## ORIGINAL PAPER
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# Social isolation and well-being among older adults in Europe

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Κοινωνική απομόνωση και ευεξία μεταξύ των ηλικιωμένων ατόμων στην Ευρώπη

*Περίληψη στο τέλος του άρθρου*

OBJECTIVE **To examine the distribution of different elements of social isolation according to background characteristics at the individual and country level, and investigate whether social isolation is associated with well-being outcomes among European older adults.** METHOD **This was a secondary data analysis of participants aged ≥65 years (n=5,129), who took part in the first wave of the Survey of Health, Aging and Retirement in Europe, 2004/5 (SHARE). Well-being was determined by the clustering of six indicators comprising life satisfaction, quality of life, self-rated health, depressive symptomatology, chronic diseases and body mass index (BMI). Social isolation was determined using seven specific aspects of older people's living conditions.** RESULTS **Analysis of covariance showed that a significantly higher mean score of well-being was attested among adults with frequent parent-child contact (p=0.028) and at least one social or productive involvement (p=0.001). Multiple logistic regression analysis indicated a significantly lower likelihood of displaying ≥4 well-being outcomes among the oldest-old, the retired and socially disengaged and a higher likelihood for the most highly educated respondents and those involved in rare or no social support exchanges. Northern Europeans were more likely to indicate more well-being outcomes and less social isolation indicators than their southern counterparts.** CONCLUSIONS **These cross-sectional findings offer empirical support to the social structure of social isolation and its potentially adverse effect on specific well-being outcomes in old age. Public health and social policies are needed to better address the potential well-being implications of social isolation among European older adults.**

The transition from middle age to older age has been closely related to social aging due to the occurrence of several changes at both the individual and the family level. Firstly, the transition from late adulthood to older age is marked by the process of changing from labor force participation to retirement and is thus possibly accompanied by the disruption or relinquishment of previous work and social roles.[1] Equally important is the trajectory from parenthood to the "empty nest" phase, involving the potential attenuation of kinship interactions and connections.[2] Other profound age-associated challenges involve emotional pain and stress as a result of the death of loved ones and the subsequent losses in identity and attachments inherent in enduring family and friendship ties.[3,4] A specific age-related pattern with regards to the onset and progression of conditions relevant to health decline and compromised physical functioning is typical of old age and has been consistently ascertained in gerontology research.[5] In this regard, various psycho-social resources, such as social bonds, supportive social networks and social engagement, are thought to make up for the aforementioned negative states and have been used to determine how successfully people manage to age and thrive in the later-life setting with respect to health and well-being.[6,7] It is well established that individuals who are socially integrated and strongly attached to groups and affiliations are more likely to be healthier, live longer[8] and report positive well-being outcomes.[9] Social relations, assessed by specific elements of social support, have been documented to mediate the adverse effects of socio-economic status on subjective health in middle and older age.[10] Family and social connectedness have also been found to hold a central role in older people's perception of what "good quality of life" actually constitutes.[11]

The objective state whereby a person undergoes a dearth or deficiency of meaningful social relationships, referred to as social isolation,[12] has been identified by most psychological and sociological research as a discrete

health and mortality risk factor. Several aspects of social isolation have been shown to account for the unequally patterned distribution of health and well-being outcomes in older adults.[13,14] In particular, solitary living, a limited family network, lack of social support, social disengagement and loneliness have been proposed as potential risk factors for coronary heart disease,[15] cognitive impairment,[16] functional decline,[17] depressive symptomatology,[18] and low subjective well-being[19] in older age. Less is known, however, about how the absence of social and family resources pertaining to social isolation is implicated in the configuration of the various domains of well-being in older age. Furthermore, most research to date has focused on single countries or regions[20,21] rather than examining social isolation and well-being using cross-nationally comparable data. Additionally, relevant earlier gerontological and social studies have measured well-being using single measures or indicators, such as life satisfaction[22] or quality of life.[23] There is therefore a lack of a robust evidence base on the role of social isolation in the welfare of older adults.

Drawing on international comparative data on older community-dwelling adults in eleven European countries, the present study aimed to (a) conduct a cross-national appraisal of social isolation in older adults; (b) examine the association of social isolation with several well-being outcomes, and (c) determine whether the above hypothesized associations differ by country of residence. To overcome earlier barriers to measuring the constructs of interest,[24] social isolation was operationalized as an index comprising both structural and functional features, while well-being was operationalized as a multifaceted outcome, integrating distinct physical, emotional and psychological components of the welfare of older adults.

## MATERIAL AND METHOD

### Participants and questionnaires

This study utilized data from the first wave of the cross-national Survey of Health, Ageing and Retirement in Europe (SHARE, http://www.share-project.org), initially conducted between 2004–2006 in eleven European countries (Denmark, Sweden, Austria, France, Germany, Switzerland, Belgium, the Netherlands, Spain, Italy and Greece). The participants were adults aged ≥50 years, residing in the community, including their partners irrespective of age. The multidisciplinary approach of SHARE allowed for the delivery of a thorough account of health, socio-economic, familial and other domains of the living conditions of European middle-aged and older adults.[25]

Nationally representative probability samples were achieved based on country-specific sampling resources. The sampling de-

signs varied from stratified-simple, random sampling or multistage sampling (in countries where national population or regional/local registers were available), to single or multistage sampling (in countries where telephone directories were obtained). Sample weights were also estimated and provided to account for the complex sample design and counterbalance non-response. Most of the data collection was carried out by computer assisted personal interviews (CAPI), further supplemented by "drop-off" self-completed paper and pencil questionnaires. Details on sampling procedures, response rates, data collection and questionnaires are provided elsewhere.[26] For the purposes of the current study, analysis focused on individuals aged ≥65 years, comprising a sample of 2,366 males and 2,763 females (n=5,129).

### Measures

A major premise for identifying older people who endure a state of social isolation pertains to inquiring into social disconnectedness and deprivation of social support networks.[27] Following a widely-held definition of social isolation[28] as *"an objective measurable state of having minimal contact with other people, such as family, friends or the wider community"*, questions on essential structural and functional attributes, inherent in older people's objective familial and social settings, were administered. In particular, the structural aspect of social isolation was construed using living arrangements, marital status, number of children and family-related interactions, defined in terms of parent-child contacts and geographical proximity to offspring. The functional facet of social isolation was determined by considering social disconnectedness, gauged by the absence of any kind of social and productive activity involvement, and lack of social exchanges, measured as the occurrence of rare or no transfers of any form of functional assistance or support between older parents and their adult offspring.

