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Original article

Assessing the socio-economic and demographic impact on health-related quality of life: evidence from Greece

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Abstract

Objectives: The impact of socioeconomic status on health has been extensively studied and studies have shown that low socio-economic status is related to lower values of various health and quality-of-health measures. The aim of this study was to assess the influence of demographic and socio-economic factors on health- related quality of life (HRQoL).

Methods: A cross-sectional study was carried out in 2003 using a representative sample of a Greek general population (n = 1007, 18+ years old), living in Athens area. Multivariate stepwise linear regression analyses were performed to investigate the influence of socio-demographic and economic variables on HRQoL, measured by eight scales of the SF-36. Interaction effects between socioeconomic status (SES) and demographic variables were also performed

Results: Females and elderly people were associated with impaired HRQoL in all SF-36 scales. Disadvantaged SES i.e. primary education and low total household income was related to important decline in HRQoL and a similar relation was identified among men and women. Only the interaction effects between age and SES was statistically significant for some SF-36 scales. Multiple regression analyses produced models explaining significant portions of the variance in SF-36 scales, especially physical functioning.

Conclusions: The analysis presented here gives evidence of a relationship existing between SES and HRQoL similar to what has been found elsewhere. In order to protect people from the damaging effects of poverty in health it is important to formulate health promotion educational programs or to direct policies to empower the disposable income etc. Helping people in disadvantaged SES to achieve the good health that people in more advantaged SES attained would help to prevent the widening of health inequalities.

Keywords: Socioeconomic groups – HRQoL – SF-36 questionnaire – health differences – Greece.

Introduction

The impact of socioeconomic status on health has been extensively studied in relation to morbidity and mortality. In the last two decades researchers have paid much more attention to important aspects like quality of life. Studies have shown that low socio-economic status is related to higher rates of mortality and morbidity, lower self-assessed health[1–9] and higher prevalence of diseases[10,11]. This association has been observed for all socioeconomic indicators, whether based on occupation, education or income.

In western European countries and in U.S the association between SES and health follows a common pattern[1–3,6,12,13]: the lower the socioeconomic status the poorer the health. Similar results have been obtained from different countries in respect to cultural background or economic growth[14–17]. In an attempt to describe the impact of socioeconomic status (SES) on health outcomes, researchers have summarized six categories of variables that might affect the association between SES and health: socio-demographic, economic, environmental, behavioral and psychological, physiological and health outcome variables[18].

In the present study, the interest was focused on quantifying the effect of socio-economic factors education and income on

health-related quality of life (HRQOL) measured by SF-36 subscales. Education and income capture distinctive aspects of social position and have distinctive characteristics. Education constitutes a stable variable, it is acquired in early adulthood, and it is easy to be measured[19]. Income, on the other hand, is sensitive to changes in life and time circumstances and has an age limitation (retirement). Recently, more attention has been paid to the advantages and disadvantages of the different measures of income concerning studies examining the association between income and health. In a previous study[20] the authors concluded that the choice of income measure has negligible impact and adjustments with equivalence scale made no difference to the association between income and health. Fritzell et al[6], added that the above might not hold for countries with different welfare state programs and labor market structures and that disposable household income adjusted with equivalence scale might be the optimal choice. Other scientists underlined that although the per capita income is preferable to total household income since it "corrects" for household size, is far from being the "ideal" concept of income. These arguments reveal the necessity for a consensus to selecting an optimal measure of income which will solve to some degree the different options, when studying the effect of income on health.

On the other hand, health is assessed by various self-assessed and quality of life measures like morbidity, questionnaires or single-item question. Questionnaires designed from a series of questions forming scales like SF-36 are more preferable because they have better reliability and validity whereas, the single item question has the advantage when a survey questionnaire does not have room for a lengthy questionnaire, and needs a brief account of the topic[21]. On the other hand, the traditional indices such as mortality and morbidity were too narrowly defined to measure important dimensions of health and quality of life[22] like physical and social functioning, emotional well-being, mental health and general well-being.

