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Gender differences in health: results from SHARE, ELSA and HRS

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Background: We examine gender differences in health at ages 50 years and older in 11 European countries, England and the USA. **Methods**: We use the Survey of Health, Ageing and Retirement (SHARE) for 11 Continental European countries; the English Longitudinal Study of Ageing (ELSA) and the Health and Retirement Study (HRS) for the USA to examine gender differences in health behaviours, functioning problems, disability, disease prevalence and self-rated health. **Results**: Women in all countries are more likely than men to have disabling, non-lethal conditions including functioning problems [odds ratio (OR) indicating the effect of female is 1.57–2.43], IADL difficulties (OR 1.45–2.94), arthritis (OR 1.46–2.90) and depressive symptoms (OR 1.45–3.35). On the other hand, self-reported heart disease is more common among men (OR indicating effect of female ranges from 0.43 to 0.86). These differences are not eliminated by controlling for smoking behaviour and weight. Self-reported hypertension (OR 0.72–1.53) is generally more common among women; stroke and diabetes do not show consistent sex differences. While subjective assessment of health is poorer among women, this is not true when indicators of functioning, disability and diseases are controlled. **Conclusion**: There is remarkable consistency in direction of gender differences in health across these 13 countries. The size of the differences is affected in many cases by the similarity in behaviours of men and women.

Keywords: disability, disease, gender, self-reported health

Introduction

While research reports that females universally experience longer life expectancy than males,[1] there is less uniformity in reports of morbidity differences. Although the generalization was that women experience worse health but lower mortality than men,[2] this generalization arose from analyses of health surveys collected from the 1960s to 1980s when the indicators of health were limited to self-reported health, functioning problems and disability. More recent analysis based on a wider range and more nuanced indicators of health has shown that morbidity differences between men and women differ across dimensions of health.[3–6] Clearly, the gap between men and women in mortality and morbidity is not fixed over time or across places.[7]

Gender differentials in health are due to a combination of biological, social and behavioural differences as well as the interaction of these factors.[8] In countries where men and women live more similar lives and behave more similarly, one would expect them to have more similar health outcomes.

Social characteristics such as employment and occupational experience contribute to both men's and women's health status[9,10] and vary across countries and over time. Men have become less likely to work at physically challenging occupations while women have become more likely to perform paid work in the labour force. Such sweeping social changes could affect the relative health of men and women. Physical functioning and disability are related to work history, so that in countries where men and women work at more similar jobs for similar lengths of time, gender differences in disability should be smaller than in places where this is not true although research findings agree that women report more disability and problems with physical functioning across a number of settings.[5]

Most research reports indicate that women report a higher prevalence of diseases and conditions that are not-fatal but are debilitating or acute such as arthritis, asthma, depression and cognitive loss; men, on the other hand, report higher prevalence of some diseases including cardiovascular conditions.[2,4,11] But the size of sex differences in disease prevalence is likely to vary across countries. For instance, male/female differences in heart disease death rates vary markedly across countries, and Lawlor and colleagues suggest that this could be due to dietary factors with differing gender susceptibility.[7]

Most research has led to the generalization that men tend to engage in more risky health behaviours such as heavy drinking and smoking but smoking levels vary markedly across countries which could affect gender differences in a variety of health outcomes.[12–15] In countries that have more similar patterns of smoking behaviour for men and women, one would expect smaller differences in cardiovascular morbidity than in countries with less similar smoking histories for men and women.

Varying male/female differences in obesity levels can cause gender differences in disability and cardiovascular conditions. Men are more likely to be overweight, but at least in the USA, women are more likely to be obese; mortality and heart disease in men may be more related to fat consumption and/or weight, but it is possible that disability in women is more affected by weight.[7,16]

In this article, we take advantage of the comparability built into the design of the English Longitudinal Study of Ageing (ELSA), the Health and Retirement Study (HRS) of the United States and the survey in 11 European countries, the Survey of

Health, Ageing and Retirement in Europe (SHARE), to examine gender differences in a number of dimensions of health including self-reported global health, functioning, the prevalence of diseases, and health behaviours. These surveys represent a unique opportunity to examine the similarity of gender differences in a sample of countries with cultural variety and which differ in the similarity in health behaviours and social roles of men and women. Details on the three surveys and their comparability are provided in Börsch-Supan *et al.*[17]

We expect to find a greater similarity in health outcomes among men and women in countries where men and women live more similar life and behave more similarly, that is, in countries where men and women are more similar in their smoking, weight and working patterns.

Methods

The surveys

The three surveys used here were designed to provide comparable results. They all provide information on health, health behaviours and a variety of life circumstances of individuals aged 50 and over. The first wave of the SHARE survey was collected in 2004 and 2005 in 11 Continental European countries. The sample size for the 50+ population is 27 444. The names of the individual countries are shown in table 1. The SHARE dataset is described in Börsch-Supan *et al.*[18]; methodological details may be found in Börsch-Supan and Jürges.[19] Sampling designs vary across SHARE countries.[20] The ELSA data were collected in 2004 which is the second wave of a panel survey of the 50+ English population that began in 2002. ELSA has a larger sample size than any of the SHARE countries with 10 482 respondents in 2004. Further details on ELSA are provided in Marmot *et al.*[21] The HRS data used here were also collected in 2004, which was the seventh wave of the survey, but a wave at which the sample was refreshed at the bottom of the age range in order to represent the community-dwelling population 50+. The sample size for HRS is much larger than for other countries ($N = 16\,356$).[22] HRS is a household sample and the interviews are collected using a combination of in-person and telephone interviews.

