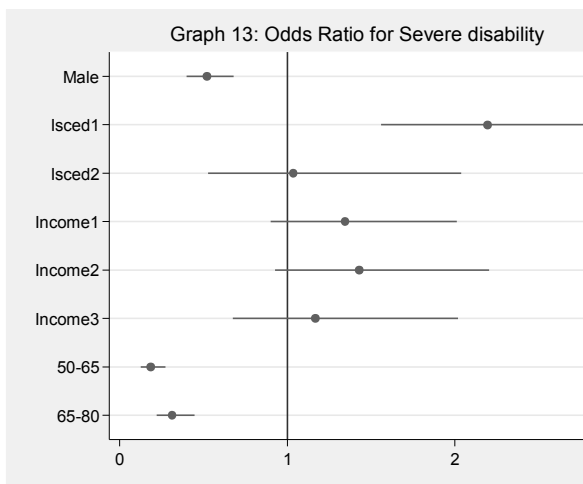
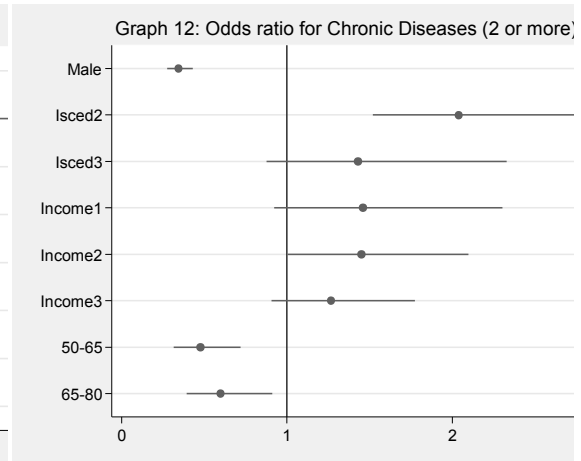
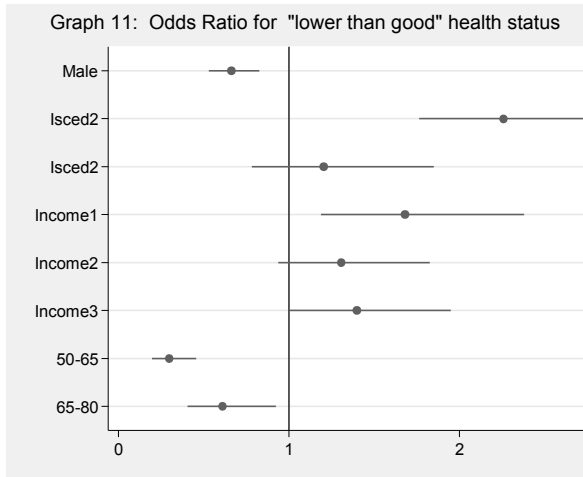
⁸ There is likely a relationship between education and income such that those who are better educated will also be able to have higher income. The correlation between the two (ordinal) variables is, as expected positive, and statistically significant, but the association is weak (Kendall's tau-b = 0.2082 ASE = 0.021).