The SF-36 Health Survey is the most widely used measure of health-related quality of life (HRQoL)[23] in population based studies. Measures of health-related quality of life stem from the recognition that an integral evaluation of the benefit of an intervention should give data about health status and quality of life of patients[24]. It is a generic instrument that measures fundamental human aspects like functioning and well-being. As it is noted[25], general measures like the SF-36 attempt to capture aspects that are important to all patients and can also be administrated to the general population to assess how a particular condition causes health to depart from a healthy standard.

The purpose of this study was to examine, in a sample of a Greek urban population, living in Athens area, the relationship between socio-economic status (measured by education and total monthly household income) and SF-36 scales, to quantify the influence of underlying factors on various aspects of physical, mental and social functioning and furthermore, to identify aspects of HRQOL affected most by these factors.

Methods

A cross-sectional study was carried out in 2003 using a stratified sample of residents of the broader Athens area, where approximately 35 % of the Greek population lives. Institutionalized people were excluded. Participants (>18 years) were chosen proportionally to the population size, according to a three-staged sampling methodology. Specifically, in the first stage a random sample of 84 blocks of residences were selected according to information from the 2001 national census. In the second stage, households were selected from every block by systematic sampling. In the third stage, a participant (>18 years) was chosen from every household by simple random sampling. Totally, 1007 out of 1426 candidates (response rate 70.6 %) agreed to participate, constituting a representative sample of the population living in this particular area. Participants were face-to-face interviewed and the survey included the SF-36 Health Survey, socio-demographic, economic and health service utilization questions.

The SF-36 is a generic, self-administered, multi-item questionnaire measuring HRQoL, which is widely used in health services research to record functional health status and general health perceptions. It consists of eight scales: Physical Functioning, Role limitations due to Physical problems, Bodily Pain, General Health, Vitality, Social Functioning, Role limitations due to Emotional problems and Mental Health[21]. The eight dimensions can be summarized in two summary scores of physical and mental health[26] with higher scores (0–100 range) reflecting better-perceived health. In previous studies in Greece[27,28], the SF-36 was validated and the results were comparable to those from studies in other European countries and the USA.

In order to explore the relationship between socioeconomic status and health, we investigated graded associations between education, total monthly household income (after taxes) and health. This would allow us to properly assess the risk of poor health and whether poor health increases with a decreasing socioeconomic position of individuals. We used dummy variables. Three educational levels were defined: primary, secondary and university with the last category assumed as the reference group. Respectively, three income categories were also defined: low (up to 880€), medium (880–1760€) and high (>1760€) with last category displaying as reference group.

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Statistical analysis

The SF-36 scales were scored according to the documented procedure[21]. Higher scores in the eight scales (dependent variables) indicate better HRQoL. Spearman correlation coefficients and variance inflation factors were used to analyze the existence of potential collinearity problems (VIF $\geq$ 10) among the independent variables. Multivariate stepwise linear regression analyses were performed to quantify the influence of independent demographic variables: age (ten-year groups), gender (1 = male, 0 = female), marital status (dummy variable with "single" as the reference category: married, divorced, widowed), and socio-economic variables: education and total monthly household income (as noted above) on HRQoL. Independent variables were grouped into two categories i.e demographic and socio-economic with demographic variables entering first followed by socioeconomic variables. A two-tailed P-value of less than 0.05 was considered to be significant. Two way interaction effects between education and sex and between education and age estimated whether education effects on HRQoL was modified by sex or age respectively. We tested further two way interaction effects to examine if the effects of income on HRQoL were modified by sex or age. All the statistical analyses were performed with SPSS v.15 (SPSS Inc. Chicago, IL, USA).

Results

Table 1 displays the characteristics of the sample. Our sample consisted of 46.6% men and 53.4% women, roughly representing the gender distribution, according to the 2001 census. The overall mean age was 45 years and the sample distribution according to age was: 18–24:14.3% , 25–34:19.7% , 35–44:18.6% , 45–54:15.4% , 55–64:15.3% , 65+:16.1% . Concerning marital status, the majority –60.0% – were married. Furthermore, the socioeconomic distribution of the sample reveals that the majority of the individuals, i.e. 53.6% , had completed twelve-year (secondary) education whereas 36.6% of the respondents reported a total household income between 880–1760€ per month. Twenty four percent of the respondents did not report their household income. Table 2 summarizes SF-36 subscale scores according to gender and age groups. Females reported worse health than males and age was an important health factor affecting physical health relatively more than mental health. All the above mentioned differences were found to be statistically significant ($p < 0.0005$).

