

Social support networks and psychological wellbeing in community-dwelling older Ghanaian cohorts

Razak M. Gyasi,^{1,2}  David R. Phillips,¹ and Kabila Abass³

¹Department of Sociology and Social Policy, Lingnan University, Hong Kong (SAR), China

²Centre for Social Policy and Social Change, Lingnan University, Hong Kong (SAR), China

³Department of Geography and Rural Development, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

ABSTRACT

Background: Social support networks for older persons have been related to health outcomes including differences in psychological wellbeing (PWB). However, the specifics of this relationship remain unclear especially in sub-Saharan Africa. This study investigates the (1) relationship between aspects of social support and PWB among older persons in Ghana and (2) the extent to which this relationship is moderated by their education levels and locational characteristics.

Method: The study included 1,200 community-residing individuals aged 50 years and older who participated in an Aging, Health, Psychological Wellbeing and Health-seeking Behavior Study (AHPWHB) conducted between July 2016 and February 2017. Logistic regression models evaluated the associations of social support and their interactions with education and locational variables in PWB.

Results: Several aspects of meaningful social support: family/friends contacts ($\beta = 0.958$, $p < 0.05$), couple focused ($\beta = 0.887$, $p < 0.001$), emotional bonds ($\beta = 0.658$, $p < 0.005$), attending social events ($\beta = 0.519$, $p < 0.001$) and remittances from children ($\beta = 0.394$, $p < 0.005$) significantly related to improved PWB in later life. These associations remained robust and largely strengthened after accounting for respondents' background and health-related factors. Education and locational characteristics substantially influenced the associations between social support and PWB.

Conclusion: These findings suggest that especially in terms of PWB, aspects of meaningful social support networks are critical elements in later life. Strengthening opportunities for closer interpersonal relations with older persons may enhance their mental health, quality of life and independence.

Key words: Ghana, older persons, social support, psychological wellbeing, remittances, social policy, public health

Introduction

The population of persons 60 years and older has been rapidly growing in many regions but especially in low- and middle-income countries (LAMICs) (WHO, 2015). Located south of the Sahara Desert with 48 countries within the geographical extent of 23617901KM² (United Nations, 2016; World Bank, 2018), sub-Saharan Africa has been aging quite dramatically in recent decades. About 46 million people aged 60 years or older lived in the region in 2015 (an increase from 23 million in 1990). Crucially, this is projected to reach 161 million in

2050, with a growth rate projected to be faster than any other region in 1950–2015 (United Nations, 2016; United Nations DESA, 2017). In Ghana, for example, the proportion of those aged 60+ increased more than seven-fold between 1960 and 2013 (Biritwum *et al.*, 2013). This provides concomitant health challenges with changes in physical and psychological health status in the demographically aging population. These are likely to include decline in psychological wellbeing (PWB) and increased incidence of life events such as widowhood and retirement. These can affect the ability of older persons to live independently and to maintain better quality of life, which have globally become important public health and social policy concerns.

Focusing on PWB in particular, evidence suggests that declines may potentially lead to a loss of independence and poor quality of life in later life (Phillips *et al.*, 2008) and in turn undermine any aging well

Correspondence should be addressed to: Razak M. Gyasi, Department of Sociology and Social Policy, Lingnan University, 8 Castle Peak Road, Tuen Mun, New Territories, Hong Kong (SAR), China. Phone: +85251339954. Fax: +85224560737. Email: RGyasi@LN.hk/razak.mgyasi@gmail.com. Received 29 Dec 2017; revision requested 02 Apr 2018; revised version received 10 Apr 2018; accepted 08 Jul 2018. First published online 25 October 2018.

agendas (WHO, 2002; WHO, 2015). Sometimes, this can be offset by support systems, either formal or informal. In LAMICs, however, formal social support and health systems are often weak or even non-existent, so an understanding of informal systems in maintaining and improving older persons' PWB and maintenance of quality of life becomes particularly essential. This is more pressing in sub-Saharan Africa where the, hitherto, strong intergenerational social support system seems to be dwindling under the variety of influences including modernization and rural-urban drift (Gyasi, 2018; van der Geest, 2016).