In comparing countries, we need to be mindful of differences in response rates. Household response rates vary markedly across the SHARE countries from a low of 39% in Switzerland to as high of 81% in France; and individual response rates range from 74% in Spain to as high of 93% in France.[20] With the exception of Spain, the response rate in SHARE for men and women were within two percentage points.[20] The individual field response rate for ELSA was 81.3% for men and 81.4% for women.[23] The response rate in HRS for the eligible sample in 2004 was 86%.[22]

In SHARE and ELSA, data are collected in personal interviews while, in HRS, a combination of personal and phone interview is used. Each of the three surveys includes interviews with spouses or partners as well as age-eligible sample members. Proxies provided information for those unable to respond because of cognitive or physical problems in all three surveys.

The samples

The total sample size, the average age and the percentage female in each country are presented in table 1. The varying sample sizes must be kept in mind when examining statistical significance of results. The proportion of the sample by gender is quite similar across countries, with the percent female ranging from 60% in Spain to 53% in Belgium, Denmark and Switzerland. Mean age of the sample is highest in Spain (67.2) and lowest in Netherlands (64.1) and Belgium (64.2).

Measures

Health measures are based on self-reports of health problems in the respective surveys. In most cases, questions were worded to be comparable. We utilize three indicators of problems with functioning and disability including self-reported difficulty performing at least one of 10 tasks related to mobility, strength and endurance, difficulty doing at least one of six activities of daily living (ADLs) which represent ability to provide self-care, and difficulty with at least one of seven instrumental activities of daily living (IADLs) in SHARE, and six in ELSA and HRS, which represent ability to live independently.

In addition, information on the presence of seven chronic diseases is reported in response to the question, 'Has a doctor ever told you that you had any of the following conditions?' (hypertension, diabetes, cancer, lung disease, heart disease, stroke and arthritis). Depressive symptoms are reported in each of the surveys using the 12 item EURO-D scale in SHARE and an 8 item CES-D in HRS and ELSA. Self-perceived health is assessed in all surveys.

For most countries, self-reports of height and weight are converted into body mass index (BMI) that is divided into normal weight, overweight and obese. In ELSA, height and weight are measured. We also examine self-reported smoking behaviour.

Analysis

We present the age-adjusted percent of men and women in each country with each health problem or behaviour. Weights are employed in all three studies to account for different probabilities of being included in the sample and for non-response to the surveys.

The odds ratios (ORs) resulting from logistic regressions are presented to indicate the link between being female and the likelihood of having health problems with age controlled, and then with age, current and past smoking, and being overweight and obese controlled indicating the level of gender differences if these behaviours were the same for both men and women. Because there may be age variability in the patterns of gender differences in these health outcomes, we examine age–gender interactions for the pooled SHARE sample across 11 countries, the HRS sample, and the ELSA sample.

In our analysis of differences in self-rated health, we determine how gender is associated with self-rated health when men and women have the same level of functioning problems and diseases to see whether men and women would assess their health similarly if they experienced the same level of health problems.

We also examine the size of national differences by gender in the health measures according to national gender differences in smoking, weight and working to determine if gender differences are systematically different in countries where men and women are more similar in these behaviours.

Results

Differences in health behaviours and working

Before looking at the health differences, we examine national differences in health behaviours and working. Men are more likely to work in every country, but there is considerable variability in the percentage currently working among both men and women (table 1). The countries with the most similar current labour force participation for the two sexes

Table 1 Sample characteristics by country; age-adjusted prevalence[a] of overweight, obesity, current and ever smoking by gender and country; ORs indicating effect of being female on health behaviours

Country	Total *N*	Mean age	Percentage Female	Percentage currently working		Overweight (BMI ≥ 25)			Obese (BMI ≥ 30)			Current smoker			Ever smoke		
				Males	Females	Males	Females	OR[b]	Males	Females	OR[b]	Males	Females	OR[b]	Males	Females	OR[b]
Austria	1849	65.4	58.0	26.4	16.1	68.9	55.1	0.55 (0.46–0.65)	17.2	19.9	1.19 (0.96–1.46)	21.7	15.9	0.67 (0.54–0.83)	48.7	27.7	0.39 (0.32–0.48)
Belgium	3649	64.2	53.3	25.8	16.7	66.4	54.3	0.59 (0.53–0.67)	18.7	17.7	0.93 (0.80–1.10)	21.7	12.3	0.49 (0.42–0.59)	70.1	28.8	0.17 (0.14–0.20)
Denmark	1615	64.6	53.1	37.3	31.7	59.3	44.5	0.55 (0.45–0.67)	14.0	13.2	0.94 (0.70–1.26)	31.5	29.4	0.93 (0.75–1.15)	71.7	57.8	0.54 (0.44–0.67)
France	3038	64.6	55.0	27.7	23.9	63.7	47.4	0.51 (0.44–0.60)	14.7	16.2	1.11 (0.92–1.34)	19.1	9.5	0.43 (0.35–0.52)	63.7	22.6	0.16 (0.14–0.19)
Germany	2941	64.5	54.9	33.4	26.5	67.4	55.2	0.58 (0.49–0.69)	16.7	17.4	1.03 (0.82–1.29)	23.8	13.7	0.49 (0.37–0.63)	62.4	27.6	0.22 (0.18–0.27)
Greece	2669	64.7	53.5	37.1	15.9	70.4	64.4	0.76 (0.64–0.89)	16.1	21.3	1.40 (1.15–1.71)	32.6	17.9	0.41 (0.34–0.49)	63.0	24.9	0.18 (0.15–0.21)
Italy	2508	64.9	55.4	27.2	15.2	67.1	54.4	0.58 (0.49–0.68)	15.8	17.9	1.16 (0.94–1.42)	23.3	14.8	0.55 (0.42–0.73)	62.9	29.0	0.23 (0.19–0.30)
Netherlands	2865	64.1	53.9	34.1	19.6	61.5	52.9	0.69 (0.59–0.82)	12.8	16.8	1.36 (1.08–1.71)	26.6	21.0	0.73 (0.64–0.84)	75.3	48.5	0.30 (0.23–0.38)
Spain	2353	67.2	59.9	31.6	17.2	70.3	67.6	0.87 (0.70–1.08)	20.3	25.7	1.36 (1.08–1.70)	27.7	8.8	0.22 (0.17–0.29)	66.6	14.1	0.08 (0.06–0.10)
Sweden	2997	65.4	54.3	40.7	36.9	60.2	49.1	0.63 (0.55–0.73)	13.0	14.7	1.15 (1.01–1.31)	14.2	19.4	1.49 (1.25–1.78)	60.1	49.7	0.65 (0.57–0.74)
Switzerland	960	65.2	53.3	45.7	30.9	60.0	41.8	0.47 (0.36–0.62)	12.9	12.5	0.96 (0.65–1.42)	19.8	18.8	0.95 (0.68–1.31)	53.8	34.7	0.46 (0.35–0.60)
Total SHARE	27 444	65.3	54.2	32.6	22.3	65.3	54.0	0.62 (0.59–0.65)	15.8	17.8	1.15 (1.07–1.22)	23.5	15.7	0.60 (0.51–0.69)	64.4	32.4	0.26 (0.21–0.31)
US (HRS)	19 108	64.6	54.6	44.0	36.1	72.4	61.5	0.58 (0.54–0.63)	27.4	29.0	1.13 (1.04–1.23)	16.2	14.9	0.83 (0.75–0.92)	69.5	49.9	0.45 (0.42–0.49)
England (ELSA)	9171	66.9	53.9	45.7	30.9	76.7	69.1	0.73 (0.66–0.82)	27.2	30.7	1.23 (1.10–1.36)	15.0	15.4	0.95 (0.83–1.08)	71.9	56.7	0.48 (0.43–0.52)