Socio-economic status and HRQoL

Multiple regression models (Table 3) were evaluated in order to further explore significant predictors of the eight SF-36 dimensions. Variance inflation factors (VIF) indicated the absence of serious collinearity problems (the VIF computed for the independent variables were less than 10). Each SF-36 scale was explained by portions of variance ranging from 8.7% for role emotional to 30.6% for physical functioning. It appears that physical functioning is the HRQoL scale most significantly influenced by this set of variables. Gender had a pronounced influence on HRQoL, with females reporting significantly lower scores in all eight scales. There were significant decreases with age in all scale scores with the higher mean decrease concerning physical functioning ($p < 0.001$) and the lowest mental health ($p = 0.005$). Marital status had a different impact with widowed people reporting a reduction in the role physical, vitality, social functioning and mental health scales, while married persons reported an increase in role emotional.

After controlling for the influence of demographic variables, significant differences in perceived health between the different educational levels were evident. People with lower education (primary) reported worse health compared to those with university level education, with the greatest decrease existing

Table 1. Socio-demographic characteristics of the sample (N = 1007).

Variable	N (%)
Gender	
Male	469 (46.6)
Female	538 (53.4)
Age Group	
18-24	144 (14.3)
25-34	198 (19.7)
35-44	188 (18.6)
45-54	155 (15.4)
55-64	155 (15.3)
65+	167 (16.1)
Marital Status	
Single	278 (27.6)
Married	604 (60.0)
Divorced	46 (4.6)
Widowed	74 (7.3)
Missing Values	5 (0.5)
Education	
Primary	201 (20.0)
Secondary	540(53.6)
University	259 (25.7)
Missing Values	7 (0.7)
Household Income	
Low	242 (26.0)
Medium	369 (36.6)
High	136 (13.5)
Missing Values	241 (23.9)

Table 2. Means (SD) of SF-36 scales scores according to gender and age.

	PF	RP	BP	GH	VT	SF	RE	MH
Gender								
Male	85.03 (24.15)	85.8 (33.06)	79.71 (29.6)	71.05 (23.12)	72.68 (20.47)	87.82 (24.7)	87.5 (31.08)	73.35 (18.9)
Female	77.25 (26.08)	74.5 (37.74)	67.31 (32.23)	64.83 (23.22)	61.68 (22.27)	77.31 (29.74)	76.65 (39.37)	64.37 (21.78)
Age								
18–24	95.11 (9.94)	92.39 (22.76)	79.05 (26.42)	79.41 (79.41)	75.93 (16.94)	88.54 (22.21)	86.65 (30.9)	71.28 (18.61)
25–34	91.98 (13.26)	89.55 (27.92)	81.48 (27.53)	79.43 (79.43)	75.65 (16.58)	90.97 (17.84)	98.66 (28.25)	73.96 (17.05)
35–44	86.38 (18.66)	87.17 (31.63)	76.70 (29.5)	72.29 (72.29)	79.91 (20.87)	87.57 (23.43)	86.4 (32.42)	69.56 (20.69)
45–54	80.54 (23.9)	75.84 (40.02)	67.64 (33.88)	63.38 (23.17)	63.73 (22.67)	78.62 (28.49)	76.81 (39.38)	66.86 (21.81)
55–64	74.67 (26.77)	76.25 (39.1)	71.3 (31.38)	61.6 (21.06)	64.01 (20.88)	81.71 (28.55)	79.6 (37.74)	68.15 (21.31)
65+	55.5 (31.74)	56.0 (47.99)	60.69 (35.84)	48.4 (24.5)	52.71 (25.23)	64.31 (36.3)	69.35 (43.51)	60.63 (23.75)

Abbreviations: PF = Physical Functioning, RP = Role Physical, BP = Bodily Pain, GH = General Health, VT = Vitality, SF = Social Functioning, RE = Role Emotional, MH = Mental Health
All the above differences were found to be statistically significant ($p < 0.0005$).

in general health ($p < 0.001$). Differences in health between secondary and university level were statistically significant for two scales only: bodily pain ($p = 0.038$) and role emotional ($p = 0.039$).