Table 4 – Odds ratio for health outcomes

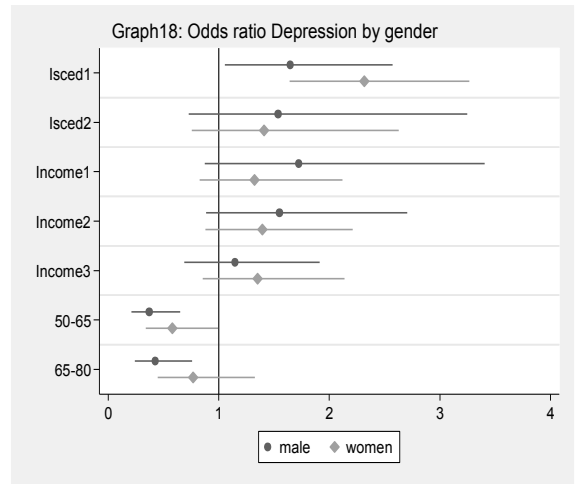
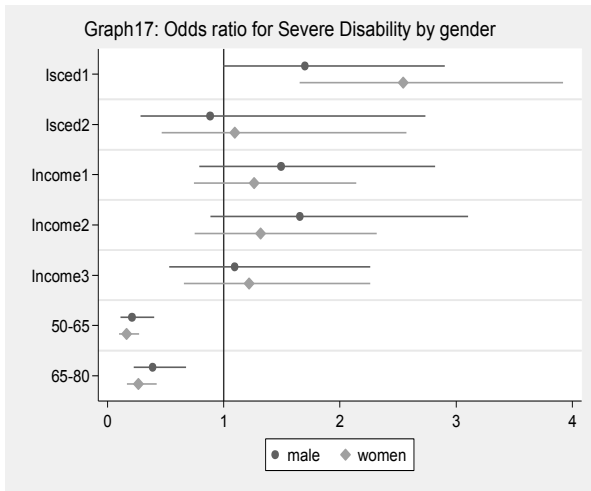
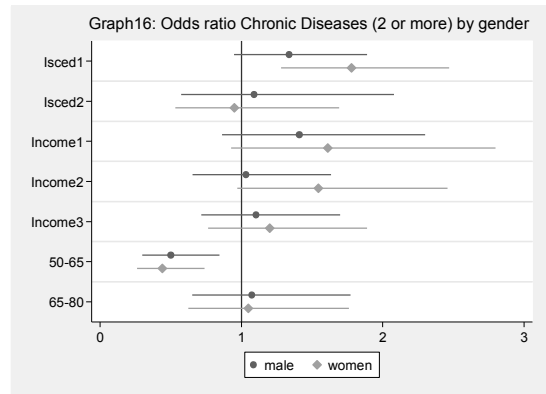
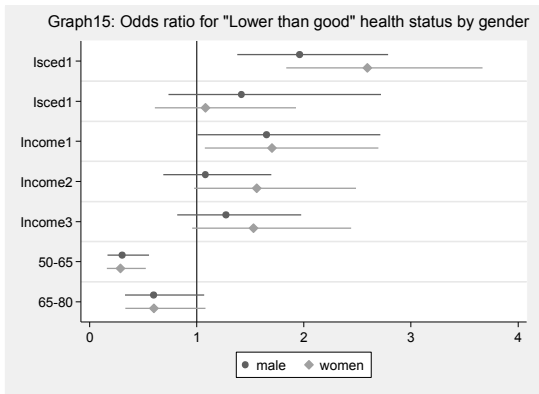
	Dsphus	Dchronic2	Severe	
			Disability	Depression
Male	0.662*** (0.0750)	0.602*** (0.0655)	0.521*** (0.0706)	0.344*** (0.0393)
Married	1.129 (0.169)	1.044 (0.150)	0.895 (0.142)	0.693*** (0.0967)
Isced1	2.259*** (0.285)	1.546*** (0.188)	2.195*** (0.380)	2.041*** (0.300)
Isced2	1.202 (0.264)	0.985 (0.216)	1.036 (0.358)	1.430 (0.354)
Income1	1.680*** (0.296)	1.509* (0.306)	1.347 (0.276)	1.459* (0.317)
Income2	1.308 (0.221)	1.270 (0.220)	1.430* (0.311)	1.451** (0.266)
Income3	1.398** (0.235)	1.153 (0.176)	1.167 (0.306)	1.268 (0.215)
65-80	0.300*** (0.0644)	0.470*** (0.0893)	0.185*** (0.0371)	0.476*** (0.0990)
+80	0.611** (0.129)	1.072 (0.198)	0.314*** (0.0567)	0.598** (0.125)
Constant	2.260*** (0.529)	1.811*** (0.392)	0.553** (0.135)	1.310 (0.324)
No. Obs.	1,666	1,666	1,666	1,666

Notes: level of statistical significance *** p<0.01, ** p<0.05, * p<0.1.