In theoretical terms, social support dynamics are generally thought of as support for coping (Thoits, 1986). Historically, numerous inquiries have keenly ascribed coping as an important stress-resistance resource (Antonovsky, 1979; Antonucci, 1990). Social support is, therefore, constructed as an effective stress moderating agent in PWB of variety of populations globally including older adults (Antonucci, 1990; Cohen and McKay, 1984; Oakley, 1985). In sub-Saharan Africa, however, limited research has specifically isolated the social nature and strategies of coping and stress moderating resources on older persons' PWB. In other regions, access to a meaningful and non-destructive social support network and the perceived availability of emotional support were found to be important indicators of mental health and PWB particularly, as well as other physical health outcomes (Antonucci, 1990; Hobfoll and Vaux, 1993; Vaux, 1988). The presence of a socially supportive companion and intimates during later life remains widely held to be beneficial to the health outcomes of older people (Antonucci *et al.*, 2014; Antonucci *et al.*, 2011).

Several longitudinal and cross-sectional studies, especially in the Western and Asian societies have demonstrated that social support has strong linkages with older persons' capacity to achieve and maintain general health status and PWB in particular, often driven by traditions and fundamental human needs to have social bonds (Chi and Chou 2001; Chou and Chi, 2005; Hajek *et al.*, 2017; Kauppi *et al.*, 2017; Kemp *et al.*, 2017; Siu and Phillips 2002; Stoeckel and Litwin, 2016; Ng *et al.*, 2002; Choi, 2000). Strong social supports appear to be good predictors of psychopathology outcomes including improved mental health (Hajek and König, 2016) or reduced risks of cognitive impairment (Zunzunegui *et al.*, 2003) and better health-related quality of life (Hajek *et al.*, 2015). Older persons who are embedded in larger, stronger, and supportive social networks maintain better physical and mental health; they tend to live healthier and longer lives with less evidence of psychological distress than among those who are socially isolated (Holt-Lunstad *et al.*, 2010; Smith and Christakis, 2008). Meaningful

interpersonal relations may potentially reduce psychological stress levels and in turn inure psychological implications such as enhancement of endocrine and immune functioning (Yang *et al.*, 2016).

However, in many LAMICS, especially in sub-Saharan Africa, less is understood about the specificities of effects on PWB. Moreover, social support as a construct can be conceptualized and also quantified in different ways and levels. For example, social support can be seen as a composite of structure (e.g., number of close relations and social interactions), or functions (provision of monetary and non-monetary help), or in terms of quality of social relations of individual older persons or at a community level, and the subjective measure of satisfaction of support people receive (Litwin, 2004; Phillips *et al.*, 2008). These variations can affect the associations of social support with PWB and other health outcomes differently (Uchino, 2009). In addition, very few investigations in sub-Saharan Africa have specifically accounted for the relationships between multilevel social support and PWB among older adults. The needs of such people can be complex and many may have multiple physical co-morbidities and also depression and cognitive decline (Fiori *et al.*, 2006; Stoeckel and Litwin, 2016). In this study, we attempt to bring greater evidence to this debate by investigating the relationship between key aspects of social support and PWB among Ghanaian older persons, utilizing representative self-report health, health-seeking-behavior and social support data.

Moreover, although it appears that educational and residential statuses may impact the composition and strength of social networks (Antonucci and Akiyama, 1987; Kauppi *et al.*, 2017; Litwin, 2004; Phillips *et al.*, 2008), local studies in sub-Saharan African countries have not investigated how these variables could potentially moderate the social support-PWB associations in later life. Therefore, this study also examines social support-PWB associations, taking into account the diversity of respondents' educational and residential characteristics. We hypothesize that different aspects of social support will present different relationship patterns with PWB. Further, older person's educational and residential characteristics are expected to moderate the associations, if any, between social support and PWB.