On the other hand, differences between income categories showed that people in the lowest income group reported the worst perceived health compared to those in highest income group (reference category). The higher impairment in HRQoL concerns physical functioning ($p < 0.001$), whereas mental health is the least affected. Differences observed between medium and high income groups were statistically significant only for the physical functioning scale ($p < 0.001$).

The interaction between sex and education or sex and income was not statistically significant ($p > .05$ for both cases). On the contrary, the interaction between age and education was statistically significant for role physical ($F = 3.89$, $p = 0.021$), bodily pain ($F = 4.07$, $p = 0.017$), vitality ($F = 6.48$, $p = 0.002$), social functioning ($F = 4.78$, $p = 0.009$) and mental health ($F = 5.36$, $p = 0.005$), whereas the interaction between age and income was statistically significant for only two scales, physical functioning ($F = 4.5$, $p = 0.011$) and role physical ($F = 4.13$, $p = 0.016$).

Studying the association between socio-economic status and HRQoL by gender resulted in the observation of interesting differences. In the male subgroup (Table 4), age was a significant predictor for all SF-36 scales and was associated with an expected decrease in HRQoL. Males with primary educational level reported a decrease in their self-perceived health compared to males with a university education in five scales: physical functioning ($p = 0.014$), bodily pain ($p = 0.002$), vitality ($p = 0.024$), role emotional ($p < 0.001$) and mental health ($p = 0.035$), while males with secondary education reported lower bodily pain ($p = 0.043$), role emotional ($p = 0.018$) and mental health ($p = 0.001$). On the other hand, differences between low versus high income groups were interesting with people in the low income category reporting a reduction in six scales with the higher decrease in physical functioning ($p < 0.001$) and the lowest in mental health ($p = 0.001$). Finally, the highest variance explained by the regression models was in the physical functioning scale (22.5 %), whereas the lowest in the bodily pain scale (5.1 %).

In the female subgroup (Table 5), demographic factors are significant predictors for SF-36 scales. Widows reported worse SF-36 scores in all scales. Age deteriorates health, with older women reporting a decline in five out of eight SF-36 scales: physical functioning, role physical, general health, vitality and social functioning. Females with primary education were associated with a significant impairment in vitality ($p < 0.0001$), social functioning ($p = 0.007$), mental health ($p = 0.004$) and bodily pain ($p < 0.001$) compared to females with university education. Interestingly, the first three scales are associated with the mental component of health status. Contrarily, women in the lower income group reported a significant reduction in the physical component of health status i. e. physical functioning ($p < 0.001$), role physical ($p = 0.002$), bodily pain ($p = 0.047$) and role emotional ($p = 0.006$). The variance explained by the regression model ranged between 5.6 % for the role emotional scale and 32.7 % for the physical functioning scale.

Additional two-way interaction effects analyses between educational level and age and between monthly household income and age identify statistically significant interaction effects for some scales in both men and women.

Table 3. Multivariate linear coefficients of SF–36 scales and interaction effects in the overall sample.