Overall, individuals in the highest income group are more likely to perceive their general health positively than those with lowest income. When compared with those with highest income, lowest income group are, on average, almost 1.68 times more likely to self-report “lower than good” health. This supports the evidence of income-related health-inequality in self-assessed health status in Portugal, favoring the highest income group (as observed decades earlier in [23] [24]). The results suggest a positive relation between income and the other health measures; nonetheless, the statistical evidence is overall weak.



Multivariate analysis results confirm our exploratory analysis of the data. Regardless of how health is measured, there is strong evidence that women and older individuals are more likely to report lower health. Women are in particular much more likely to experience depression. Moreover, a stepwise regression analysis shows that adjusting for socioeconomic variables does not significantly attenuate the gender or age groups' differences captured by the odds-ratios. The results suggest that gender and age impacts on self-reported health are not mediated by differences in the socioeconomic status. Moreover, regressions by age group [Results upon request], confirm the role that gender and education levels can play in health disparities. Regressions by gender [Graphs 15 to 19] indicate persistence of socioeconomic inequality within gender groups. Education appears to impact, on average, more on women's health than men's, suggesting lowest education women are a particular fragile group in terms of health status. The estimated effects of age groups are similar, suggesting that after controlling for other socio-economic variables and based on cohort evidence, the health deterioration across age groups is, on average, similar.



Conclusions

The study provides evidence on the health status and the role of gender and socioeconomic inequality in self-reported health and morbidity status amongst the elderly in Portugal. The extent of health depreciation that accompanies the ageing process in Portugal appears to be high. There are noteworthy results from this exploratory study: a negative self-perception of health status amongst the elderly, the high prevalence of chronic diseases since an earlier age, the high level of depression problems reported by women and the high disability amongst the oldest old.

There are, nonetheless, substantial differences in health status between age groups that suggest a potential for health gains in the future. Health projections also point to a future improvement in elderly health [41]. Consistent with previous studies [2] [19] [25] [28] we observe wide gender inequality, persistent across age and socioeconomic groups.

Mental health may be a relevant link in this association. Further research on the topic is needed for conclusive results. Late life depression should be treated as an important public health problem. It is associated with other devastating health, cognitive and social problems, self-neglect, and increased mortality [42].

The results are consistent with education-related inequality in health amongst the elderly, in disfavor of the least educated. The debate of association between education and health is an ongoing debate. There are several potential mechanisms through which education can affect health, such as better individual decision-making and information, healthier employment, more social capital, and healthier behaviors [11] [27] [43] [44] [45]. Understanding these mechanisms is relevant for health policy and should be the focus of future research. Nonetheless, our results suggest that wellbeing at older ages depends on the entire history of individuals and therefore policies to address inequality should target individuals earlier in life.

We can anticipate that the consequences of rapid deterioration of the health stock among elderlies can be substantial. The prevalence of chronic diseases, mental problems and high disability requires an adequate (re)organization of healthcare delivery to the elderly. That includes better coordination of care, expansion of long-term care, developments on e-health, improving management of multi-morbidity and reinforcing of mental health care. Health policies should prepare people for healthy ageing, including enhancing prevention, promotion of healthy lifestyles and encouragement for better self-care. These policies, combined with the expected reduction of education inequality, can help to mitigate

education-related health inequality. Moreover, the evidence presented clearly calls for a gendered perspective on health policy, particularly in mental health policy.

The estimated (so-called) age-gradient actually mixes age and cohort effects. Age effects on health tend to be stronger than cohort effects [26], and therefore we keep the terminology. That is nonetheless an important limitation of the present analysis. Moreover, the study also does not address causality. Further studies, using longitudinal approaches, are necessary. Given that self-reported health is not perceived on an absolute scale [46], and is inherently subjective, and because of the exclusion of the institutionalized population from the database, inequality and steepness of the age-gradient are likely to be underestimated.

Further research is needed to better understand the complex variations in health amongst the elderly so that policy-makers can more efficiently target healthcare investments.

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