Data and methods

Data

This study uses data from the 2016/17 Aging, Health, Psychological Wellbeing, and Health-seeking Behavior Study (AHPWHB), which is a

stratified multistage clustered area probability sample of Ghanaian community-dwelling older adults aged 50 years or older in the Ashanti Region of Ghana. In many parts of the developing world where average life expectancy at birth is often shorter (around 60 years) and adults experience early onset of health challenges (Biritwum *et al.*, 2013), chronological time or “date of birth” becomes least significant in defining old age. Moreover, in the sub-Saharan African context, a considerable proportion of people still earn a subsistence living in the informal economic sector (WHO, 2014) and therefore do not expect or receive formal retirement benefits. Defining old age as 60 years or older may not take into account or recognize the population that will soon become older and should be targeted for later life policies in health and socioeconomic development. Indeed, changes in social roles and functional capabilities of individuals should be prime considerations in constructing and defining older persons in these contexts. Given these circumstances, our study conceptualizes “older people” as those aged 50 years or older, as adopted in the Minimum Data Set project on ageing and many other regional studies including the WHO’s Study on Global Ageing and Adult Health that took place in five developing countries, including Ghana (see Biritwum *et al.*, 2013; WHO, 2014).

The selection of the Ashanti Region for this study was based on fact that the region is the most populous in Ghana, and also one of the major cosmopolitan regions of the country with diverse demographic, cultural and religious characteristics. The selection was not only based on its centrality and being considered as the nodal region in Ghana with complex socioeconomic structure, but also because it accommodates the highest proportion (17.5%) of the older population in Ghana (Ghana Statistical Service (GSS), 2012).

A total of 1,200 eligible respondents nested in six districts and 24 rural-urban communities were included through systematic random sampling technique. Sampling weights were generated to account for the survey design employed (Moussavi *et al.*, 2007). In the initial sampling stage, three sub-regional areas were defined as primary sampling units based on their distinctive demographic, sociocultural, and geographic characteristics. Two districts in each sub-region were randomly selected, with equal chances of selection given to all districts. Urban and rural sectors of each selected district were identified based on the GSS (2012) classification. Details of sampling and data generation procedure are reported elsewhere (Gyasi, 2018; Gyasi and Phillips, 2018; Gyasi *et al.*, 2018). Interviews were conducted by trained research assistants with experience in health-related research,

with quality assurance procedures followed during fieldwork.

Human Subject Certification and ethics approval were obtained from the Committee on Human Research Publication and Ethics, School of Medical Sciences, Kwame Nkrumah University of Science and Technology and Komfo Anokye Teaching Hospital, Kumasi, Ghana (Ref: CHRPE/AP/507/16). Ethics approval was also granted by the Research Ethics Committee of Lingnan University, Hong Kong before interviews began. Study participants were fully briefed on the research and they provided informed consent.

Psychological wellbeing (PWB)

The concept of PWB is now increasingly recognized and is sometimes also referred to as “subjective wellbeing” (Phillips *et al.*, 2005). PWB was assessed by a composite of a 10-item questions measuring the psychological health and depressive symptomatology of the participants on a range of health complaints, adapted from the Kessler Psychological Distress Scale (KPDS)-(K10) (Kessler *et al.*, 2002). These items included, “In the last 30 days about how often did you feel . . .” (1) “tired out for no good reason?”, (2) “nervous or uneasy?”, (3) “so nervous that nothing could calm you down?”, (4) “hopeless?”, (5) “restless or fidget?”, (6) “so restless you could not sit still?”, (7) “depressed?”, (8) “that everything was an effort?” (9) “so sad that nothing could cheer you up?” and (10) “worthless?”. Respondents rated the items with a five-point response scale from 1 = “none of the time,” 2 = “a little of the time,” 3 = “some of the time,” 4 = “most of the time,” to 5 = “all of the time.” Cronbach’s alpha of the scale was assessed to be 0.88. Scores of the 10 items were then summed, yielding a minimum score of 10 and a maximum score of 50. The range of score 20–50 was adjudged 0 = “psychologically poor” and 10–19 was considered 1 = “psychologically well.”