	B Coefficient* (p–value <.05)							
	PF	**RP**	**BP**	**GH**	**VT**	**SF**	**RE**	**MH**
Gender	5.18	5.91	7.99	3.80	8.05	5.36	6.17	7.12
	(p = 0.002)	(p = 0.029)	(p = 0.001)	(p = 0.018)	(p = 0.000)	(p = 0.008)	(p = 0.017)	(p < 0.001)
Age	–5.99	–4.23	–2.13	–5.79	–2.92	–3.17	–2.44	–1.68
(10-year groups)	(p <0.001)	(p <0.001)	(p = 0.004)	(p <0.001)	(p <0.001)	(p <0.001)	(p = 0.001)	(p = 0.038)
Marital status								
Married	4.16	1.6	4.17	3.65	1.75	4.75	5.92	3.82
	(p = 0.081)	(p = 0.680)	(p = 0.206)	(p = 0.111)	(p = 0.729)	(p = 0.097)	(p = 0.029)	(p = 0.077)
Divorced	4.73	9.91	6.45	5.14	5.51	2.93	7.46	4.03
	(p = 0.244)	(p = 0.134)	(p = 0.251)	(p = 0.189)	(p = 0.137)	(p = 0.548)	(p = 0.242)	(p = 0.273)
Widowed	–3.91	–17.90	–4.2	–2.30	–6.46	–14.46	–1.88	–6.39
	(p = 0.361)	(p = 0.001)	(p = 0.477)	(p = 0.577)	(p = 0.038)	(p <0.001)	(p = 0.895)	(p = 0.040)
change of R2	**0.273**	**0.130**	**0.077**	**0.230**	**0.181**	**0.150**	**0.066**	**0.087**
Education								
Primary	–5.89	–8.39	–15.21	–5.48	–9.09	–8.22	–17.75	–6.85
	(p = 0.014)	(p = 0.031)	(p <0.001)	(p = 0.043)	(p <0.001)	(p = 0.004)	(p <0.001)	(p = 0.002)
Secondary	–2.96	–2.38	–5.55	–2.54	–2.11	–4.35	–6.23	–2.95
	(p = 0.138)	(p = 0.462)	(p = 0.038)	(p = 0.186)	(p = 0.244)	(p = 0.070)	(p = 0.039)	(p = 0.103)
Household income								
Low	–11.95	–9.50	–1.5	–5.86	–4.54	–7.02	–5.41	–4.31
	(p <0.001)	(p = 0.002)	(p = 0.746)	(p = 0.001)	(p = 0.007)	(p = 0.002)	(p = 0.328)	(p = 0.010)
Medium	–7.81	–5.44	–1.14	–5.47	–4.61	–2.91	–1.37	–2.73
	(p <0.001)	(P = 0.307)	(p = 0.799)	(p = 0.082)	(p = 0.122)	(p = 0.459)	(p = 0.942)	(p = 0.355)
change of R2	**0.033**	**0.021**	**0.019**	**0.011**	**0.035**	**0.027**	**0.021**	**0.026**
R2	**0.306**	**0.151**	**0.096**	**0.241**	**0.216**	**0.177**	**0.087**	**0.113**
Education* age	2.54	3.89	4.07	1.39	6.48	4.78	1.67	5.36
F	(p = 0.079)	(p = 0.021)	(p = 0.017)	(p = 0.248)	(p = 0.002)	(p = 0.009)	(p = 0.188)	(p = 0.005)
Hous. income*age	4.50	4.13	0.46	1.50	1.65	1.11	1.72	7.03
F	(p = 0.011)	(p = 0.016)	(p = 0.631)	(p = 0.223)	(p = 0.192)	(p = 0.327)	(p = 0.180)	(p = 0.495)

Abbreviations: PF = Physical Functioning, RP = Role Physical, BP = Bodily Pain, GH = General Health, VT = Vitality, SF = Social Functioning, RE = Role Emotional, MH = Mental Health
*non–standardized regression coefficient

Discussion

In this study we evaluated the association between socioeconomic status (rated by education and net monthly household income) and self-perceived health measured by SF-36 in a Greek urban general population living in Athens area. Evidence was provided to support assertions made in previous studies[1–3,12–17,29] that impaired HRQoL is associated with low socioeconomic status. Low educational level and low income were profound predictors of negative HRQoL as it seemed to affect all SF-36 scales. The same was observed for both men and women. Furthermore sex and age were important predictors of HRQoL, a fact that is expected.