An index of social isolation was then constructed, with participants being assigned one point if they lived unpartnered *(not residing with a partner or spouse)*, were unmarried, had no children, did not cohabitate with their offspring *(all children residing in a separate household/building or at a distance more than 1 km away)*, declared infrequent parent-child contact *(having any kind of contact either personally, by phone or mail, less than once a month or never during the past twelve months)*, exhibited social disengagement *(not having done voluntary or charity work, cared for a sick or disabled adult, provided help to family, friends or neighbors, attended an educational or training course, gone to a sport, social or other kind of club, taken part in a religious organization, taken part in a political or a community-related organization in the last month)* and were involved in infrequent or no social support exchanges *(given and/or received any kind of social support less than once a month or never the last twelve months)*. The final, total clustering index ranged from 0 to 7, with older people presenting with 4+ indicators being considered to experience a higher level of social isolation.

Well-being was operationalized drawing upon the current conceptual and methodological understanding of well-being, as outlined above, and building on the idea that *"well-being*

constitutes an area of research and practice that has objective and subjective components, and that social scientists cannot make rational evaluations of well-being as a state, unless both are taken into account".[29] Thus, well-being was construed along six related, yet distinct, indicators, comprising: Life satisfaction, determined by a four-rating single question; quality of life, measured on the Control, Autonomy, Self-realization, Pleasure (CASP-12) scale; psychological distress, using the Center for Epidemiological Studies of Depression (CES-D 11) questionnaire; self-rated health, defined by a four-item question; presence of chronic diseases (11 health conditions); body mass index (BMI), estimated according to the World Health Organization (WHO) criteria.[30] Advanced well-being was equated with high quality of life (CASP-12 score of ≥39 points), absence of psychological distress (CES-D 11 score of <9 points), very good self-rated health, high satisfaction with life, no or one chronic health condition and normal BMI (18.5–24.9 kg/m$^2$).[9] The accumulation of multiple well-being indicators, as indicated by a clustering score of 4+, was regarded to suggest the presence of a high level of well-being.

The demographic characteristics of gender and age *(years)* and the socio-structural resources of educational attainment *(total years of schooling)*, household income *(gross income in the last year)* and retirement status *(not retired/retired)* were assessed as potential determinants of social isolation and well-being. Possible regional variations in the role of social isolation in the accumulation of well-being outcomes were examined by classifying the European regions geographically into northern *(Denmark, Sweden)*, central *(Austria, Belgium, France, Germany, the Netherlands, Switzerland)* and southern *(Greece, Italy, Spain)*.

## Statistical analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS) software (IBM SPSS Statistics for Windows, version 23.0; IBM Corp, Armonk, NY). Weights were applied, adjusted for non-response and according to the complex sampling design of the survey. The prevalence (weighted %) of social isolation indicators and their clustering (0, 1, 2, 3 or 4+) was examined according to the participants' socio-demographic characteristics *(gender, age, education status, household income, retirement status)*, with the corresponding 95% confidence intervals (95% CIs), and by country, with the significance of differences evaluated by Chi-square tests of independence (p-values determined based on the adjusted-F statistic). The mean well-being score was estimated according to the presence and clustering of social isolation indicators (as none, 1, 2, 3 and 4+), using analysis of covariance, following the complex multistage stratification sampling design procedures of the study, with gender, age (years), education status (years), household income, retirement status and European region (northern, central, southern) as covariates. The weighted prevalence (and 95% CIs) of each well-being variable for respondents with 4+ social isolation indicators was estimated at the country level. Multiple logistic regression analysis was applied for older adults displaying multiple well-being outcomes (4+), compared with those with

none, 1, 2 or 3 indicators. Two models were performed to compute adjusted odds ratios (ORs) in order to estimate (a) the role of socio-demographic characteristics and European regions, and (b) the aggregate association between socio-demographics, European regions and social isolation indicators and the accumulation of well-being outcomes. The test of parallel lines was computed by the 2 log-likelihood function and logit was applied as a link function. Nagelkerke pseudo R estimators were 0.076 and 0.101 in the two models, respectively. Simple linear regression analysis was used to illustrate graphically the well-being (WB) and social isolation (SI) ratios (WB:SI ratios) in each European country. This ratio illustrates the rational relation between well-being and social isolation indicators, with a ratio of 1.00 or almost 1.00, indicating similar prevalent levels of well-being and social isolation, and a ratio of greater than 1.00 denoting a higher occurrence of well-being outcomes relative to social isolation indicators.

## RESULTS

## Socio-demographic characteristics

The socio-demographic characteristics of the participants are presented in table 1. More than half of the partici-

**Table 1.** Descriptive characteristics of 5,129 adults, aged ≥65 years in the SHARE study (2004/05).

| Characteristics | n | % |
|---|---|---|
| *Gender* | | |
| Males | 2,366 | 46.1 |
| Females | 2,763 | 53.9 |
| *Age (years)* | | |
| 65–74 | 3,097 | 60.3 |
| 75–84 | 1,701 | 33.2 |
| ≥85 | 331 | 6.5 |
| Mean±standard deviation (min–max) | 73.6±6.6 (65–99) | |
| *Education (years)* | | |
| 0–7 | 2,202 | 43.2 |
| 8–12 | 1,629 | 32.0 |
| ≥13 | 1,262 | 24.8 |
| Mean±standard deviation (min–max) | 9.0±4.5 (0–21) | |
| *Retirement status* | | |
| Retired | 4,228 | 82.4 |
| *Income** | | |
| Lower quartile | 1,808 | 35.3 |
| *European regions* | | |
| Northern | 874 | 17.1 |
| Central | 2,674 | 52.1 |
| Southern | 1,581 | 30.8 |

*Income was classified using country-specific quartiles for all participants in the SHARE survey in 2004/05

pants (53.9%) were females. The mean age was 73.6 years (SD [standard deviation]: 6.6; range 65 to 99 years). The majority of participants (75.2%) had received 0–7 years of education or had attended high school. The vast majority of participants (82.4%) were in retirement, and over one third (35.3%) were classified as low-income individuals. The central European region represented the majority (52.1%) of the surveyed SHARE population.