Source: SHARE (2004), HRS (2004), and ELSA (2004).

a: Prevalence rates are adjusted for age using the SAS survey program, standardizing for age-groups 50–59, 60–69, 70–79 and 80+, and a standard 2001 population provided by Eurostat [47]. We multiply the age-specific prevalence from each study population by the proportion of people in that age group in the standard population, and then sum the results to get the age-adjusted estimate. For details on this procedure, refer to [48].

b: With age controlled.

are Denmark, France and Sweden. Men and women differ most in their working behaviour in Greece, and the fewest women work in Greece, Italy, Spain, Austria and Belgium.

On the basis of self-reported height and weight, a higher proportion of males than females is overweight in each country, although not significantly so in Spain (table 1). France and Switzerland have the largest gender difference in the prevalence of self-reported overweight (16.3 and 18.2%) and Spain the lowest (2.7%). The odds of women being overweight are 24–53% of those for men in these countries. Significant gender differences in obesity were not as common; however, where there was a difference, more women were obese than men. This was true in Greece, Netherlands, Spain, Sweden, USA and England.

In most countries, a higher percentage of men than women is current smokers. The gender difference in the prevalence of current smoking is greatest in Spain where females have a very low rate of smoking (27.7% for males and 8.8% for females). Female smoking levels in this age range are also very low in France (9.5%). Men are significantly more likely to smoke than women in all but four countries. In Switzerland, Denmark and England, there is no gender difference. In Sweden, women are more likely to be current smokers than men. In all countries, men are more likely than women to report being ever-smokers.

Gender differences in functioning and disability

ADL difficulties are somewhat higher among women in most countries, but the differences are not significant in many cases (table 2). In eight countries women report significantly more problems than men, but in France men report more ADL problems than women. On the other hand, IADL and functioning difficulties are significantly more prevalent among women in all countries. The relative odds of IADL difficulties among females ranged from 1.45 to 2.94. The presence of some difficulty with functioning ranges from about a third to a half among men (31.0–59.8%) and from a half to almost three-quarters among women (46.4–72.0%). Controlled for age, the relative odds of having functioning problems for women ranged from 1.57 in Germany to 2.43 in Spain.

In order to see how gender differences in health behaviours mediate gender differences in the prevalence of ADL, IADL and functioning difficulties, we controlled current and past smoking and overweight and obese status in the logistic regression models (table 2). Given the higher likelihood that men are overweight and smoke, this resulted in an increase in the effect of being female in many equations particularly in functioning difficulties. This means that if men and women were alike in smoking behaviour and propensity to be overweight, the differences would be even larger than those observed.

The national ORs indicating gender differences in ADL and IADL disability and functioning problems are not significantly related to the national sex ratios in currently working or the national ORs indicating the gender effect of overweight and obesity (data shown in supplementary table).

Gender differences in chronic conditions

Table 3 shows the percent of men and women who self-report having seven major chronic diseases in the 13 countries as well as the odds of women having each disease when age is controlled and when health behaviours are also controlled. Self- reports of hypertension are more prevalent among females in most countries but significantly in only six countries and in the pooled sample for continental Europe. Swiss women are actually less likely to report themselves hypertensive than Swiss men. When health behaviours are controlled, the results are similar except in Germany, Switzerland and the USA.

Self-reported heart disease is less prevalent among females with the difference significant in every country except Spain. The ORs indicate that heart disease is about forty percent as likely to be reported by females in most European countries with smaller differences in England. These differences are very stable and do not change with the introduction of controls for health behaviours in the majority of countries.

Gender differences in the prevalence of stroke are not significant in most of the continental European countries. Men are significantly more likely to have had a stroke in three SHARE countries, the pooled European sample, England and the USA. When health behaviours are controlled, the results were only significant in the pooled European sample and Sweden.

Diabetes is significantly less likely to be reported among women in four countries in Europe (Austria, France, Sweden and Switzerland), the pooled European sample, the USA and England. With controls for health behaviours, gender differences in the odds of having diabetes were no longer significant in Sweden, Switzerland or the pooled European group indicating that they may have arisen from higher levels of overweight among men.

