Health disparities in Europe's ageing population: the role of social network

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Abstract

Background: This study aims to investigate the impact of relative position in the educational hierarchy on poor self- rated health among elderly from 16 European countries. Further, the study determines whether relative educational position interacts with social network satisfaction regarding self-rated health (SRH). **Methods:** The study used cross-section data of individuals aged 50+ from the fourth wave of The Survey of Health, Ageing, and Retirement in Europe (SHARE). The outcome is poor self-rated health. All analyses are adjusted for age and stratified by gender. **Results:** The results from bivariate analysis showed that lower education was associated with poor SRH. For females, low satisfaction with social network was associated with poor SRH in all country groups. However, low satisfaction with social network predicted poor SRH only among males in West/Central and East Europe. The multivariable analysis showed an increased likelihood of poor SRH among those with relatively lower education as well as those with low satisfaction with social network in women from all country groups and men from West/Central and East Europe. However, we found an interaction effect between relative position in educational level and satisfaction with social network among male and female participants from North Europe. The health of individuals who are highly satisfied with their social network are more associated with socioeconomic status in Northern Europe. **Conclusion:** This study highlights the significance of social network and socioeconomic gradients in health among elderly in Europe.

Key-words: Self-rated health, Ageing, Europe, Social network, SHARE

Introduction

In times of population ageing and trends of decreasing family size, the density and functionality of social networks is becoming a key issue for health outcome and well-being in the ageing cohorts throughout Europe, across gender, socio-economic groups and countries with different welfare models. Several studies have revealed a significant influence of density and functionality of social networks and social isolation on health outcomes (1, 2) and confirm that well-being and social support are related to the quality and social density of relationships (3-5) and may be so particularly for the older segment of the population (5). Assuming that individuals' degree of happiness represents a certain state of emotional well-being, and that interpersonal environment influences emotional well-being, the degree of subjective well-being increases with the number of peoples constitute the immediate social context (6). This suggests that social network, considering both quantity and quality of networks, will affect an individual's degree of subjective well-being and self-rated health. Moreover, previous research suggests that social network may have a very different role in countries with different welfare regimes. Cross-national comparisons reveal closer intergenerational contacts in Southern and Eastern Europe with a family based welfare model compared to the Scandinavian with a universal welfare regime (7). Even though, the intergenerational contacts are less frequent in the Scandinavian countries and more old people live alone, several studies report larger satisfaction with the social network as compared to countries in Southern and Eastern Europe (8, 9). Previous studies have also shown that the impact of intergenerational contacts varies across socio-economic groups and that family ties for instance are denser among the less educated and partly compensate for lack of other resources, even in countries with strong public welfare institutions (10). Moreover, a great body of research has revealed large gender differences both in relation to subjective health and the importance of social networks (7, 11, 12). Hence we explore the extent to which social networks across genders, socio-economic position (level in the educational hierarchy) and countries with different welfare models, influence the subjective

well-being of people aged 50+ in 16 countries participating in the Survey of Health Ageing and Retirement in Europe.

The study aims to 1) assess the socioeconomic differentials in health among men and women; 2) examine the extent to which social network moderates this association ; 3) seek information on similarities and differences of the interplay between socioeconomic position, social network and health in countries with different welfare regimes in Europe.

Subjective well-being is an important clinical and societal outcome (13, 14). Measuring the subjective well-being of older people and identifying its determinants is becoming increasingly relevant in Europe, as a result of both rising life expectancy and growth in the population of the elderly population. The increasing interest in subjective well-being and self-rated health is also related with the gap between objective determinants of well-being and the laymen's own evaluation of it (13). However, previous studies indicate that self-rated health could be a good predictor of health outcomes, considering culture-specific differences (15-17). Moreover, socioeconomic position has been identified as a key determinant of poor well-being, with those currently experiencing socioeconomic disadvantage reporting poorer well-being (18, 19). Different dimensions of socioeconomic position, such as education, wealth, occupational or social class have been considered in research about social inequalities in health. However, occupational or social class as measurements of social inequality among elderly is controversial because some elderly women have never worked. Moreover, social class indicators based on occupation are inadequate for older people because the impact of occupation on health decreases with time since leaving the labor market (20). Educational qualifications have usually been used instead because they can be applied to all adults and are more stable throughout the life-course (21).