## Social isolation according to socio-demographic characteristics and country

Table 2 demonstrates the prevalence of social isolation indicators, and their clustering, according to socio-demographic characteristics. The majority of participants (53.5%) lived unpartnered, a characteristic considerably higher in females than in males (54.1 vs 27.4%, p<0.001) and in the oldest age group (86.8%, p<0.001), compared to the younger age groups (86.8 vs 41.8 vs 64.6%, p<0.001). The prevalence of older adults living unpartnered was greater among those with the fewest years of education and the lowest household income (p=0.001). Being unmarried and childless was more common among highly educated individuals and the lowest-income group (p=0.001). Parent-child geographic distance was more common among females and retired participants and less prevalent in the highest household income group. Social disengagement (no activity participation) was prevalent for the majority of participants (60.9%), with higher prevalence among the oldest age group (p=0.002), participants with the lowest educational attainment and household income (p<0.001) and retired participants (p=0.045). Infrequently or never

**Table 2.** Prevalence of social isolation indicators according to socio-demographic characteristics in 5,129 adults, aged ≥65 years in the SHARE study.

| Social isolation indicators | | n | Weight % (95% CIs) | Males | Females | 65–74 | 75–84 | ≥85 | 0–7 | 8–12 | ≥13 | Low | Average | High | Not-retired | Retired |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Total** | **Gender** | | **Age (years)** | | | **Education status (years)** | | | **Household income** | | | **Retirement status** | |
| | | | | | | | | | **Weight %** | | | | | | | |
| Living without partner or spouse | | 2,296 | 53.5 (51.1–55.8) | 27.4 | 54.1* | 41.8 | 64.6 | 86.8* | 48.2 | 39.8 | 38.1* | 68.5 | 36.7 | 17.8* | 36.3 | 46.9* |
| Being unmarried | | 280 | 5.5 (4.4–6.8) | 7.8 | 9.2 | 6.9 | 4.2 | 1.0 | 3.3 | 9.7 | 11.7* | 12.5 | 8.2 | 4.4* | 10.2 | 7.0* |
| Childless | | 659 | 15.0 (13.3–16.9) | 17.2 | 14.7 | 14.0 | 15.9 | 18.6 | 13.8 | 14.1 | 18.5* | 21.1 | 15.1 | 10.7* | 15.2 | 16.5 |
| Parent-child contact: Less than once a month or never | | 92 | 2.3 (1.6–3.3) | 3.0 | 2.0 | 2.7 | 1.9 | 1.3 | 1.9 | 2.2 | 3.0 | 3.0 | 2.2 | 2.4 | 2.4 | 2.6 |
| All children living >1 km | | 3,435 | 59.7 (57.3–62.0) | 47.5 | 51.2* | 60.0 | 60.8 | 52.6 | 48.0 | 48.6 | 51.3 | 51.2 | 51.8 | 42.6* | 41.0 | 57.7* |
| No activity participation | | 2,633 | 60.9 (58.6–63.1) | 53.0 | 55.5 | 55.3 | 65.8 | 78.9* | 67.0 | 54.5 | 44.6* | 63.6 | 53.5 | 44.3* | 49.6 | 58.9* |
| Social exchange: Almost never | | 3,381 | 66.3 (63.9–68.6) | 69.9 | 62.5* | 71.3 | 62.3 | 48.6* | 70.9 | 64.5 | 63.2* | 65.5 | 65.6 | 67.0 | 65.3 | 66.5 |
| Clustering of social isolation indicators | None | 71 | 1.7 (1.2–2.4) | 5.8 | 3.8 | 2.4 | 0.7 | 1.0 | 2.0 | 5.5 | 6.2 | 1.2 | 4.4 | 9.8 | 7.4 | 2.2 |
| | 1 | 725 | 11.3 (10.1–12.7) | 19.3 | 14.4 | 13.9 | 8.7 | 5.0 | 12.7 | 17.7 | 19.0 | 7.9 | 17.4 | 26.4 | 20.0 | 13.5 |
| | 2 | 1775 | 31.2 (29.1–33.4) | 35.0 | 31.2 | 34.2 | 28.1 | 24.2 | 34.1 | 31.9 | 32.9 | 27.8 | 34.5 | 36.4 | 33.8 | 32.2 |
| | 3 | 1792 | 36.8 (34.4-39.2) | 26.6 | 33.1 | 32.5 | 41.6 | 45.4 | 34.2 | 30.7 | 26.4 | 36.8 | 30.3 | 21.1 | 25.8 | 34.3 |
| | 4+ | 752 | 19.0 (16.9–21.2) | 13.4 | 17.5* | 17.0 | 20.9 | 24.4* | 17.0 | 14.2 | 15.5* | 26.3 | 13.4 | 6.4* | 13.1 | 17.9* |

Weight percentages were estimated according to the complex sampling design of the study
Chi-square tests (of independence based on the adjusted F): *p<0.05
95% CIs: 95% confidence intervals

being involved in any kind of supportive exchange was more prevalent in males, participants in the youngest age group and those with the fewest years of education. Social isolation, as measured by the clustering of 4+ indicators, was significantly more prevalent in females, compared to males (17.5% vs 13.4%, p=0.003), those in the oldest age group, those with the lowest educational attainment and household income, as well as participants who were retired.

The prevalence of social isolation indicators, including also their clustering, by European country, are presented in table 3. Austria presented the highest prevalence of single-person households. The highest prevalence of adults who declared never having married was observed in Sweden (16.8%), and the lowest in southern Europe (3.3% in Spain and Italy and 5.7% in Greece). Germany exhibited the highest proportion of childless adults (18.6%) and those maintaining infrequent or no contact with their offspring (3.7%), while the lowest prevalence of having no offspring contact was observed in Greece (0.5%). Geographical distance between participants and their adult children varied between countries but was generally lower in southern Europe, and highest in Denmark (72.3%). In contrast, activity disengagement was highest in two southern European countries, namely Spain (70.5%) and Italy (68.6%), and lowest in Switzerland (31.3%). Prevalence of lack of support and social exchange was also highest in Spain (78.3%). Clustering of social isolation indicators was highest in Austria (19.4%) and generally more prevalent in adults from northern and central European countries (except for Switzerland, the Netherlands and Belgium). Greece was the only country where the prevalence of social isolation (4+ indicators) was lower than 10%.

## Well-being outcomes according to social isolation indicators

The mean well-being scores according to the various different social isolation indicators and their clustering are presented in table 4. Participants who lived with a partner and those who contacted their offspring daily or almost once a month had significantly higher total well-being scores, compared to those who lived without a partner (1.90 vs 1.69, p=0.007), and those who reported less frequent or no parent-child contact (1.80 vs 1.40, p=0.028), respectively. Social engagement was also significantly related to well-being, with active participants in any kind of social or productive involvement displaying a considerably higher mean well-being score than their socially disengaged counterparts (1.93 vs 1.70, p=0.001). In contrast, those who exhibited frequent social exchanges had a lower mean

score of well-being than participants who lacked social support (1.66 vs 1.85, p=0.007). Socially isolated participants, as measured by the clustering of 4+ indicators, had the lowest mean well-being score, compared to less isolated individuals, but this association was weak.