The multivariate regression models indicate a different impact on the various health dimensions. Demographic characteristics are more important predictors of HRQoL than socioeconomic status since education and income explained less of the total variance of the SF-36 scales. Furthermore analyzing the interaction effects between age and SES (separately for each variable) we saw that health inequalities increased more by the joint effect of education and age as it was statistically significant for the five out of eight scales. The same does not occur for the interaction effect between income and age as it was statistically significant for only two scales. This last point may be connected with the measure of income used in the present study and which constitutes a limitation of our study.

Table 4. Multivariate linear coefficients of SF–36 scales and interaction effects in male subjects.

	B Coefficient* (p-value <.05)							
	PF	**RP**	**BP**	**GH**	**VT**	**SF**	**RE**	**MH**
Age (10-year groups)	–5.41 (p <0.001)	–5.06 (p <0.001)	–2.55 (p = 0.014)	–5.55 (p <0.001)	–3.59 (p <0.001)	–5.05 (p <0.001)	–4.19 (p <0.001)	–1.67 (p = 0.007)
Marital Status								
Married	8.34 (p = 0.472)	8.16 (p = 0.131)	4.55 (p = 0.342)	6.47 (p = 0.662)	2.42 (p = 0.439)	6.84 (p = 0.088)	7.92 (p = 0.106)	3.71 (p = 0.221)
Divorced	10.75 (p = 0.770)	17.55 (p = 0.037)	4.51 (p = 0.542)	10.61 (p = 0.048)	6.58 (p = 0.176)	4.51 (p = 0.467)	11.48 (p = 0.131)	4.01 (0.393)
Widowed	19.08 (p = 0.837)	21.48 (p = 0.200)	6.44 (p = 0.665)	15.44 (p = 0.150)	14.08 (p = 0.148)	–1.82 (p = 0.947)	7.57 (p = 0.618)	–1.74 (p = 0.852)
change of R^2	**0.201**	**0.066**	**0.027**	**0.160**	**0.101**	**0.091**	**0.069**	**0.029**
Education								
Primary	–9.71 (p = 0.014)	–11.58 (p = 0.075)	–16.55 (p = 0.002)	–5.87 (p = 0.160)	–8.55 (p = 0.024)	–11.67 (p = 0.657)	–23.59 (p <0.001)	–7.70 (p = 0.035)
Secondary	–4.46 (p = 0.105	–5.1 (p = 0.221)	–7.17 (p = 0.043)	–3.71 (p = 0.164)	–4.05 (p = 0.094)	–6.04 (p = 0.052)	–8.57 (p = 0.018)	–7.80 (p = 0.001)
Household Income								
Low	–13.83 (p <0.001)	–9.80 (p = 0.015)	–5.23 (p = 0.429)	–7.89 (p = 0.002)	–9.80 (p <0.001)	–11.32 (p <0.001)	–6.13 (p = 0.366)	–7.80 (p = 0.001)
Medium	–8.19 (p = 0.015)	–9.26 (p = 0.179)	–1.24 (p = 0.074)	–9.71 (p = 0.028)	–3.88 (p = 0.331)	–1.56 (p = 0.911)	–6.25 (p = 0.316)	–2.43 (p = 0.527)
change of R^2	**0.024**	**0.014**	**0.024**	**0.024**	**0.032**	**0.035**	**0.044**	**0.031**
R^2	**0.225**	**0.080**	**0.051**	**0.184**	**0.143**	**0.126**	**0.113**	**0.060**
Education x age F	2.44 (p = 0.088)	2.06 (p = 0.128)	1.55 (p = 0.121)	1.12 (p = 0.121)	2.12 (p = 0.122)	3.10 (p = 0.46)	6.92 (p = 0.001)	1.97 (p = 0.141)
Hous. income x age F	5.82 (p = 0.003)	2.29 (p = 0.103)	1.33 (p = 0.265)	4.98 (p = 0.007)	6.32 (p = 0.002)	4.15 (p = 0.017)	0.37 (p = 0.685)	3.27 (p = 0.039)

Abbreviations: PF = Physical Functioning, RP = Role Physical, BP = Bodily Pain, GH = General Health, VT = Vitality, SF = Social Functioning, RE = Role Emotional, MH = Mental Health
* non–standardized regression coefficients