Research about the social determinants of health among older people has only recently started to integrate three different approaches that were usually studied separately: socio-economic position, family characteristics and social support (22). The current study is an attempt to do

such investigation among older people from 16 European countries. By conducting cross country analyses we further take into account that the effects can vary across different sociocultural contexts and welfare regimes (18, 23) and hence can be considered to moderate the influence of socioeconomic position on poor self-rated health (23).

Methods

Data

This study used cross-section of individual level data from releases 1.1.1 of the fourth wave of The Survey of Health, Ageing, and Retirement in Europe (SHARE) collected in 2010-2011 (24). SHARE is a bi-annual longitudinal survey with the aim to carry out international comparisons and analysis of economic and social issues related to ageing. This fourth wave consists of 40,129 households (58,489 individuals) surveyed in 16 countries (Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium, Czech Republic, Poland, Hungary, Portugal, Slovenia and Estonia). Countries were collapsed into four sub-categories, representing four welfare state regimes (see e.g. (25, 26), as North Europe (Sweden, Denmark), West and Central Europe (Germany, Austria, France, Belgium, Netherlands, Switzerland), East Europe (Czech Republic, Poland, Hungary, Slovenia, Estonia) and South Europe (Spain, Italy, Portugal).

The outcome variable is self-rated health. It is a common measure of health in empirical research (27, 28), especially when the focus is to assess the effect of social capital and social network on health (29, 30). A binary variable is created from the original five items (from bad to very good health) in which 0 is given to individuals reporting good or very good health, and 1 if worse health status is reported.

Education is used as the socioeconomic indicator in this study. Education level is measured on the International Standard Classification of Education Scale (ISCED-97) ranged from 0 (low) to 6 (High), making sure that this variable is internationally comparable between different European

countries in the study. ISCED-97 code 6 has not been used in all countries, e.g. in Sweden only 5 categories is available, where code 5 represent the highest education level.

In order to measure social networks in SHARE, the fourth wave of the survey introduced a new social network module that employed a direct approach for social network derivation (31). The social network module in SHARE uses a name generator for network identification and compiles a list of meaningful people in the life of the respondent. This list is subjective and is based on the interpersonal ties that are considered to be the most important to respondents and hence reflective of their personal ties. The interviewer asks a direct probe and the respondent supplies a list of names, in total up to seven, in response to the probe: "Over the last 12 months, who are the people with whom you most often discussed important things?" This question focuses the respondents to consider their confidants, persons with whom they interact, discuss things of relative importance, and maintain a degree of trust. In order to represent only the true confidents in a social network, respondents are limited to listing only seven persons. Satisfaction with network was divided into two questions distinguishing respondents with or without cited social network members. The derived network satisfaction variable combines the data from these two variables into one overall measure of satisfaction with the state of one's interpersonal network on a scale of 0-10, where 0 means completely dissatisfied and 10 means completely satisfied.

Statistical analysis

The proportion of poor self-rated health within categories of sociodemographic characteristics and social network was compared by means of chi-square test.

The socioeconomic status of an educational group is conceptualized as the group's relative position in the social hierarchy (Relative index of inequality, RII). This position is quantified as the proportion of the population that has a higher position in the social hierarchy and takes a value between 0 and 1 (32). For example, the highest educational group comprises 1.1% of the male population in South Europe. The relative position of its members would be between 0 and 0.011,

the average being 0.0055. This procedure is then continued for the rest of the educational categories, separately for each country group and gender. The RII scores were entered as an independent variable in our analyses and were related to poor self-rated health in logistic regressions. The regression coefficients of the relative educational position indicator and the standard error were used to calculate the probability of poor SRH which is the RII for poor SRH and can be interpreted as the probability of poor SRH moving from the top (0) to the bottom (1) of the educational hierarchy. The larger the probability, the greater the degree of inequality of poor health across the socioeconomic (education) hierarchy. We examined the interaction effect of RII by social network satisfaction. If the interaction was significant, marginal effect of RII and the incremental effect of social network satisfaction on poor self-rated health was estimated in the predicted probability metric, taking into account the interaction term. All analyses are conducted in each country group and stratified by gender. All statistical tests were two-sided with significance defined as a P value <0.05, and all analyses performed using STATA version 13.0 (StataCorp, College Station, TX).