Assessment of social support networks

We adopted a theoretical categorization of social support networks into structural and functional social supports based on discussions in Cantor (1979); Hakulinen *et al.* (2015); Rodriguez-Artalejo *et al.* (2006). In total, we included six structural and functional network types in this study. Four of these types reflected the structural components of social network characteristics of older persons reported by previous social support literature (Lubben *et al.*, 2006; Wenger, 1991), including couple focused (living with spouse), having emotional bonds, contact with family and friends, and attending communal and social activities. Couple focused originally collected on four levels, was recoded and

dichotomized into 0 = “not married” or 1 = “currently married.” For emotional bonds, respondents were asked whether or not they have an emotional bond with at least one other person. A five-point response scale ranging from 1 = “completely true,” 2 = “somewhat true,” 3 = “not sure,” 4 = “somewhat false,” to 5 = “completely false” was given and responses were averaged. The contact with family and close friends variable was derived by averaging responses to two items: frequency of contact with family members and with close friends. The responses to the two items were given on a five-point scale ranging from 1 = “never,” 2 = “less frequently,” 3 = “frequently,” 4 = “very frequently,” to 5 = “every day.” These were dichotomised into 0 = not frequently (never/less frequently) and 2 = frequently (frequently/very frequently/every day).

Participation in four activities was combined to indicate frequency of social activities: attendance at religious services, a social club at a senior center, regular sports or cultural clubs, and civic or political organizations. The responses to participation in each activity were given on a five-point scale ranging from 1 = “never” to 5 = “almost every day,” which were later averaged. Functional social support was derived from two characteristics reflecting the support received by older persons from their households and remittances from distant adult children. Separate questions were asked about monetary and nonmonetary support received regularly from their household. For each question, responses were coded 0 if no support was received and 1 if regular support was received. A summary measure was created by averaging the monetary and nonmonetary variables. Finally, the older respondents were asked whether they received regular remittances from their distant children. The responses were coded 0 if no remittances were received and 1 if remittances were received.

Covariates

Although the focus of this research is on the effects of social support networks typologies on PWB, it was crucial to control for other relevant factors so that the effects are more reliable (Litwin, 2004). Age was categorized into three groups (younger-old, 50-69; older-old, 70-79; and oldest-old, 80+ years). Education reflected four schooling levels: (1) never/none, (2) basic, (3) secondary, and (4) tertiary. Other variables were dichotomous: gender (male, female), employment status (unemployed, employed), rural/urban residence and income level (low, high). Self-reported diagnosis of ten chronic comorbidities by a health professional was considered including hypertension, diabetes, respiratory diseases, cancers, stroke, chronic kidney diseases, asthma, arthritis,

depression, and insomnia. Functional limitations (not limited/limited) were obtained and included in the analysis as covariates. The respondents’ level of performance of the basic activities of daily living (ADL) that are commonly used to gauge older people’s daily performance were also recorded on a five-item scale that reflected performance at four levels: (1) not limited at all, (2) less limited, (3) somewhat limited, and (4) much limited. The total score ranged from 5 to 20; divided into two groups: 5-10 was considered not functionally impaired (1), and 11-20 was adjudged functionally impaired (2). Physical activity levels were also assessed and categorized (1) inactive and (2) active.

Analytic methods

The Pearson’s χ^2 test was used in the bivariate associations and descriptive analysis, comparing respondents’ social network typologies based on covariates and psychological wellbeing status. Setting a statistical significance threshold of $p < 0.05$, we used SPSS v.21.0 (IBM, Armonk, NY) and conducted a multivariate logit models for the dummy outcome variable to examine the effect of social support networks on psychological wellbeing. Beta (β) scores, the unstandardized regression coefficients (interpreted as the change in the outcome measure associated with a unit change in the exposure variable) with robust standard errors (SE) were presented. The first model (Model 1) included only the older adults’ social support network characteristics in order to explore their direct effects on PWB, while Model 2 added the demographic, socioeconomic, and health-related variables to investigate whether the effects of social support networks on PWB were moderated by these factors. Model 3 included the interaction terms (rural/urban residence x social support; educational level x social support) to further investigate whether the impact of each social support characteristic on PWB varied and moderated significantly.