Even though education is related to all scales, it seems that the association is stronger with scales that contribute to the construction of the mental health component of the SF-36. A low educational level was associated more with deteriorations of mental rather than physical functioning and this could reflect an increase in the prevalence of mental conditions in less educated individuals. A strong, inverse association between education and the prevalence of common mental disorders has been reported elsewhere[30]. Another study showed that education was also a factor that contributes to the improvement of HRQoL, mainly physical health, in patients with coronary heart disease suggesting a higher prevalence of disease severity in disadvantaged socioeconomic groups[31]. On the other side, an increase in educational level from primary (6 years) to secondary (12 years) reduces the health inequalities compared to university level. An improvement in education means that persons possess more educational skills with which they can perhaps minimize the impact of incidents within the family, the social and work environment that could negatively affect health compared to those with only primary education. Another potential explanation could be that respondents with secondary education correspond to half of our sample, but this explanation needs further research.

The risk of poor health increases as income level decreases, and this has been consistent with previous studies[6,16]. It seems that low household income has stronger associations with physical rather than with mental health. The same pattern exists for males and females. In a previous study[32] low household income was associated more with poorer mental health than physical health, an issue that is of interest. An increase in monthly income would improve health significantly (health differences between medium and high income level concern only one scale i. e. physical functioning). Because of the relationships observed in this study, as well as in others, it is reasonable to conclude that any efforts to empower the household income of poorer people will enhance HRQoL and thereby improve people's life generally.

Concerning demographic factors, men report better health than women in all dimensions, something that is common in health surveys. Age is associated with a continuous decline in

Table 5. Multivariate linear coefficients of SF-36 scales and interaction effects in female subjects.

	B Coefficient* (p-value <.05)							
	PF	**RP**	**BP**	**GH**	**VT**	**SF**	**RE**	**MH**
Age (10-year groups)	–6.75 (p <0.001)	–4.56 (p <0.001)	–2.35 (p = 0.068)	–5.91 (p <0.001)	–2.40 (p <0.001)	–2.77 (p = 0.001)	–1.71 (p = 0.274)	–1.27 (p = 0.143)
Marital status								
Married	1.42 (p = 0.899)	–4.63 (p = 0.415)	4.43 (p = 0.348)	–1.73 (p = 0.817)	–1.12 (p = 0.967)	3.71 (p = 0.377)	6.49 (p = 0.253)	4.71 (p = 0.138)
Divorced	–2.37 (p = 0.692)	1.23 (p = 0.905)	8.62 (p = 0.317)	–1.58 (p = 0.783)	3.87 (p = 0.494)	1.08 (p = 0.496)	3.54 (p = 0.732)	4.08 (p = 0.480)
Widowed	–11.70 (p = 0.020)	–25.29 (p <0.001)	–12.57 (p = 0.025)	–9.66 (p = 0.007)	–11.01 (p = 0.002)	–19.18 (p <0.001)	–18.72 (p <0.001)	–8.33 (p = 0.022)
change of R^2	0.308	0.145	0.063	0.256	0.163	0.151	0.041	0.053
Education								
Primary	–4.87 (p = 0.209)	–6.70 (p = 0.315)	–10.81 (p <0.001)	–4.23 (p = 0.253)	–11.25 (p <0.001)	–10.81 (p = 0.007)	–11.04 (p = 0.097)	–8.05 (p = 0.004)
Secondary	–1.53 (p = 0.857)	–1.96 (p = 0.848)	–4.77 (p = 0.256)	–1.76 (p = 0.787)	–1.34 (p = 0.601)	–2.73 (p = 0.464)	–2.85 (p = 0.572)	–3.32 (p = 0.239)
Household income								
Low	–11.85 (p <0.001)	–12.68 (p = 0.002)	3.21 (p = 0.660)	–4.49 (p = 0.047)	–4.57 (p = 0.339)	–8.057 (p = 0.216)	–11.2 (p = 0.006)	–4.23 (p = 0.389)
Medium	–7.99 (p = 0.008)	1.55 (p = 0.850)	4.01 (p = 0.558)	1.82 (p = 0.856)	–3.29 (p = 0.461)	–4.54 (p = 0.455)	6.33 (p = 0.253)	–2.89 (p = 0.529)
change of R^2	**0.019**	**0.018**	**0.014**	**0.008**	**0.032**	**0.014**	**0.015**	**0.017**
R^2	**0.327**	**0.163**	**0.077**	**0.264**	**0.195**	**0.165**	**0.056**	**0.070**
Education x age F	2.18 (p = 0.003)	3.15 (p = 0.044)	4.31 (p = 0.014)	0.98 (p = 0.374)	7.87 (p <0.001)	4.48 (p = 0.012)	2.73 (p = 0.066)	5.51 (p = 0.004)
Hous. income x age F	3.25 (p = 0.114)	3.57 (p = 0.029)	0.44 (p = 0.642)	1.86 (p = 0.156)	1.13 (p = 0.325)	8.77 (p = 0.417)	1.79 (p = 0.167)	0.41 (p = 0.666)