Self-reported lung disease does not differ by sex in most countries; however, it is significantly more common among men in Belgium, France and Spain and the total of the 11 European countries. Controls for smoking eliminate the significance of all of these gender differences.

Arthritis is significantly more likely to be reported among females in all countries. The relative odds of females reporting arthritis are in the range of 1.46–2.90. Differences are not affected much by controls for age and health behaviours including women's higher obesity in some countries.

Women in every country are significantly more likely to report depressive symptoms with ORs ranging from 1.45 to 3.35. The gender differences are smallest in Denmark, the Netherlands, the USA and England, and the largest in Greece and Spain. It is possible that the smaller differences in the USA and England are related to the use of the CES-D scale rather than the EURO-D scale. We were able to compare the two scales for a subset of SHARE respondents and found that across all countries the female to male ratio among these selected SHARE respondents was 2.0 using the EURO-D and 1.7 using the CES-D. (This is not a comparison with exactly the same scale used in HRS and ELSA because the CES-D collected in the subset of SHARE respondents had four response categories for each item and the CES-D used in HRS and ELSA has only two response categories.)

We also examine whether the gender differences observed so far differ by age in three samples: the pooled SHARE sample, ELSA and the USA (supplementary table). Age is divided into three groups (50–59, 60–69, 70+); age–gender interactions are included in equations with gender and age main effects and the dependent variables are the health outcomes of overweight, ADL, IADL, functioning difficulties, heart disease, hypertension, stroke, diabetes, lung disease, arthritis, and depressive symptoms. Stronger effects of being female at the oldest ages would provide some suggestion that women's longer life could be related to higher prevalence of these health outcomes. There were almost no consistent patterns of interactions, i.e. differences across the age range and across the three samples. However, the effect of being female on hypertension was significantly greater among older women in all three samples. The effect on stroke was higher among older women in SHARE. ADL disability was higher among

Table 2 Age-adjusted percent with ADL, IADL, and functioning difficulties by gender and country; ORs indicating effect of being female on ADL, IADL, and functioning difficulties[a]

Country	ADL				IADL				Functioning			
	Males	Females	OR[b]	OR[c]	Males	Females	OR[b]	OR[c]	Males	Females	OR[b]	OR[c]
Austria	8.9	10.0	1.16 (0.88–1.53)	1.18 (0.89–1.57)	13.6	20.9	1.81 (1.40–2.35)	1.88 (1.46–2.43)	45.8	57.4	1.63 (1.39–1.92)	1.80 (1.49–2.17)
Belgium	10.7	15.4	1.61 (1.28–2.02)	1.75 (1.38–2.22)	14.9	23.0	1.86 (1.56–2.21)	2.11 (1.72–2.59)	41.2	57.2	2.00 (1.75–2.29)	2.46 (2.13–2.84)
Denmark	10.8	10.3	0.92 (0.66–1.29)	0.90 (0.64–1.28)	13.4	21.1	1.84 (1.38–2.45)	1.88 (1.39–2.54)	36.5	49.9	1.79 (1.45–2.21)	2.05 (1.64–2.57)
France	13.5	10.8	0.77 (0.62–0.97)	0.87 (0.67–1.12)	14.0	19.1	1.56 (1.25–1.94)	1.50 (1.20–1.87)	39.9	57.1	2.23 (1.98–2.50)	2.64 (2.29–3.05)
Germany	9.9	10.8	1.10 (0.81–1.48)	1.14 (0.81–1.60)	12.9	17.1	1.45 (1.16–1.81)	1.45 (1.13–1.85)	49.7	59.6	1.57 (1.35–1.83)	1.71 (1.45–2.02)
Greece	7.3	10.7	1.63 (1.21–2.18)	1.86 (1.31–2.64)	12.2	24.8	2.94 (2.32–3.73)	2.92 (2.23–3.83)	45.5	63.5	2.36 (1.99–2.80)	2.60 (2.15–3.14)
Italy	10.7	12.3	1.20 (0.88–1.65)	1.24 (0.90–1.72)	10.3	18.6	2.20 (1.64–2.94)	2.02 (1.44–2.82)	44.6	58.1	1.83 (1.55–2.17)	2.21 (1.77–2.77)
Netherlands	7.5	10.0	1.46 (1.12–1.90)	1.43 (1.07–1.92)	12.0	21.0	2.11 (1.70–2.60)	2.07 (1.63–2.63)	34.1	51.1	2.14 (1.81–2.53)	2.21 (1.86–2.64)
Spain	10.3	13.0	1.36 (1.05–1.76)	1.31 (0.89–1.91)	17.1	27.2	1.97 (1.61–2.42)	1.92 (1.41–2.61)	43.5	62.4	2.43 (2.00–2.96)	2.63 (2.06–3.38)
Sweden	8.0	10.8	1.38 (1.11–1.73)	1.32 (1.03–1.69)	11.5	19.8	1.99 (1.75–2.27)	1.98 (1.81–2.16)	36.1	53.1	2.18 (1.87–2.54)	2.37 (2.03–2.77)
Switzerland	5.1	8.7	1.82 (1.04–3.18)	2.13 (1.15–3.94)	5.4	11.6	2.43 (1.44–4.11)	2.74 (1.53–4.89)	31.0	46.4	2.07 (1.55–2.75)	2.47 (1.80–3.39)
Total SHARE	9. 7	11.6	1.25 (1.13–1.38)	1.28 (1.15–1.42)	13.1	20.9	1.92 (1.78–2.06)	1.92 (1.77–2.09)	41.3	56.8	2.00 (1.90–2.10)	2.22 (2.08–2.37)
US (HRS)	13.0	16.6	1.38 (1.25–1.52)	1.43 (1.29–1.59)	12.7	20.1	1.76 (1.61–1.93)	1.79 (1.62–1.97)	59.8	72.0	1.82 (1.69–1.97)	2.04 (1.88–2.21)
England (ELSA)	17.3	20.7	1.25 (1.12–1.39)	1.28 (1.14–1.44)	16.5	24.0	1.67 (1.50–1.85)	1.75 (1.56–1.96)	49.8	64.4	1.89 (1.74–2.06)	2.06 (1.88–2.25)