Ancillary analysis of the association between individual well-being outcomes and social indicators revealed that the proportion of participants with a low depression score (69.2%) (p<0.001) reported very good health (9.9%) (p<0.001), satisfaction with life (33.2%) (p=0.012), and less than two chronic conditions (46.1%) and had a normal BMI (35.2%) (p<0.001) was substantially greater among those living with a partner, than those living without a partner or spouse. In addition, a higher proportion of participants who were socially active, compared with those who were not, had a low depressive score (p<0.001), very good health (p<0.001), life satisfaction (p<0.001) and less than two chronic conditions (p=0.001). Lastly, a significantly higher proportion of participants who were infrequently or almost never involved in supportive exchanges (59.8%), compared with those reporting having provided and or received any kind of social support at least once a month over the last year (52.5%), did not report having psychological distress. A greater proportion of participants who had frequent exchanges of social support, compared with those with rare or no support provision or receipt, reported being very satisfied with their life and having less than two chronic diseases (29.7% vs 24.1%, p=0.002 and 44.6% vs 38.7%, p<0.001, respectively).

The associations between socio-demographic variables, social isolation indicators and the presence of 4+ well-being outcomes, examined via multiple regression analysis, are presented in table 5. Gender, age, educational attainment, retirement status and European region were independent predictors of well-being clustering in both regression models, with participants of female gender, higher age, retired and living in the central and southern Europe being less likely to demonstrate multiple indicators of well-being, relative to males, younger respondents, non-retired and northern Europeans, respectively. Adults with more years of schooling had higher odds of presenting 4+ well-being indicators in both the first (1.79; 95% CI: 1.18–2.72) and the second (1.74; 95% CI: 1.15–2.64) models. Activity involvement and social engagement were also predictors of well-being clustering in the second model, with the likelihood of exhibiting accumulated well-being outcomes being lower among participants with no activity involvement (0.51; 95% CI: 0.38–0.68) and higher among those who reported being involved in rare or no exchanges of social support (1.49; 95% CI: 1.07–2.08).

**Table 3.** Prevalence of social isolation indicators according to European country in 5,129 adults, aged ≥65 years in the SHARE study.

| Social isolation indicators | | Austria | Belgium | Denmark | France | Germany | Greece | Italy | Netherlands | Spain | Sweden | Switzerland |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Weight % (95% CIs)** | | | | | | |
| Living without partner or spouse | | 47.8 (44.4–51.2) | 35.6 (32.8–38.5) | 40.2 (36.0–44.4) | 39.5 (35.3–43.9) | 43.2 (39.6–46.9) | 44.8 (41.5–48.1) | 41.2 (36.7–45.8) | 38.7 (35.2–42.3) | 41.9 (38.0–45.9) | 42.5 (39.1–45.9) | 35.8 (30.7–41.2) |
| Being unmarried | | 11.1 (9.2–13.4) | 9.5 (7.9–11.4) | 14.8 (12.0–18.0) | 11.7 (9.1–14.9) | 12.2 (9.9–15.0) | 5.7 (4.3–7.4) | 3.3 (1.9–5.7) | 8.2 (6.3–10.5) | 3.3 (2.0–5.5) | 16.8 (14.2–19.7) | 10.5 (7.6–14.4) |
| Having no children | | 16.7 (14.3–19.4) | 12.1 (14.2–10.3) | 12.3 (9.7–15.5) | 13.2 (10.5–16.4) | 18.6 (15.8–21.7) | 12.9 (10.9–15.3) | 15.2 (12.0–18.9) | 14.2 (11.8–17.0) | 16.6 (13.8–20.0) | 11.3 (9.2–13.7) | 15.8 (12.2–20.2) |
| Parent-child contact: Less than once a month or never | | 3.3 (2.3–4.8) | 2.3 (1.5–3.4) | 1.4 (0.7–2.8) | 2.4 (1.4–4.1) | 3.7 (2.6–5.5) | 0.5 (0.2–1.3) | 1.7 (0.8–3.9) | 1.9 (1.1–3.3) | 1.9 (1.0–3.6) | 1.3 (0.7–2.4) | 2.9 (1.6–5.3) |
| All children living >1 km | | 52.7 (49.3–56.0) | 63.5 (60.6–66.3) | 72.3 (68.2–76.0) | 64.4 (60.1–68.4) | 53.3 (35.5–42.0) | 49.7 (56.9–38.7) | 36.1 (31.9–40.5) | 64.6 (61.2–67.8) | 34.9 (31.3–38.6) | 71.4 (68.2–74.4) | 55.8 (50.2–61.2) |
| No activity participation | | 48.4 (45.0–51.7) | 39.2 (36.3–42.2) | 34.7 (30.7–38.9) | 45.4 (41.1–49.9) | 52.6 (49.0–56.1) | 42.4 (39.2–45.7) | 68.6 (64.4–72.4) | 36.1 (32.9–39.4) | 70.5 (66.8–73.9) | 34.7 (31.6–37.9) | 31.3 (26.4–36.6) |
| Social exchange: Almost never | | 66.3 (63.0–69.4) | 52.6 (49.6–55.6) | 58.1 (53.8–62.3) | 65.4 (61.1–69.5) | 60.6 (57.0–64.1) | 68.8 (65.7–71.8) | 70.2 (65.9–74.2) | 58.6 (55.0–61.9) | 78.3 (74.9–81.5) | 61.7 (58.4–64.8) | 62.4 (56.9–67.6) |
| Clustering of social isolation indicators | None | 4.3 (3.1–5.9) | 7.0 (5.7–8.7) | 3.6 (2.2–5.7) | 3.2 (2.0–5.1) | 5.5 (4.2–7.1) | 4.6 (3.5–6.2) | 4.9 (3.6–6.7) | 5.7 (4.3–7.6) | 3.4 (2.3–5.1) | 3.9 (2.8–5.3) | 5.1 (3.1–8.2) |
| | 1 | 17.8 (15.3–20.6) | 22.8 (20.4–25.3) | 20.0 (16.8–23.7) | 19.0 (15.8–22.7) | 16.1 (13.8–18.6) | 19.9 (17.4–22.7) | 15.5 (12.9–18.6) | 20.6 (18.2–23.2) | 11.7 (9.6–14.3) | 19.5 (17.2–22.0) | 23.6 (19.2–28.7) |
| | 2 | 29.0 (26.0–32.1) | 31.7 (29.0–34.5) | 33.8 (29.9–37.9) | 29.7 (25.8–33.9) | 30.9 (27.8–34.2) | 43.0 (39.8–46.3) | 33.8 (30.0–37.9) | 32.2 (29.2–35.4) | 36.6 (33.0–40.3) | 31.0 (28.1–34.0) | 34.6 (29.6–40.0) |
| | 3 | 29.6 (26.6–32.7) | 27.3 (24.7–30.1) | 27.6 (23.9–31.6) | 32.1 (28.1–36.3) | 29.5 (26.3–33.0) | 23.3 (20.6–26.2) | 31.5 (27.5–35.9) | 30.8 (27.7–34.1) | 31.9 (28.3–35.6) | 28.5 (25.5–31.6) | 26.4 (21.9–31.5) |
| | 4+ | 19.4 (16.8–22.2) | 11.1 (9.4–13.2) | 15.0 (12.2–18.3) | 16.0 (13.0–19.5) | 18.0 (15.2–21.2) | 9.1 (7.4–11.1) | 14.2 (11.0–18.2) | 10.7 (8.5–13.4) | 16.4 (13.5–19.8) | 17.2 (14.6–20.1) | 10.3 (7.4–14.1) |