Results

There were 54,751 individuals (23,943 male and 30,808 female) aged 50 and older included in the analysis. Mean age for the total population was 66,2±9,9 years (66±10 in West & Central, 67±10 in North, 66±10 in South, and 66±10 in East). The population was distributed equally across gender regarding age. Overall, 56% of the population were women and 44% were men. The proportion of those who reported poor SRH was lower in the younger age groups and this applies to both men and women across all country groups (table 2). The proportion of poor SRH was highest among those in the lowest educational category compared to the highly educated individuals across all country groups (Table 2). This finding was more pronounced among women where 69% in the lowest educational category reported poor SRH compared to 59% among men (Table 2). In total, there were significantly higher proportion of poor SRH among those with low social network satisfaction compared to individuals with high social network

satisfaction (40.8% vs. 38.7% for men and 44.8% vs. 43.5% for women, respectively, Table 2). For men, a higher proportion of individuals reported poor SRH among those with a smaller size of network than those with an extended network (42.0% vs. 38%, p<0.001, respectively). However, the proportion of poor SRH was not significantly different among women with a small social network compare to an extended social network (44.2% vs. 43.7%, respectively, Table 2).

The results from relative indices of inequality showed that when adjusted for age, the predicted probability of poor SRH is 0.26 greater among those in the lowest educational category compared to the highest (IRR=0.2598, p<0.001, Table 3). In other words, one unit shift from higher to lower education results in 26 percentage point increase in the probability of reporting poor SRH. After controlling for satisfaction with social network, the probability of poor SRH reduced 0.04 percentage point (0.2598 to 0.2594) among men, suggesting a buffering effect of social network satisfaction (Table 3). The stratified analysis by country group shows a null effect of social network satisfaction on poor SRH among men in North and South Europe (Table 3). However, a protective effect of high satisfaction with social network was found among male respondents from East Europe, where highly satisfied individuals were approximately 5 percentage point less likely to report poor SRH (Table 3). Similar pattern with slightly lower likelihood was found among male respondent from West and Central Europe, revealing 2.6 percentage point lower probability to report poor SRH among those with a lower, as compared to those with a higher satisfaction with their social network (Table3). A significant interaction between RII and social network satisfaction was found among male respondents from North Europe (Figure 1) where probability corresponding to one unit increase in RII was approximately double among those with high social network satisfaction than those with low satisfaction (28 vs. 14 percentage point, respectively). Among female respondents, a protective effect of high satisfaction with social network was found (Figure 2) and those who were highly satisfied were 1.5 percentage point less likely to report poor self-rated health (Table 3). The protective effect of high satisfaction with social network was highest among female respondents from Northern Europe (5.2 percentage point less likely to report poor SRH, Table 3). A

significant interaction effect between RII and satisfaction with social network among female respondents in North Europe (Figure 2) suggests a higher probability of poor SRH for lower educated individuals among those who are highly satisfied with their network compared to less satisfied respondents (29 vs. 14 percentage point, respectively, Table 3).

Discussion

The aim of this study was to assess the socioeconomic differential in poor self-rated health among men and women in old age from 16 European countries and specifically to investigate the moderating effect of social network in such association. In summary, the study suggests three key findings responding to the research questions. Socioeconomic inequalities in the poor self-rated health of individuals in old age were found on country level across all welfare regimes, but with different magnitude. The largest educational inequality in self-rated health was found among women in South Europe whereas the narrowest inequality was found among women in East followed by men in North Europe. Similar studies with specific focus on quality of life have been conducted using SHARE data (23, 33), in which the observed differences in quality of life between those with and without a limited illness as well as between the least and most educated individuals is reported. Similar to our findings, the influence of being poorly educated on quality of life in Greece, Italy and Spain was worse than experiencing limited illness (23). This study provides evidence on the association between satisfaction with social network and self-rated health among elderly. The protective effect of social network was considerable among females in general and more specifically among females in North Europe. This indicates that social networks are more important for the well-being of women and in line with findings showing that women are more active in maintaining social contacts, especially within the family (34). The results indicate that the satisfaction with the social networks is more correlated with good self-rated health in countries in the North. One possible explanation could that social networks become more important for well-being in countries where family based support is less common and not taken for granted. Previous studies based on SHARE has also shown that old people in