Source: SHARE (2004), HRS (2004), and ELSA (2004).

a: ADL functions include walking across a room, getting in and out of bed, bathing or showering, eating (such as cutting up your food), dressing (including putting on shoes and socks) and using the toilet (including getting up or down). IADL abilities include using a map to figure out how to get around in a strange place, preparing a hot meal, shopping for groceries, making telephone calls, taking medications, managing money, such as paying bills and keeping track of expenses. In SHARE, IADLs also include doing work around the house or garden.

b: With age controlled.

c: With age, current and past smoking and overweight, and obese controlled.

Table 3 Age-adjusted prevalence of selected diseases by gender and country; ORs indicating effect of being female on having selected diseases

Country	Hypertension				Heart				Stroke				Diabetes			
	Males	Females	OR[a]	OR[b]	Males	Females	OR[a]	OR[b]	Males	Females	OR[a]	OR[b]	Males	Females	OR[a]	OR[b]
Austria	27.9	33.3	1.27 (1.05–1.55)	1.37 (1.13–1.66)	12.2	7.3	0.55 (0.39–0.77)	0.58 (0.41–0.81)	5.2	3.5	0.64 (0.42–0.97)	0.70 (0.45–1.07)	10.0	7.0	0.67 (0.50–0.88)	0.73 (0.53–0.99)
Belgium	29.1	34.0	1.25 (1.09–1.43)	1.37 (1.16–1.61)	18.8	11.8	0.55 (0.44—0.69)	0.71 (0.55–0.91)	3.9	4.2	1.07 (0.77–1.47)	1.18 (0.87–1.61)	7.6	9.3	1.25 (0.97–1.61)	1.30 (0.97–1.74)
Denmark	31.4	28.6	0.84 (0.68–1.05)	0.96 (0.76–1.21)	10.8	7.6	0.64 (0.45–0.92)	0.68 (0.47–0.98)	6.5	4.6	0.67 (0.43–1.04)	0.69 (0.43–1.09)	8.5	6.7	0.77 (0.53–1.12)	0.83 (0.56–1.23)
France	26.2	31.2	1.27 (1.08–1.49)	1.43 (1.22–1.68)	19.3	9.8	0.43 (0.35–0.52)	0.44 (0.35–0.56)	3.7	3.5	0.93 (0.66–1.31)	0.92 (0.62–1.38)	11.2	8.4	0.72 (0.58–0.91)	0.73 (0.59–0.92)
Germany	34.3	36.9	1.10 (0.92–1.31)	1.24 (1.01–1.51)	14.26	9.3	0.56 (0.43–0.72)	0.63 (0.47–0.85)	5.6	3.1	0.51 (0.33–0.79)	0.63 (0.37–1.05)	11.4	12.2	1.08 (0.84–1.37)	1.07 (0.83–1.39)
Greece	31.4	40.1	1.49 (1.26–1.76)	1.54 (1.28–1.86)	14.9	10.7	0.67 (0.53–0.85)	0.70 (0.53–0.91)	4.1	3.5	0.84 (0.56–1.27)	1.03 (0.64–1.67)	8.9	9.4	1.05 (0.81–1.37)	1.13 (0.84–1.54)
Italy	36.1	37.3	1.04 (0.82–1.31)	1.17 (0.92–1.48)	12.7	9.1	0.68 (0.52–0.91)	0.74 (0.53–1.03)	3.8	2.5	0.63 (0.35–1.14)	0.78 (0.41–1.45)	12.9	10.9	0.81 (0.61–1.08)	0.77 (0.58–1.02)
Netherlands	23.8	28.1	1.24 (1.05–1.48)	1.26 (1.05–1.51)	14.7	8.9	0.52 (0.38–0.72)	0.57 (0.41–0.79)	5.0	4.8	0.92 (0.66–1.27)	1.09 (0.73–1.63)	8.3	9.3	1.11 (0.90–1.38)	1.07 (0.85–1.34)
Spain	27.2	36.5	1.53 (1.26–1.86)	1.61 (1.29–2.02)	11.4	10.0	0.86 (0.66–1.13)	1.07 (0.77–1.49)	2.4	1.8	0.74 (0.42–1.29)	1.23 (0.45–3.36)	15.4	13.3	0.84 (0.64–1.10)	1.04 (0.76–1.42)
Sweden	28.1	29.5	1.05 (0.87–1.28)	1.13 (0.93–1.36)	20.3	13.0	0.55 (0.43–0.70)	0.57 (0.47–0.70)	6.3	3.6	0.53 (0.42–0.68)	0.52 (0.40–0.68)	10.4	7.8	0.72 (0.53–0.99)	0.72 (0.51–1.03)
Switzerland	30.1	24.2	0.72 (0.53–0.97)	0.84 (0.60–1.16)	9.5	5.4	0.50 (0.29–0.85)	0.57 (0.32–1.01)	2.9	2.2	0.72 (0.31–1.68)	0.95 (0.37–2.41)	7.5	4.1	0.50 (0.28–0.89)	0.71 (0.38–1.34)
Total SHARE	29.6	33.4	1.18 (1.12–1.24)	1.26 (1.13–1.41)	15.4	9.9	0.58 (0.53–0.62)	0.63 (0.58–0.69)	4.5	3.5	0.74 (0.65–0.83)	0.84 (0.72–0.98)	10.3	9.4	0.89 (0.82–0.97)	0.91 (0.82–1.01)
US (HRS)	51.7	53.1	1.03 (0.97–1.11)	1.10 (1.02–1.18)	26.4	19.7	0.69 (0.64–0.75)	0.73 (0.67–0.80)	6.6	5.5	0.82 (0.71–0.93)	0.87 (0.76–1.00)	18.9	16.1	0.83 (0.76–0.91)	0.86 (0.78–0.95)
England (ELSA)	33.0	33.4	1.04 (0.92–1.09)	0.99 (0.91–1.09)	19.0	16.0	0.79 (0.71–0.87)	0.82 (0.73–0.92)	3.2	2.5	0.75 (0.58–0.96)	0.90 (0.68–1.19)	8.2	5.3	0.61 (0.52–0.72)	0.62 (0.52–0.74)