Results

Descriptive and bivariate findings

Six interrelated social support types reflecting structural and functional social support properties were derived as the main independent variables. Table 1 summarizes the variations in the distribution of the social network typologies across the sociodemographic, health-related variables, and PWB status of the sample. It was particularly interesting to find a huge gendered disparity in the network types, especially in view of the greater longevity of females in Ghana (as elsewhere). Older women were

Table 1. Descriptive demographic, health-related and psychological wellbeing variables by social support network types

| | SOCIAL SUPPORT NETWORK TYPES | | | | | |
|---------------------------|------------------------------|----------------------|------------------------|----------------------|----------------------|----------------------|
| | EMOTIONAL BONDS | COUPLE FOCUSED | FAMILY/FRIEND CONTACTS | SOCIAL PARTICIPATION | HELP FROM HOUSEHOLD | REMITTANCES |
| | <i>n</i> (%) | <i>n</i> (%) | <i>n</i> (%) | <i>n</i> (%) | <i>n</i> (%) | <i>n</i> (%) |
| Covariates | | | | | | |
| Age (years) ^a | 66.21 (±12.039) | 68.43 (±12.237) | 66.18 (±11.878) | 65.43 (±11.597) | 65.43 (±11.597) | 67.95 (±12.070) |
| Women | 681 (62.2)* | 196 (42.8)*** | 723 (63.3) | 563 (64.0) | 422 (68.0)*** | 490 (65.9)* |
| Urban living | 600 (54.8) | 284 (62.0)*** | 644 (56.3)*** | 497 (56.5) | 351 (56.5) | 405 (54.4) |
| Education | 557 (50.9)* | 300 (65.5)*** | 566 (49.5) | 452 (51.4) | 293 (47.2)* | 325 (43.7)*** |
| Employed | 505 (46.2)*** | 277 (60.5)*** | 507 (44.4) | 404 (45.9) | 268 (43.2) | 284 (38.2)*** |
| Income | 246 (25.7) | 158 (37.7)*** | 260 (26.1)* | 198 (25.7) | 169 (31.4)*** | 154 (24.0) |
| Comorbidities | 581 (53.1) | 220 (48.0)** | 608 (53.2) | 439 (49.9)*** | 350 (56.4)* | 428 (57.5)*** |
| Functionally limitation | 326 (29.8) | 90 (19.7)*** | 337 (29.5)* | 221 (25.1)*** | 216 (34.8)*** | 270 (36.3)*** |
| Physical activity | 549 (50.2) | 290 (63.3)*** | 587 (51.4)* | 501 (56.9)*** | 282 (45.4)*** | 354 (47.6)* |
| Dependent variable | | | | | | |
| PWB | 619 (56.6)*** | 311 (67.9)*** | 642 (56.2)*** | 518 (58.9)*** | 359 (57.8)* | 430 (57.8)** |

Statistical significance is in bold.

^aMean (±SD).

* $p < .05$, ** $p < .005$, *** $p < .001$.

significantly more likely to have emotional bonds with at least one other person (62%), to have received help from household (68%) and remittances from distant adult children (66%) but they were less likely to have spouses (43%). Urban residents were more likely to report frequent family contacts (56%) and were also more couple focused (62%). In line with our expectations, older adults who had higher education, who were employed and had higher incomes were less likely to receive household help and remittances. However, those educated and employed were significantly more likely to be couple focused.

In terms of health-related variables, generally, respondents with comorbidities and functional impairments were more likely to receive household help and remittances but less likely to have spouses and to have participated in social events. Compared with older adults who were inactive, the physically active cohorts were more likely to report living with spouses (63%), to have frequent contacts with family and friends (51%), and to attend social events (57%). Moreover, each of the social network types significantly contributed to better PWB among older persons. Table 2 compares the descriptive baseline characteristics and health correlates in relation to PWB levels of the respondents. We observed significant differences in all the six network types and covariates except for rural/urban residence and income statuses. As shown in Table 3, aspects of social support and PWB variables naturally tended to be interrelated.