Weight percentages were estimated according to the complex sampling design of the study
Italic percentage indicates the highest prevalence and grays the lowest in each indicator in level of p<0.05
95% CIs: 95% confidence intervals

**Table 4.** Mean number of well-being outcomes, according to the presence and clustering of social isolation indicators in the SHARE study.

| Social isolation indicators | | Weight % | Mean (standard error) | p-value |
|---|---|---|---|---|
| | | | **Well-being outcomes\*** | |
| Living arrangements | Living with partner or spouse | 46.5 | 1.90 (0.04) | 0.007 |
| | Living without partner or spouse | 53.5 | 1.69 (0.04) | |
| Marital status | Married, widowed etc. | 94.5 | 1.79 (0.03) | 0.962 |
| | Being unmarried | 5.5 | 1.78 (0.12) | |
| Number of children | At least one child | 85.0 | 1.79 (0.03) | 0.981 |
| | No children | 15.0 | 1.79 (0.07) | |
| Contact with children | Daily to about once a month | 97.6 | 1.80 (0.03) | 0.028 |
| | Less than once a month or never | 2.4 | 1.40 (0.15) | |
| Proximity to children | At least one child living in the same house/building | 40.3 | 1.82 (0.04) | 0.329 |
| | All children living >1 km | 59.7 | 1.77 (0.03) | |
| Activity participation | At least one | 39.0 | 1.93 (0.04) | 0.001 |
| | No activity | 61.0 | 1.70 (0.03) | |
| Social exchange | Given and or received support at least once a month | 33.7 | 1.66 (0.05) | 0.007 |
| | Almost never | 66.3 | 1.85 (0.03) | |
| Clustering of social isolation indicators | None | 1.7 | 1.94 (0.21) | |
| | 1 | 11.3 | 1.89 (0.06) | |
| | 2 | 31.3 | 1.83 (0.04) | 0.200\*\* |
| | 3 | 36.7 | 1.77 (0.04) | |
| | 4+ | 19.0 | 1.69 (0.07) | |

\* Well-being outcomes: Life satisfaction; CASP-12: Control, Autonomy, Self-realization and Pleasure questionnaire; CES-D 11: Center for Epidemiological Studies of Depression questionnaire, Self-rated health, Chronic diseases; BMI: Body mass index
Comparisons were examined using analysis of covariance (according to the complex sample design procedure), with gender, age *(years)*, education status *(years)*, household income, retirement status and European regions (northern, central, southern), as covariates
\*\* Polynomial (linear) trend

## Social isolation and well-being at the regional and country level

The prevalence of positive well-being outcomes among participants with 4+ social isolation indicators was highest in northern Europe, than in the other two European regions (fig.1). In particular, Switzerland and Denmark exhibited the highest proportion of socially isolated individuals assessing their health as being very good, reporting being very satisfied with their life and displaying a low depression score. The highest prevalence of respondents recording high quality of life was observed among Swiss socially isolated participants, whereas having less than two chronic conditions and normal BMI were more prevalent in Switzerland and Sweden, respectively. The mean ratio of well-being to social isolation indicators (WB:SI ratio) was higher in Switzerland (1.19) and Denmark (1.11) (fig. 2). In contrast, participants in southern countries, such as Italy (0.77) and Spain (0.78), displayed the lowest ratios, indicating that social isolation was more prevalent than well-being. The

exception was Greece, where the corresponding WB:SI ratio was 0.97, suggesting an almost equal occurrence of well-being and social isolation indicators in the Greek elderly population.

## DISCUSSION

This study aimed to examine the association between social isolation and well-being, taking into account personal characteristics and country of residence, among nationally representative samples of European older adults residing in 11 countries and participating in the SHARE study. The study made an important contribution to the evidence base by examining these constructs and their interaction cross-nationally and by operationalizing the assessment of the constructs by considering a variety of factors pertaining to social isolation and well-being, including social and family resources, as well as physical, mental and emotional indicators, instead of using single measures or indicators of these constructs.

**Table 5.** Adjusted odds ratios for presenting 4+ well-being outcomes in relation to socio-demographics and social isolation indicators in 5,129 adults, aged 65+ years in the SHARE study.

| Prognostic factors | | 4+ clustering indicators of well-being | |
|---|---|---|---|
| | | Adjusted odds ratios (95% CIs) | |
| | | 1st model | 2nd model |
| Gender (females vs males) | | 0.63 (0.46–0.88) | 0.66 (0.47–0.93) |
| Age | 65–74 years | 1.00 | 1.00 |
| | 75–84 | 0.54 (0.39–0.75) | 0.60 (0.42–0.85) |
| | ≥85 | 0.51 (0.27–0.99) | 0.71 (0.35–1.44) |
| Education status | 0–7 years | 1.00 | 1.00 |
| | 8–12 | 1.39 (0.90–2.14) | 1.43 (0.93–2.19) |
| | ≥13 | 1.79 (1.18–2.72) | 1.74 (1.15–2.64) |
| Retirement status (retired vs not retired) | | 0.56 (0.38–0.85) | 0.60 (0.40–0.90) |
| Household income | Low | 1.00 | 1.00 |
| | Average | 1.36 (0.96–1.92) | 1.26 (0.88–1.81) |
| | High | 1.46 (0.94–2.28) | 1.27 (0.81–2.01) |
| European regions | Northern | 1.00 | 1.00 |
| | Central | 0.33 (0.25–0.44) | 0.37 (0.28–0.50) |
| | Southern | 0.24 (0.16–0.35) | 0.29 (0.19–0.44) |
| Living arrangements (living without partner or spouse vs living with partner or spouse) | | – | 0.88 (0.60–1.30) |
| Marital status (being unmarried vs being married, widowed etc.) | | – | 1.51 (0.73–3.14) |
| Number of children (having no children vs having at least one child) | | – | 0.83 (0.48–1.44) |
| Parent-child contact (less than once a month or never vs daily to about once a month) | | – | 0.46 (0.15–1.41) |
| Proximity to children (all children living >1 km vs at least one child living in the same house/building) | | – | 0.95 (0.65–1.40) |
| Activity participation (no activity vs at least one) | | – | 0.51 (0.38–0.68) |
| Social exchange (almost never vs given and or received support at least once a month) | | – | 1.49 (1.07–2.08) |
| Pseudo $R_{Nagelkerke}$ | | 0.076 | 0.101 |