(continued)

Table 3 Continued

Country	Lung				Arthritis				Depressive symptoms[c]				Poor or Fair Self-rated Health		
	Males	Females	OR[a]	OR[b]	Males	Females	OR[a]	OR[b]	Males	Females	OR[a]	OR[b]	Males	Females	OR[a]
Austria	4.1	2.6	0.63 (0.38–1.03)	0.62 (0.37–1.04)	8.1	13.1	1.71 (1.30–2.24)	1.74 (1.34–2.26)	13.1	25.4	2.34 (1.86–2.94)	2.30 (1.79–2.97)	37.6	41.2	1.18 (0.97–1.44)
Belgium	6.7	5.0	0.73 (0.56–0.94)	1.17 (0.89–1.53)	18.5	29.2	1.84 (1.60–2.12)	2.01 (1.73–2.33)	17.4	33.1	2.40 (2.10–2.75)	2.64 (2.33–3.00)	30.8	34.8	1.21 (1.04–1.41)
Denmark	8.7	7.0	0.76 (0.52–1.11)	0.90 (0.61–1.32)	20.0	32.5	1.91 (1.52–2.42)	2.13 (1.67–2.72)	14.3	21.5	1.66 (1.27–2.16)	1.78 (2.35–2.34)	30.2	32.3	1.09 (0.88–1.36)
France	6.7	5.2	0.75 (0.57–0.98)	1.00 (0.71–1.40)	24.1	36.4	1.84 (1.58–2.13)	1.89 (1.60–2.25)	24.3	40.8	2.16 (1.90–2.46)	2.27 (1.98–2.62)	39.9	38.0	0.92 (0.81–1.04)
Germany	5.5	4.5	0.81 (0.55–1.17)	0.83 (0.57–1.23)	9.8	13.7	1.46 (1.10–1.94)	1.40 (1.01–1.93)	13.8	26.8	2.40 (1.97–2.92)	2.47 (2.05–2.99)	44.8	47.9	1.14 (0.96–1.35)
Greece	3.7	3.5	0.93 (0.62–1.41)	1.24 (0.78–1.98)	10.8	24.7	2.90 (2.31–3.63)	2.68 (2.08–3.46)	14.5	34.0	3.21 (2.62–3.92)	3.67 (2.92–4.61)	32.2	43.9	1.80 (1.52–2.14)
Italy	8.5	6.1	0.69 (0.48–1.00)	0.83 (0.57–1.21)	21.5	38.6	2.32 (1.90–2.84)	2.27 (1.82–2.82)	26.0	42.8	2.20 (1.77–2.74)	2.14 (1.69–2.71)	46.2	55.1	1.48 (1.20–1.82)
Netherlands	6.7	7.4	1.10 (0.88–1.38)	1.28 (0.99–1.66)	5.9	13.9	2.64 (1.88–3.71)	2.76 (1.92–3.97)	16.3	26.0	1.83 (1.55–2.16)	1.84 (1.49–2.27)	31.6	34.2	1.13 (0.96–1.32)
Spain	7.1	3.9	0.53 (0.35–0.79)	1.12 (0.68–1.83)	18.9	35.3	2.39 (1.91–2.99)	2.20 (1.66–2.91)	21.6	46.8	3.35 (2.75–4.07)	3.43 (2.63–4.47)	42.3	53.8	1.65 (1.36–1.99)
Sweden	3.0	3.0	1.01 (0.76–1.35)	1.15 (0.86–1.55)	6.0	13.7	2.48 (2.14–2.88)	2.44 (2.15–2.76)	13.1	26.8	2.45 (2.19–2.73)	2.47 (2.23–2.74)	33.0	39.6	1.35 (1.17–1.57)
Switzerland	2.8	3.7	1.30 (0.61–2.76)	1.39 (0.64–3.02)	7.9	15.6	2.26 (1.45–3.52)	2.80 (1.73–4.54)	12.1	24.8	2.43 (1.70–3.47)	2.32 (1.59–3.39)	17.7	22.5	1.34 (0.96–1.87)
Total SHARE	5.9	4.8	0.79 (0.71–0.89)	1.02 (0.92–1.14)	14.1	24.7	2.02 (1.89–2.15)	2.01 (1.83–2.21)	17.4	32.5	2.34 (2.21–2.48)	2.35 (2.16–2.55)	36.1	41.5	1.26 (1.18–1.36)
US (HRS)	9.2	9.9	1.11 (0.99–1.25)	1.36 (1.21–1.53)	50.5	63.6	1.73 (1.61–1.86)	1.90 (1.76–2.05)	17.7	24.0	1.45 (1.32–1.58)	1.50 (1.36–1.65)	26.2	26.8	1.05 (0.97–1.13)
England (ELSA)	6.9	7.2	1.02 (0.87–1.19)	1.00 (0.84–1.19)	29.3	43.9	1.91 (1.76–2.08)	1.96 (1.80–2.15)	18.2	26.8	1.67 (1.51–1.84)	1.78 (1.61–1.98)	25.6	27.3	0.99 (0.89–1.10)

Source: SHARE (2004), HRS (2004), and ELSA (2004).
a: With age controlled.
b: With age, current and past smoking, and overweight and obese controlled (lung disease controlled for age and current and past smoking only).
c: Based on 12-item EURO-D scale ≥4 for SHARE and eight item CES-D scale ≥3 for HRS and ELSA.