Statistical modelling

Table 4 presents the estimates of logistic regression models in which PWB was regressed on social support network types. The initial results (Model 1) showed that, apart from receiving help from household, all other network types were positively associated with better PWB. After controlling for covariates (Model 2), we observed that older persons who had frequent contacts with family/friends were more likely to show the strongest positive association with good PWB ($\beta = 0.759$, $p < 0.05$). A similar relationship was found for those who had emotional bonds with others ($\beta = 0.713$, $p < 0.005$). Additional positive associations were evident among the couple focused respondents ($\beta = 0.629$, $p < 0.001$), those attending social events ($\beta = 0.518$, $p < 0.001$) and those receiving remittances from distant adult children ($\beta = 0.484$, $p < 0.005$).

Model 3 added the interactions of social network types with residential and educational characteristics. The pattern of strength and direction of the associations of PWB and covariates changed slightly in this model. However, several distinctions emerged in the associations between social network type and PWB depending upon education and residence. Among the educated respondents, receiving help from household ($\beta = 0.801$, $p < 0.05$) and being couple focused ($\beta = 0.698$, $p < 0.05$) significantly increased PWB but having emotional bonds (perhaps counter-intuitively) decreased the likelihood of reporting PWB ($\beta = -1.359$, $p < 0.05$). Moreover,

Table 2. Baseline characteristics, social support network types by psychological wellbeing level of the sample

| | ALL | PSYCHOLOGICALLY POOR | PSYCHOLOGICALLY WELL | $\chi^2 / t\text{-test}$ |
|-------------------------------------|------------------------|------------------------|------------------------|--------------------------|
| | <i>n</i> (%) | <i>n</i> (%) | <i>n</i> (%) | |
| sample | 1200 (100) | 544 (45.3) | 656 (54.7) | – |
| Covariates | | | | |
| Age (years) | 66.15 (± 11.850) | 66.37 (± 12.135) | 65.96 (± 11.614) | 38.529** |
| Women | 759 (63.3) | 378 (69.5) | 381 (58.1) | 16.645*** |
| Urban living | 660 (55.0) | 289 (53.1) | 371 (56.6) | 1.414 |
| Education level | 599 (49.9) | 238 (43.8) | 361 (55.0) | 15.137*** |
| Employed | 533 (44.4) | 204 (37.5) | 329 (50.2) | 19.283*** |
| Estimated income level | 264 (25.3) | 104 (22.7) | 160 (27.4) | 2.998 |
| Comorbidities [†] | 636 (53.0) | 319 (58.6) | 317 (48.3) | 12.706*** |
| Functional limitations | 362 (30.2) | 214 (39.3) | 148 (22.6) | 39.735*** |
| Physically active | 606 (50.5) | 228 (41.9) | 378 (57.6) | 29.362*** |
| Social support network types | | | | |
| <i>Structure</i> | | | | |
| Emotional bonds | 1094 (91.2) | 475 (87.3) | 619 (94.4) | 18.321*** |
| Couple focused | 458 (38.2) | 147 (27.0) | 311 (47.4) | 52.372*** |
| Family/Friend contacts | 1143 (95.3) | 501 (92.1) | 642 (97.9) | 21.885*** |
| Social participation | 880 (73.3) | 362 (66.5) | 518 (79.0) | |
| <i>Function</i> | | | | |
| Help from household | 621 (51.8) | 262 (48.2) | 359 (54.7) | 5.131* |
| Distal remittances | 744 (62.0) | 314 (57.7) | 430 (65.5) | 7.735** |

[†]Diagnosed of at least one of the following: hypertension, diabetes, arthritis, asthma, respiratory diseases, chronic kidney disease, insomnia, stroke, chronic lung disease, cancers, and depression.

* $p < .05$, ** $p < .005$, *** $p < .001$.