95% CIs: 95% confidence intervals
Multiple logistic regression analysis (estimations according to the complex sampling design of the study)

The prevailing premise that social isolation may be triggered as people grow older through diverse personal life-course trajectories, which further compound the socio-economic and emotional disadvantages pertinent in later-life,[20,31] was supported by the present analysis. The finding that social isolation increased consistently with age was similar to that of a recent empirical investigation,[32] where the oldest participants were the most socially isolated age group. The clustering of social isolation indicators differed markedly amongst the three age groups, with the variations being more pronounced between the two ends of the age spectrum, the young-old and the oldest-old individuals. The group aged >85 years displayed a significantly lower likelihood of having a greater number of positive well-being outcomes in both models. Given the fact that living

without a partner or spouse and social disconnectedness were both significantly more likely to occur among respondents of greater age, this suggests that multiple social and well-being disadvantages accumulate in the later years of life. It is, however, difficult to assess whether the positive link between social isolation and age is the result of a "true age-effect" or whether other conditions inherent in old age are involved in this association.[33]

Significant gender differences were observed concerning the prevalence of most social isolation indicators and their accumulation, with males generally faring better than females. Most prominent were the gender differences in partnership status, with almost twice as many females as males living unpartnered. This is possibly because women tend to live longer and thus outlive their partners,[12] despite
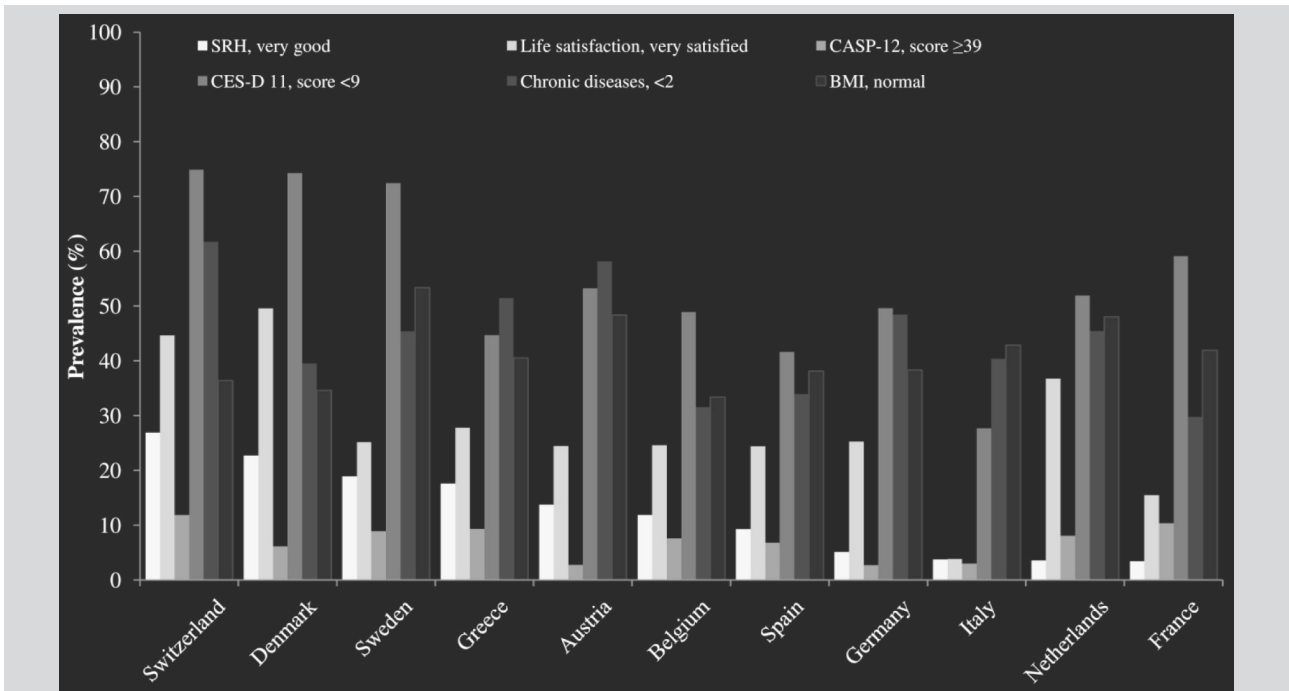
**Figure 1.** Prevalence of 4+ social isolation indicators in 5,129 adults, aged 65+ years, in relation to the presence of well-being outcomes in the SHARE study.
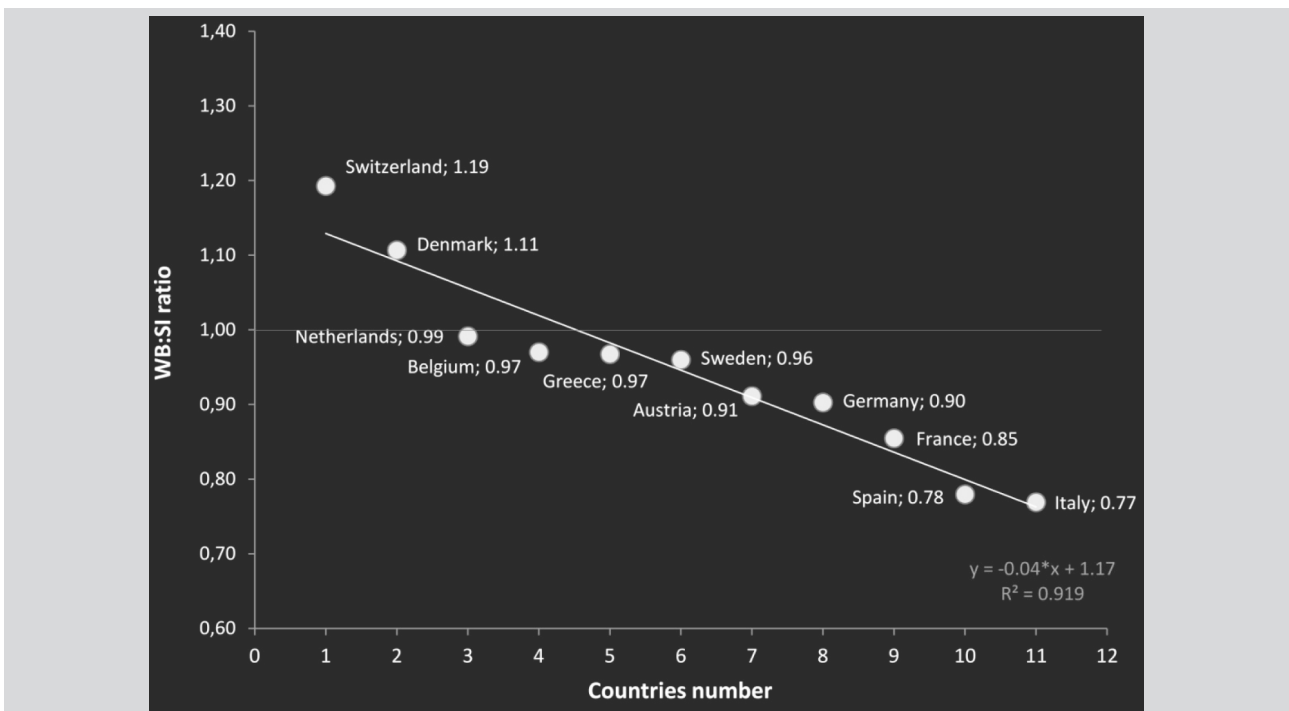