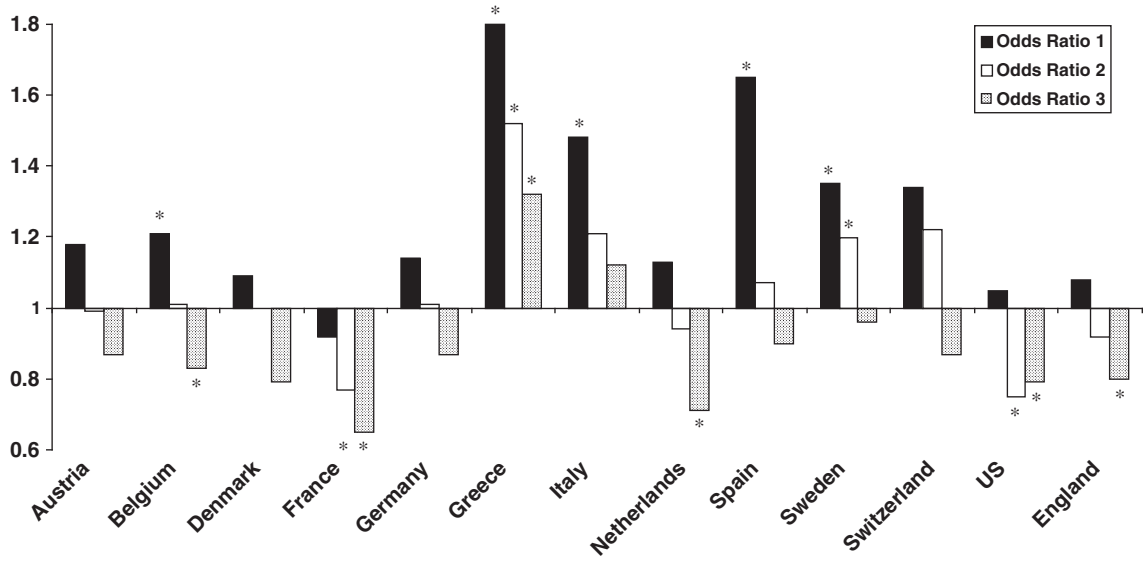

Figure 1 Odds ratios indicating effect of being female on reporting fair or poor self-rated health. Odds ratio 1 with age controlled, odds ratio 2 with age, diseases controlled and odds ratio 3 with age, diseases, functioning and ADL/IADL disability controlled. *$P < 0.05$

older women in both SHARE and ELSA. In SHARE overweight was more common among younger men; but the sex differential reversed at the oldest ages.

National differences in work status by gender are not related to national differences by gender in any of the diseases (see supplementary table). National level ORs indicating the relative likelihood of women being overweight are significantly related to the national level ORs indicating the relative likelihood that women will have heart disease ($r = 0.74$) (data in supplementary table). This suggests that greater national gender similarity in overweight is linked to greater similarity in heart disease, which would mean that women's heart disease levels more closely approach the higher levels for men. It is also true that higher national relative likelihoods of obesity for females are related to higher female relative likelihoods of having arthritis ($r = 0.63$), meaning that where women are relatively more obese, the levels of arthritis become relatively even higher. Finally, in countries where the relative likelihood of female current smoking is higher, the national ORs indicating the relative likelihood of females having lung disease are higher ($r = 0.59$), but the national ORs indicating the relative likelihood of females having hypertension are lower ($r = -0.66$).

Gender differences in self-rated health

We now turn to gender differences in self-rated health or subjective assessment of overall health which we assume reflects an overall assessment of one's health based on the presence of chronic conditions, and physical and mental functioning problems.[24] Our analysis controls for disease presence and functioning problems to determine how men and women with similar diseases and functioning would assess their health. With only age-controlled, a higher percentage of females than males in five countries reported having poor or fair health (table 3). When diseases are added to the equation, the odds of females rating their health poorly were still higher in Greece and Sweden, but became insignificant in Belgium, Italy and Spain. In France, with controls for the presence of diseases, males rated their health worse (figure 1). When indicators of functioning are added to the equation, the odds of females rating their health poorly were higher only in Greece, but males rated their health worse in five countries. The greater odds of women reporting poorer health appear to be explained by differences in both diseases, and functioning and disability. If men and women had the same disabilities and diseases, men in five countries would report worse health than women and in no country would women report worse health.

Discussion

From these primarily self-report data, one can conclude that some gender differences in some health indicators are quite uniform across these countries. Women in late middle and older age have worse functioning and higher IADL disability than men; but ADL disability is not as different for men and women. Arthritis is also clearly higher among women across these countries; however, the size of the gender difference in arthritis is linked to relative national levels of obesity for men and women. These results confirm differences widely found in the literature, but provide detail on the size of the difference observed across a large number of countries.

Since functioning and disability problems as well as arthritis are not major causes of mortality, they may be more prevalent among women because they live longer; although the lack of consistently stronger gender differences at the oldest ages does not support this. Longitudinal data indicating onset and survival by gender would be needed to clarify the process leading to these gender differences.

Women are also more likely to report depressive symptoms across these countries. This may reflect basic sex differences in emotion; or it may be related to women's living longer and experiencing more loss of family and friends, but again there is no consistently stronger effect at the oldest ages. On the other hand, the consistently higher prevalence of heart disease among men in these countries may reflect a nearly universally greater susceptibility of men to heart disease, which is not eliminated by control for men's greater smoking or their greater tendency toward overweight. While males have higher levels of heart disease in almost all countries, national gender differences in overweight affect the size of the gender difference in heart disease, adding support for the hypothesis that diet and fat may be related to the size of the sex difference in heart disease in Western countries.[7] Heart disease is the leading cause of mortality in this age range, and men have

higher mortality, indicating there would likely be even a larger sex differential in the presence of heart disease if many men had not succumbed to it.