Table 3. Correlation between aspects of social support

| | <i>N</i> | <i>M</i> \pm <i>SD</i> | 1 | 2 | 3 | 4 | 5 | 6 |
|---------------------------|----------|--------------------------|---------|---------|----------|---------|-------|---------|
| 1. Emotional bonds | 1200 | 1.91 \pm 0.28 | 0.124** | – | | | | |
| 2. Couple focused | 1200 | 0.38 \pm 0.49 | 0.209** | 0.118** | | | | |
| 3. Family/friend contacts | 1200 | 1.95 \pm 0.21 | 0.135** | 0.096** | 0.063* | | | |
| 4. Social participation | 1200 | 1.73 \pm 0.44 | 0.140** | 0.025 | 0.035 | 0.273** | | |
| 5. Help from household | 1200 | 0.518 \pm 0.51 | 0.065* | 0.158** | –0.007 | 0.074** | 0.032 | |
| 6. Distal remittances | 1200 | 0.620 \pm 0.49 | 0.080** | 0.065* | –0.102** | 0.043 | 0.025 | 0.433** |

Factor loadings for each aspect on the general social support factor are listed on the *diagonal*.

* $p < .005$, ** $p < .001$.

urban living was positively associated with good psychological health if the older adult received remittances from distant children ($\beta = 0.900$, $p < 0.05$) but had lower PWB with social events attendance ($\beta = -0.668$, $p < 0.005$). The amount of explained variance increased from 11% to 16% between Models 1 and 2, and the interaction terms resulted in an appreciable change to 20%, pointing to the variations in the associations between the key variables.

Discussion and conclusions

In this study, we investigated the effect of multilevel social support networks on the PWB of older

persons in Ghana, taking into account their educational levels and rural/urban locations. In general, our sample broadly reflected the socio-demographic features typical of the aging population in Ghana and probably in similar LAMICs especially those in sub-Saharan Africa. Before sociodemographic and health-related conditions were factored into the analysis, older persons with various social support characteristics including family and friends contacts, being couple focused, emotionally bonded with relevant others, participating in social events and receiving remittances from distant children and relatives, were more likely to report better PWB than those who were socially isolated and showed limited or no social support. These significant differences

Table 4. Regression analysis of social support network types and psychological wellbeing

| VARIABLES | MODEL 1 | | MODEL 2 | | MODEL 3 | |
|---|-----------|--------------|---------|-------------|---------|--------------|
| | β^a | SE^b | β | SE | β | SE |
| Social support network types | | | | | | |
| Emotional bonds | .658** | .225 | .713** | .256 | .654* | .281 |
| Couple focused | .887*** | .129 | .629*** | .152 | .634*** | .160 |
| Family/friend contacts | .958** | .335 | .759* | .356 | .679 | .407 |
| Social participation | .519** | .141 | .518*** | .159 | .589*** | .166 |
| Help from household | .035 | .135 | .112 | .154 | .060 | .161 |
| Distal remittances | .394** | .139 | .484** | .157 | .404* | .163 |
| Covariates | | | | | | |
| Age (years) | | | .018* | .007 | .013* | .007 |
| Women | | | -.184 | .158 | -.275 | .166 |
| Urban living | | | .217 | .142 | .162 | .454 |
| Education level | | | .240 | .152 | .920* | .447 |
| Employed | | | .188 | .158 | .164 | .163 |
| Estimated income level | | | -.157 | .169 | -.194 | .175 |
| Comorbidities [†] | | | -.195 | .141 | -.173 | .147 |
| Functional limitations | | | -.515** | .176 | -.575* | .184 |
| Physically active | | | .335* | .154 | .276 | .162 |
| Interaction terms | | | | | | |
| Emotional bonds x Urban living | | | | | .483 | .555 |
| Couple focused x Urban living | | | | | -.055 | .296 |
| Family/Friend contacts x Urban living | | | | | -.216 | .774 |
| Social participation x Urban living | | | | | -.668* | .328 |
| Help from household x Urban living | | | | | .169 | .315 |
| Distal remittances x Urban living | | | | | .900** | .323 |
| Emotional bonds x Education | | | | | -1.359* | .535 |
| Couple focused x Education | | | | | .698* | .295 |
| Family/Friend contacts x Education | | | | | -.325 | .786 |
| Social participation x Education | | | | | .366 | .323 |
| Help from household x Education | | | | | .801* | .312 |
| Distal remittances x Education | | | | | -.393 | .326 |
| Model fitting information | | | | | | |
| Log-likelihood | | -773.049 | | -651.137 | | -631.427 |
| Model's Hosmer-Lemeshow χ^2 (significance) | | 11.853(.158) | | 8.526(.384) | | 14.311(.074) |
| Nagelkerke Pseudo-R ² | | .114 | | .157 | | .200 |