Abbreviations: PF = Physical Functioning, RP = Role Physical, BP = Bodily Pain, GH = General Health, VT = Vitality, SF = Social Functioning, RE = Role Emotional, MH = Mental Health
* non-standardized regression coefficients

self-perceived health. Apart from the apparent causation of old age, there may exist an underlying socio-economic inequality. It has been suggested that problems related to physical and mental health in elderly people are not attributed only to old age, but may be traced back to accumulated social exposure over the course of life and to the risk factors in childhood and adulthood[15,33] . Identifying the factors that contribute to changes in health functioning over the lifespan may result in developing policies for reducing health inequalities. A finding that is apparent in our study as well is that, increasing age has a stronger inverse association with physical rather than with mental health. This difference is attributed to the fact that in old age the prevalence of chronic conditions like heart disease, respiratory distress, etc., is more common[34,35] and also to the fact that the impact on physical health is more profound. Marital status has a pronounced impact on HRQoL with the widowed reporting bad health in scales that contribute to the construction of the mental health component. It seems that widowhood is associated more with quality of life domains that refer to emotional and psychosocial aspects. Concerning women, marital status (widowhood) had a strong association with HRQoL affecting all SF-36 scales.

This study has some limitations. Firstly the study sample involves an urban population living in Athens area, the Greek capital. There is no information about the HRQoL of people living in rural areas. Geographical (urban/rural) socioeconomic inequalities in health are related to income distribution, access to information and better ability to use the available resources, access to health care, etc and thereby the impact of this gap might be examined as a social characteristic of inequalities in HRQoL. Another limitation concerns using the total monthly household income as a measure of income and not measures used in other studies such as equivalent income or per capita income which was thought more appropriate. Taking into account the above different opinions and having in mind the objective difficulties this study encountered (the most important being the fact that one fourth of the sample did not report its income, informal economy mainly to high income groups, Greeks are reluctant to report their income so there is a possibility of errors or underestimation), the re-

sults of the study concerning the income variable might be not so robust. Finally, including data about health behaviors or variables concerning early social conditions, individuals' personal expectations, attitudes and values would enable us to quantify their significance in HRQoL and the possible differences among the genders. Distinguishing the factors and their role in the inequalities contributes to the development of policies for reducing inequalities in health overall.

To conclude, the analysis presented here gives evidence of a relationship existing in Greece, between socioeconomic position and HRQoL similar to what has been found elsewhere. Moreover the results clearly indicate that income, education and HRQoL have a similar relation among men and women. Poor health also indicates higher need. The findings imply that health and the related quality of life is not just a matter of health policy but a matter of social and economic policy as well. Health promotion formulating educational programs for worst-off individuals, or policies directed to empower the disposable income and balance the income distribution, to secure equal distribution of health care and dealing with environmental issues would protect from the damaging effects of poverty in health. Helping people in disadvantaged socioeconomic position to achieve the good health that people in more advantaged socioeconomic position attained would help to reduce need and prevent the widening of health inequalities.

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