the Scandinavian countries are more satisfied with their social network despite less frequent contacts (7, 8) and report less loneliness despite less contacts and higher prevalence of living alone (9).

Berkman et al. have proposed a cascading causal process, through which social relationships influence health (35). They suggest that the causal connection is mediated by factors such as socio-cultural and environmental conditions as well as social support and access to material resources. While Berkman's model proposes a general relationship between social networks and health, prior studies show that there are social class differences in patterns of social interaction. Such patterns are culture-specific and vary within cultures by socioeconomic position and gender and thus may have different effects on health (36).

While our research on the interaction between socio-economic position and type of welfare regime revealed few significant results, we found an association between poor SRH and high satisfaction with social network among lower educated individuals in Northern Europe which was more pronounced among men. While prior research provided empirical evidence on the effect of social network on health among older Europeans (37), our unique contribution lies on the role of education and gender on such association. We speculate that it can be explained by reverse causality (11, 37, 38), suggesting that less healthy people are more likely to need and seek help from larger social networks than their healthier counterparts. This effect is more highlighted among lower educated elderly in Northern Europe in the current analysis because they demand more resources compared to higher educated individuals and also because they have the resources to do so due to the welfare regimes in Northern Europe. Another argument could be the fact that not all social contacts support and fosters well-being. Social networks can sometimes be perceived as emotionally demanding and become stressful, unwanted and unpleasant and, potentially result in worse health (11).

However, it is important to keep in mind that the data for this analysis is cross sectional. Consequently, we cannot identify the causal mechanism underlying the association between

poor SRH and higher social network satisfaction among lower educated individuals in Northern Europe.

A study by Chemaitelly *et al*. (39) highlights the importance of gender in analyzing social support and networks significance in women and men's self-rated health. That gender plays an important role is also shown in this study as the gap in poor SRH between high and low social network satisfactions was larger among men than in women in North Europe. A gender stratified study on the association between social network , group belonging and collective self-esteem shows that males were more likely than females to report negative collective self-esteem whereas females were more likely to report high positive collective self-esteem and therefore more satisfied with their social network and thus had better general health (40).

In conclusion, socioeconomic differentials in health and the effect of network satisfaction on poor self-rated health varies across European countries with different welfare regimes and differs by gender, which is in parallel with other finding on health and social support (39).

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Table 1: Distribution (%) of characteristics of the participants by country and sex

Men (n=23,943)	North EU	West and Central EU	East EU	South EU	Total
Age in years					
50-59	24.7	30.8	30.4	25.7	29.4
60-69	36.7	35.3	36.4	34.3	35.6
70-79	25.7	23.4	23.9	28.2	24.5
80-89	11.5	9.7	8.9	10.7	9.7
90 and more	1.5	0.8	0.4	1.1	0.8
Education (ISCED)					
0 (Low)	0.05	2.3	0.58	6.9	2.3
1	18.6	12.8	7.5	42.4	16.2
2	9.7	12.5	24.8	20.8	17.8
3	35.1	39.8	42.7	15.2	36.5
4	3.7	4.4	6.4	1.0	4.5
5	32.9	26.5	17.4	12.6	21.7
6 (High)	0	1.7	0.5	1.1	1.1
Self-rated health					
Good or very good	76	71	46	57	60
Poor	24	29	54	43	40
Social network					
Size in scale 0-7 (Mean±sd)	2.3±1.5	2.5±1.6	2.0±1.3	2.3±1.5	2.3±1.5
Satisfaction in scale 0-10 (Mean±sd)	9.1±1.3	8.6±1.4	8.7±1.6	8.8±1.5	8.8±1.5
Women (n=30,808)					
Age in years					
50-59	25.7	32.1	29.7	29.6	30.4