While most countries had no gender differences in lung conditions, where they existed, they were eliminated with controls for smoking differences and that national level differences were linked to gender differences in smoking. The differences between the genders in diabetes and stroke were not as regularly observed as the above differences although more men tended to report both of these conditions. Similar to our findings, studies of diabetes based on measured glucose tolerance in areas in over 50 European countries have found the level for men higher in some places and that for women higher in other places.[25] From our analysis, it appears that without gender differences in weight, there would not be significant gender differences in diabetes in most European countries but they would remain in England and the USA.

The similarity among middle-aged and older men and women in stroke prevalence in some countries may be related to the reported higher prevalence of hypertension among women in many countries. A meta analysis of sex differences in stroke prevalence among those age 55 and over has assessed the male–female ratio as 0.71,[26] which is relatively close to what is observed in these data.

National levels of self-reported hypertension are also less clearly different by gender although where there are differences, women tend to report more hypertension. Other studies limited to the post-menopausal ages have reported that women have higher blood pressure.[27,28] The consistently stronger effect of being female at the oldest ages may be due to women's living longer with hypertension.

Our conclusions depend on whether men and women report their conditions, disability and behaviours in the same way. In general, research has shown relatively high agreement between the self-report and medical record report of some common medical conditions.[29,30] For example, relatively strong agreement is found for diseases such as diabetes,[31–33] stroke[31] and myocardial infarction.[33] A number of studies report no effect of gender on validity of self-report for various cardiovascular conditions.[29,34] However, it may be that medical personnel are less likely to diagnose heart disease in females, leading them to report differently. In at least one study, females have been reported to be less accurate in reporting diabetes than males.[35] Research comparing reporting of work disability in the USA and the Netherlands finds that in the USA, women use higher thresholds for determining work disability than men; in the Netherlands, there appears to be no gender difference.[36] This leads us to conclude that differential reporting or knowledge by gender may vary by condition and across countries.

The level of agreement between self-report and medical records for hypertension is generally thought to be lower than that for some other conditions.[33,34] However, comparison of measured blood pressure and self-reports of hypertension collected at the same wave in the ELSA and HRS samples indicates that levels using both measures are very close in both samples and that gender differences in the two measures are similar in both samples. Hypertension may, however, be underestimated in the SHARE countries, with perhaps only half reported in some countries.[37] During the 1990s, hypertension awareness among those with hypertension was higher for women than for men in a number of countries, so it is possible that some of the sex difference in hypertension found in this analysis for the SHARE countries may result from better reporting by women.[38]

It is also possible that using self-reports of height and weight may affect gender differences in levels of overweight and obesity. A comparison of gender differences in obesity using estimated corrections for misreporting and uncorrected self-reports for SHARE and HRS indicates that females reported more obesity in both series in all countries but one—the uncorrected figures for Denmark.[39–41] Using the corrected data, however, increases the excess obesity of females. When gender differences in overweight are compared in the corrected figures, the excess male overweight is somewhat reduced and females are more overweight than males in Spain and overweight is equal between the sexes in Greece. Without correction, overweight males exceeded females in all countries. Thus, we assume our use of uncorrected self-reports may underestimate the excess female obesity and overestimate the excess overweight of males.

Another limitation of our study is the differences in response rates across countries. In countries with very low response rates (e.g. Switzerland), the results could be less representative of the entire population. However, there is no evidence that gender differences are affected as response within country is fairly similar by gender.

Finally, we need to note that our analysis is based on cross-sectional differences in prevalence. Without longitudinal data, it is not possible to understand the processes that led to the observed gender differences in prevalence. A higher prevalence of health problems can result from either a higher rate of onset or a longer time lived with problems. Because men have higher mortality, they may have less disability because they live fewer years with their disability.[42] Current life tables for each of the countries examined here indicate that on average about one-third of men (33.1%) who are aged 50 will survive to age 85; this is true for about half (51.2%) of the women.[43] More men with diseases with high mortality have been selected out of the population and more women survive to the ages at which some debilitating and disabling conditions are more common. Sex differences in disease would differ if we had the whole history of disease presence for those who died as well as those who survived to be interviewed. We should note that recent analysis based on longitudinal data on onset of disease and disability over 2 years among the SHARE participants has indicated that men have a higher incidence of heart attack and stroke while women have a higher incidence of disability.[44]

Comparable surveys across a number of countries allow us to make generalizations that cannot be made with isolated surveys in individual countries or studies that address only one aspect of health. These 13 surveys provide convincing evidence that many gender differences at ages 50 and older in many aspects of health are similar in direction across countries although somewhat different in size, within a variety of cultural circumstances in Northern and Southern Europe, England and the USA. A number of the gender differences observed here fit with the conclusion that women are more likely to have conditions that disable. Differences in functioning, disability, depression and arthritis are non-mortal conditions that predominate among women. On the other hand, men have higher levels of heart disease, the major cause of mortality in these countries. But men do not have consistently higher levels of hypertension, stroke or diabetes. Whether these differences truly transcend cultures, will require examination of countries more different than those included here; how survival affects gender differences will require longitudinal data.

Supplementary data

Supplementary data are available at *EURPUB* online.

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Conflicts of interest: None declared.

Key points

- Gender differences in health vary across dimensions of health.
- Gender differences in specific dimensions are generally consistent in direction across these 13 countries.
- There is no consistent gender difference in self-rated health with disease, functioning and disability controlled.
- Men are more likely to smoke, be overweight and have heart disease; while women are more likely to have functioning problems, disability, depressive symptoms, arthritis and hypertension.

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