**Figure 2.** Well-being (WB) to social isolation (SI) ratio (WB:SI ratio) in 5,129 adults, aged 65+ years, in the SHARE study in eleven European countries.

generally displaying fewer financial and educational resources and more ill-health conditions.[34] Recent evidence shows that social isolation is significantly greater among women than men as a result of them not having married or being no longer married, and thus living without a spouse or partner.[35] Childlessness, which is associated with

the existence of smaller family networks and fewer ties of kinship,[36] was found in the present study to be higher in males, though not to a significant degree. This is in agreement with the contention that, due to life-course social identity roles tied to gender, parenthood is highly valued by women, representing a social goal expected to be accomplished by them.[37] Important gender-linked variations were also observed in the social isolation indicator of lack of social support exchanges. In agreement with the present findings, studies have shown that receipt of social support is much less evident among men[35] and integration in wider confidant networks is more prevalent among women.[38] These gender differences should be considered when formulating policies related to social isolation in older age.

In concordance with earlier literature,[39,40] low literacy and limited financial resources were shown to be risk factors for social isolation in the current study. When social isolation was operationalized as a composite social disengagement index, based on the number of social ties or contacts, it was found that older adults with fewer years of education and lower income resources had a higher likelihood of becoming socially isolated. Similarly, low education and income status, representing social disadvantage, among adults aged 45–75 years has been positively associated with social isolation, as estimated by social participation, partnership status and number of close ties.[41]

Congruent with earlier research showing mixed results on the association between social isolation and well-being, due to the different definitions and measurement methods of these constructs, the pattern of the association in the present analysis also varied along the different construct measures. For example, living status was significantly associated with most of the indicators of social isolation and their clustering, with the absence of clinically relevant depression, very good self-perceived health status, satisfaction with life and the occurrence of none or one chronic condition being more prevalent among individuals sharing a partnered arrangement, than their unpartnered counterparts. Living alone has recently been demonstrated to be significantly associated with poor quality of life and serious psychological distress among adults aged 65 and older.[42] Parental status was also associated with lower psychological distress and higher life satisfaction, which is in support of the previously suggested psychological benefits in late life of parenting.[43] The strength of the evidence for the role of childlessness in the accumulation of well-being indicators was however weak. As previously suggested,[44] it may be that childless people successfully adjust to their status through their life course, and seeking to engage in wider social supportive networks, whilst childlessness might also have some ben-

efits to confer, such as fewer responsibilities, conflicts and concerns and hence less psychological and financial strain.

There was some evidence, albeit, weak, that the older adults afflicted the most by social isolation (as indicated by the presence of 4+ isolation indicators) experienced lower levels of well-being, than those with no social isolation indicators. According to regression analysis, however, socially and productively active older adults were considerably more likely to present a greater number of well-being outcomes, than socially inactive individuals. This finding confirms the notion that social engagement matters for the well-being of older adults, as demonstrated by the Established Populations for Epidemiologic Studies of the Elderly (EPESE) project,[18] which also suggested that socially disengaged older adults have a higher likelihood of presenting depressive symptoms.

The finding that social support was negatively associated with well-being is in contrast to earlier research supporting the positive effect of social support on several health and well-being outcomes in older people.[45,46] The experience of being cared for, however, might also entail stressful emotions for older adults with related health-associated needs for social support.[47] The negative association observed in the current study might therefore be due to the extent of the exchange of the specific types of social support assessed, which could also be linked to the participants' health status. Another study[48] also showed that the receipt of instrumental support was associated with a greater likelihood of exhibiting poor health self-ratings. It is possible that the social exchange process might lack reciprocity in the situation where, because of health conditions, older adults are rendered recipients of assistance and support, while being unable to compensate for it.[49] Subsequently, this kind of unrequited social exchange, in so far that it is negatively appraised by older adults, may embody feelings of dependency and incompetence,[50] and thus trigger psychological distress.[51]

Considerable differences were observed in the distribution of indicators of social isolation and their clustering across countries. Despite the country variations with regards to individual social isolation indicators, such as frequency of contact with, and proximity to offspring, activity participation and social exchanges, relative consistency was observed at the regional level. For example, fewer residents in southern Europe, as compared to both their central and northern counterparts, reported contacting their offspring less than once a month or never. This finding agrees with earlier research showing that frequent parent-child contact is much less likely to occur among northern Europeans,

compared with their southern peers.[52] This could be due to the stronger family contexts which appear to prevail in southern European countries, where proximate later intergenerational ties are predominant and highly appreciated by the elderly.[53] Adult offspring in southern societies are subjected to strong cultural expectations with regards to the maintenance of intimate life-course bonds and interaction with their parents.[54] The current study also showed significantly lower proximity to offspring in the northern European countries than in Spain, Italy and Greece, which agrees with earlier findings that older adults are more likely to co-reside with their adult children in southern than in northern Europe.[55] Co-habitation, which is a common living arrangement for intergenerational familial care in southern Europe, apart from being culturally preferable, has also been attributed to *"measurable economic and policy factors"*;[56] the comparatively worse financial situation of older people in the south of Europe and the inadequacy of formal welfare system services partially necessitate parent-child co-residence. The converse appears to apply in the north of Europe, where solitary living in the later years of life means more autonomy and independence and seems to be the most preferred living arrangement for older people.