60-69	36.2	32.8	34.1	33.5	33.6
70-79	23.3	22.1	24.6	24.4	23.4
80-89	12.4	11.5	10.7	11.1	11.2
90 and more	2.3	1.6	0.9	1.5	1.4
Education (ISCED)					
0	0.09	3.2	0.9	9.9	3.2
1	20	17.7	13.6	47.9	21.0
2	13.1	19.3	24.6	18.0	20.6
3	26.2	35.8	37.5	11.5	32.1
4	4.4	2.8	8.4	1.4	4.7
5	36.3	20.2	14.7	10.9	17.9
6	0	1.0	0.3	0.4	0.6
Self-rated health					
Good or very good	72	68	42	49	56
Poor	28	32	58	51	44
Social network					
Size in scale 0-7 (Mean±sd)	2.9±1.6	2.9±1.7	2.4±1.5	2.5±1.5	2.6±1.6
Satisfaction in scale 0-10 (Mean±sd)	9.2±1.3	8.8±1.3	8.8±1.6	8.9±1.4	8.8±1.4

Table 2: Percentage (%) of poor self-rated health within categories of sociodemographic characteristics and social network, by country and gender

Men	West and Central EU	North EU	South EU	East EU	Total
Age in years					
50-59	23 ***	16 ***	26 ***	43 ***	30 ***
60-69	25	19	41	51	36
70-79	34	29	50	66	47
80-89	48	42	64	75	59
90 and more	59	48	71	76	64
Education (ISCED)					
0 (Low)	54 ***	-	62 ***	66 ***	59 ***
1	46	39 ***	52	66	52
2	34	31	35	64	48
3	29	22	26	50	36
4	14	19	28	61	38
5	19	16	35	43	27
6 (High)	25	-	25	45	28
Social network: size					
Small	32.5 ***	24.0	43.0	53.1	42.0***
Extended	27.5	24.0	42	55.7	38.0
Social network: Satisfaction					
Low	30.9***	25.1	44.9	57.6***	40.8**
High	27.8	23.1	41.6	52.7	38.7
Women					
Age in years					
50-59	23 ***	19 ***	35 ***	44 ***	32 ***

60-69	26	23	46	52	38
70-79	39	33	64	72	55
80-89	51	47	76	80	64
90 and more	52	52	69	82	62
Education (ISCED)					
0	61 ***	-	77 ***	67 ***	69 ***
1	47	41 ***	59	69	56
2	34	38	40	69	50
3	27	28	29	52	38
4	15	32	36	61	46
5	22	17	38	41	28
6	19	-	26	44	25
Social network: size [b]					
Small	35.5***	31.2*	55.4***	56.9	44.2
Extended	28.4	25.8	49.8	58.3	43.7
Social network: satisfaction [b]					
Low	32.9**	31.0*	54*	60.4***	44.8*
High	30.7	26.3	50	56.6	43.5

Table 3: Predicted probability of poor self-rated health, by country group

Men	West and central EU	North EU	South	East	Total
Model 1					
RII	0.2835***	0.2245***	0.2629***	0.2349***	0.2598***
Model 2					
RII (main effect)	0.2818***	0.2252***	0.2648***	0.2332***	0.2594***
RII (main effect, stratified by satisfaction with social network)					
Low satisfaction social network	0.2555***	0.1416**	0.2475***	0.2477***	0.2389***
High satisfaction social network	0.3025***	0.2857***	0.2739***	0.2248***	0.2729***
High satisfaction with social network (main effect)	-0.026**	**-0.031**	**-0.0323**	-0.0500***	-0.020***
p-value for RII × Satisfaction with SN	0.05	0.015	0.57	0.49	0.079
Women					
Model 1					
RII	0.2614***	0.2323***	0.3364***	0.2125***	0.2497***

Model 2					
RII (main effect)	0.2612***	0.2365***	0.3411***	0.2135***	0.2504***
RII (main effect, stratified by satisfaction with social network)					
Low satisfaction social network	0.25***	0.14**	0.2875***	0.1863***	0.2194***
High satisfaction social network	0.26***	0.29***	0.3644***	0.2268***	0.2674***
High satisfaction with social network (main effect)	-0.025**	-0.052**	-0.038**	-0.035***	-0.0146**
p-value for RII × Satisfaction with SN	0.41	0.007	0.13	0.27	0.01

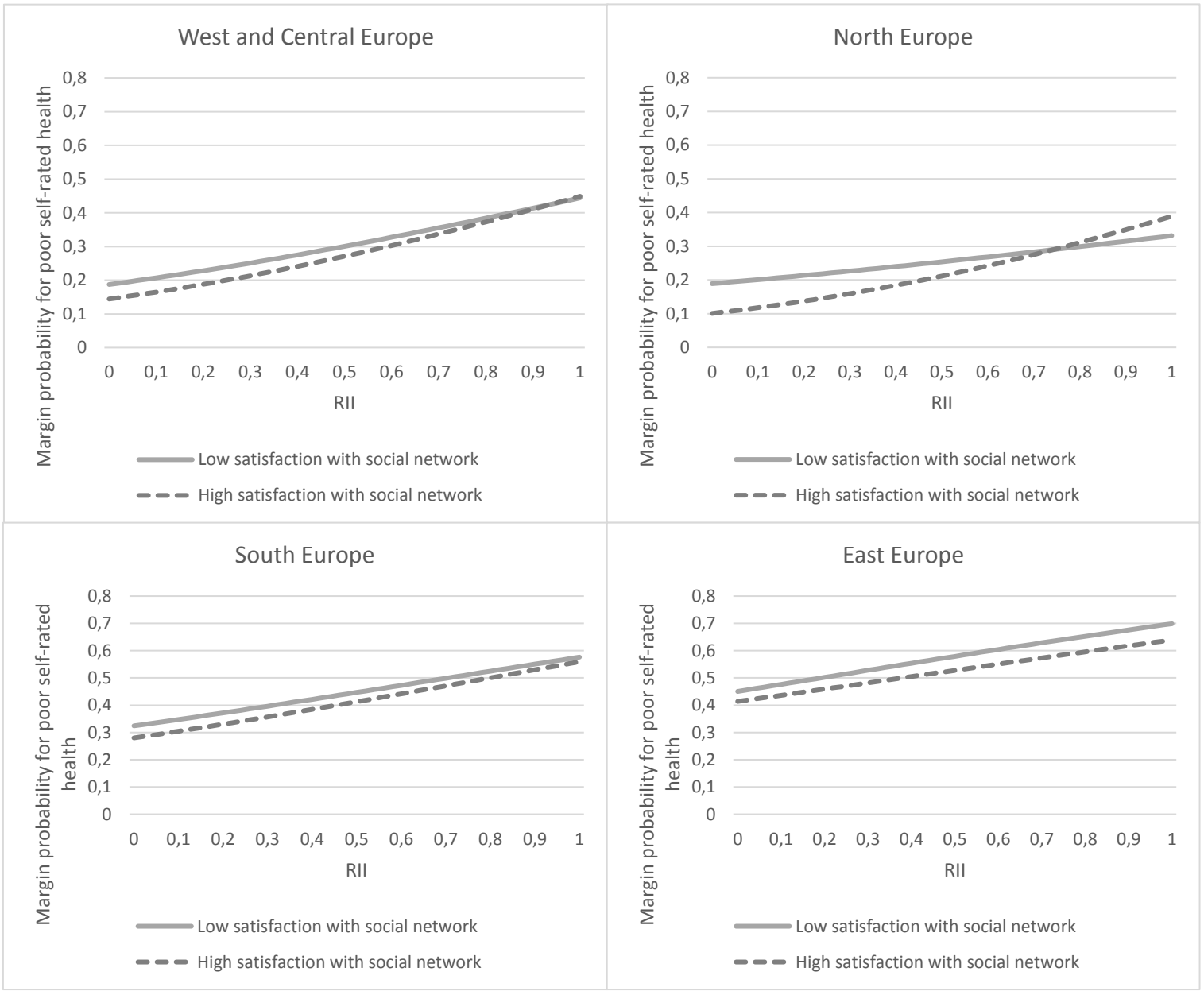

Figure 1: Margin probability for poor self-rated health by satisfaction with social network among males in different country groups