Lack of social support exchanges among European older parents and their children was relatively high; it was least often observed in Belgium, Denmark and the Netherlands, whereas, notably, Spain, Italy and Greece ranked among the highest. This contradicts previous research which has suggested that older people's living arrangements determine their intergenerational supportive exchanges,[57] implying that support and care transfers among older parents and their offspring are most likely to occur in southern Europe, where cohabitation is more common. Furthermore, northern Europeans were less likely to be socially and productively inactive than participants in southern Europe, with the exception of Greece. Similar conclusions have been drawn by previous research, which has indicated that participation rates in a wide range of social and productive activities tend to be much higher in northern Europe.[58]

Cross-national differences were observed in the well-being to social isolation ratio estimated in each European country, with the highest ratios detected in Switzerland and Denmark and the lowest in Spain and Italy. This finding suggests that the occurrence of positive well-being outcomes is more pronounced in Switzerland and Denmark, relative to the prevalence of social isolation indicators. The opposite was observed for Spain and Italy, where the indicators of

social isolation were more prevalent than positive well-being outcomes. Similar results were observed regarding the accumulation of well-being outcomes, with the likelihood to achieve high well-being, being significantly higher in northern than in southern European countries. This further reinforces the consistently depicted north-south gradient in health and well-being,[59] which has been considered to be contingent on differences in the distribution of socio-economic and health care resources both within and between European countries.[60]

The current research findings are liable to certain limitations which warrant discussion. Firstly, although the present paper is indicative of specific associations between the measures under scrutiny, causal inferences cannot be drawn, due to the cross-sectional nature of the study. Reverse causation cannot thus be excluded, since it could be fairly assumed that the well-being of older adults might affect the amount of their family and social resources. Secondly, the study is biased towards healthier and more socially integrated non-institutionalized elderly, while frail, not community-resident, older people were not investigated. This might have led to the underestimation of the real magnitude of the association between social isolation and well-being. Lastly, the self-reported nature of social isolation and well-being constructs should be considered when interpreting the results of the present inquiry. Studies that rely mainly on self-assessment are thought to suffer from recall errors and reporting bias, due to social desirability drawbacks, to which social and health research based on self-reported data is inherently subject.

Despite the aforementioned methodological and conceptual limitations, this study provides important evidence of the role of the underlying adverse domains of social environment which pertain to social isolation in the determination of the well-being of European older adults. The findings provide further evidence of the salient role the country context plays in elderly people's well-being, substantiating the previously demonstrated north-south gradient in the distribution of health and well-being outcomes. These findings should be considered by policy makers and stakeholders involved in the development of strategies to reduce social isolation, with the aim of improving well-being in later life. The results of this study can also support the development of interventions that could lead to improvements in late-life well-being through the mitigation of social isolation and the amelioration of specific facets of the objective family and social conditions of older adults.

## ΠΕΡΙΛΗΨΗ

### Κοινωνική απομόνωση και ευεξία μεταξύ των ηλικιωμένων ατόμων στην Ευρώπη

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**ΣΚΟΠΟΣ** Εξέταση της κατανομής των διαφορετικών παραμέτρων της κοινωνικής απομόνωσης σύμφωνα με τα κοινωνικο-δημογραφικά χαρακτηριστικά των συμμετεχόντων σε ατομικό επίπεδο, αλλά και σε επίπεδο χωρών, καθώς και διερεύνηση της συσχέτισης μεταξύ κοινωνικής απομόνωσης και διαφορετικών αποτελεσμάτων ευεξίας μεταξύ των ηλικιωμένων στην Ευρώπη. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Το παρόν δείγμα, το οποίο συνιστούσαν άτομα ηλικίας ≥65 ετών (n=5.129), αντλήθηκε από το πρώτο κύμα της μελέτης SHARE (μελέτη για την υγεία, τη γήρανση και τη συνταξιοδότηση στην Ευρώπη, 2004/5). Η ευεξία προσδιορίστηκε ως η συγκέντρωση έξι δεικτών που περιλαμβάνουν την ικανοποίηση από τη ζωή, την ποιότητα ζωής, την αυτο-αναφερόμενη υγεία, την καταθλιπτική συμπτωματολογία, τα χρόνια νοσήματα και τον δείκτη μάζας σώματος. Η κοινωνική απομόνωση μελετήθηκε σε όρους επτά συγκεκριμένων εκφάνσεων των συνθηκών διαβίωσης των ηλικιωμένων ατόμων. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Σύμφωνα με την ανάλυση συνδιακύμανσης βρέθηκε μια σημαντικά υψηλότερη βαθμολογία ευεξίας μεταξύ των ατόμων που είχαν συχνή επαφή με τα παιδιά τους (p=0,028) και εκείνων τα οποία συμμετείχαν τουλάχιστον σε μία κοινωνική ή παραγωγική δραστηριότητα (p=0,001). Επιπρόσθετα, η ανάλυση πολλαπλής λογιστικής παλινδρόμησης έδειξε σημαντικά χαμηλότερη πιθανότητα να εμφανίσουν 4+ αποτελέσματα ευεξίας τα πιο ηλικιωμένα άτομα, οι συνταξιούχοι και τα κοινωνικά ανενεργά άτομα και υψηλότερη πιθανότητα για τα περισσότερο μορφωμένα άτομα και εκείνα με σπάνιες ή καθόλου ανταλλαγές κοινωνικής υποστήριξης. Τέλος, οι βόρειοι Ευρωπαίοι ήταν πιο πιθανό να έχουν περισσότερους παράγοντες ευεξίας και λιγότερους δείκτες κοινωνικής απομόνωσης, σε σχέση με τους συνομηλίκους τους στη νότια Ευρώπη. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Τα παραπάνω ευρήματα, παρ' όλο που θα πρέπει να ερμηνευτούν με προσοχή εξ αιτίας της συγχρονικής τους φύσης, ωστόσο παρέχουν εμπειρική υποστήριξη στην κοινωνική κατανομή της κοινωνικής απομόνωσης και τη δυσμενή επίδραση της κοινωνικής απομόνωσης σε συγκεκριμένα αποτελέσματα της ευεξίας στη γεροντική ηλικία. Ως εκ τούτου, είναι ανάγκη οι δημόσιες πολιτικές υγείας και οι κοινωνικές πολιτικές να αντιμετωπίσουν πιο ενδελεχώς τις ενδεχόμενες επιπτώσεις της κοινωνικής απομόνωσης στην ευεξία των ατόμων της τρίτης και της τέταρτης ηλικίας.

**Λέξεις ευρετηρίου:** Ευεξία, Ηλικιωμένα άτομα, Κοινωνική απομόνωση, Μελέτη SHARE

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