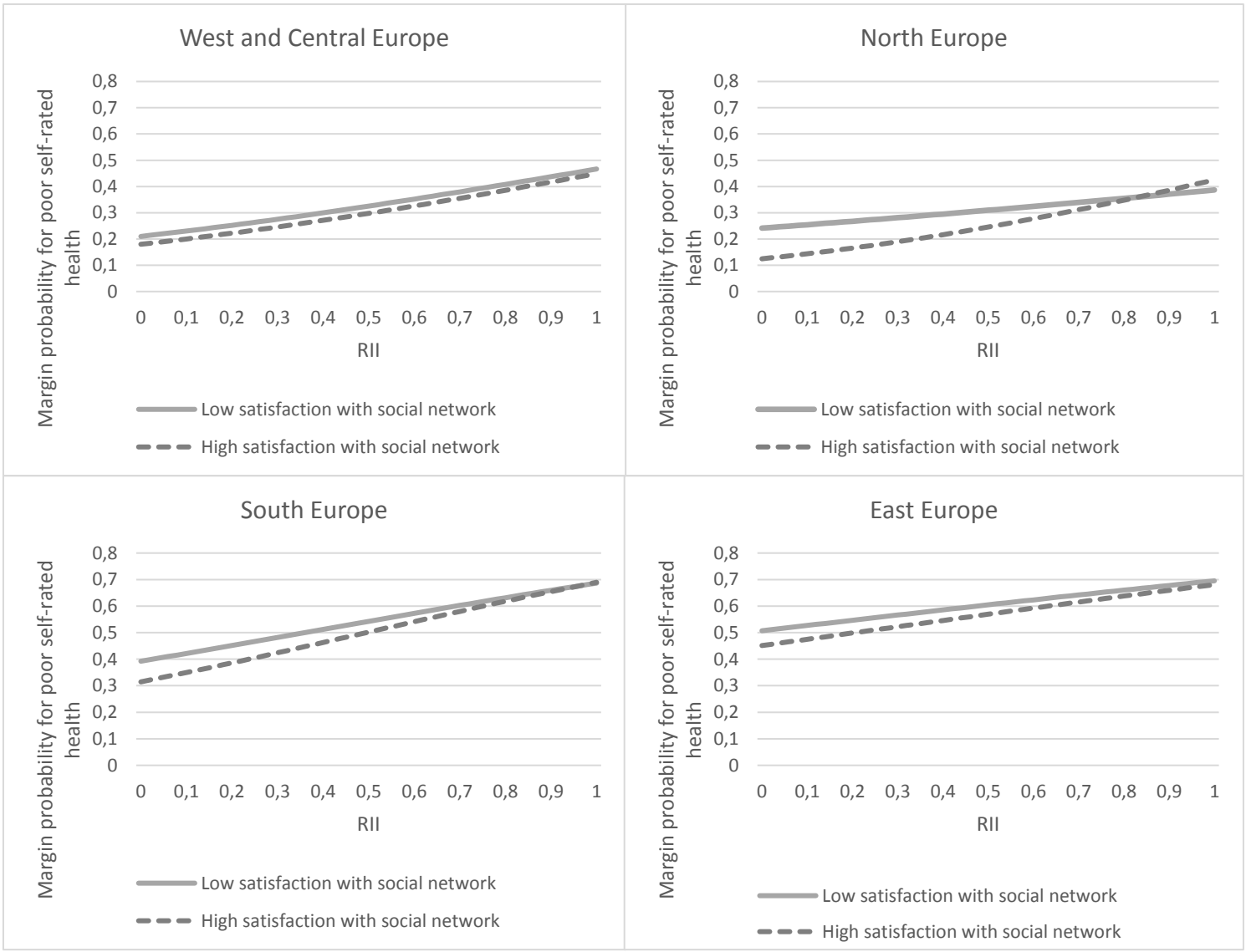

Figure 2: Margin probability for poor self-rated health by satisfaction with social network among females in different country groups