Model 1 contains social support types only; Model 2 contains all variables in Model 1 plus age, gender, residential type, education, employment status, income level, comorbidities, functional impairments, and physical activity levels; Model 3 contains all variables in Model 2 plus the interaction terms (social support x urban living and social support x education). [†] Diagnosed of at least one of the following: hypertension, diabetes, arthritis, asthma, respiratory diseases, chronic kidney disease, insomnia, stroke, chronic lung disease, cancers, and depression.

^a Regression coefficient.

^b Robust standard error.

* $p < .05$, ** $p < .005$, *** $p < .001$.

remained robust and largely fortified the relationship for emotional bonds, social events and remittances from distant children after adjusting for theoretically relevant sociodemographic characteristics and health-related covariates. Although our social network construct does not allow a direct comparison with research in more widely studied Western contexts, the findings certainly provide exploratory empirical evidence to support the general claim that aspects of social support enhance the psychological state, depression and in general, mental health of older people (Chou and

Chi, 2005; Hakulinen *et al.*, 2015; Phillips *et al.*, 2008; Siu and Phillips, 2002).

Very surprisingly, however, our results showed an insignificant association between receiving help from the household and the PWB status of the sample of older people in this study, unlike the other domains of social support. This finding is not consistent with the observation of many previous inquiries particularly in LAMICs or rapidly aging non-Western societies (Chi and Chou, 2001; Oladeji, 2011; Siu and Phillips, 2002). For example, Oladeji's (2011) study on family care, social services, and living

arrangement factors influencing PWB of older people in Ibadan, Nigeria, found familial support as instrumental in improving PWB in later life. The possible explanation for our finding is that household help for older people which often takes the form of *material* assistance (e.g., food and small monetary help) is generally iterated and/or assumed to be routine. As a result, it may lose its significance over time in the eyes of older people compared with frequent social connectedness and emotional relations with others, especially as older people gradually become disengaged and perhaps socially excluded. We, therefore, argue that improvement in the PWB in older people is a function of non-material and emotional relationships rather than the receipt of physical or material items. Then again, the specific effect of the help at the household level on older people's PWB should be contextually constructed and assessed particularly in rural communities of developing countries.

Moreover, in support of our hypothesis relating to the effect of different types of social support, the findings suggest that specific typologies of social support do present different patterns of association with PWB. Interestingly, comparing the rate of PWB among social network types, we found, that compared with other social network types, family/friend contacts showed strongest effects in reporting PWB, followed by the emotional bonding and couple focused networks, despite the fact that these are generally characterized by limited social ties. This observation is consistent with previous findings in Asian contexts (Chi and Chou, 2001; Siu and Phillips, 2002), presupposing the uniqueness and significant role played by immediate family members and close friends and especially spousal cohabitation in late life, as widely demonstrated by previous gerontological investigations (Zhang and Hayward, 2006). From a life-course perspective, social support for Ghanaian older persons (which may differ from that in Western countries due to the lesser availability of formal support) highlights the expected *filial obligations* (reciprocal duties) based on traditional values where older people who provided for relevant others including children and spouses are better cared for in old age (van der Geest, 2016). Presumably, closeness to older people and the filial support they receive may reduce stress, and improve health and self-efficacy which may be beneficial to their PWB. Although the data for this study were gathered from Ghana, our findings could potentially be extended not only in the African continent, but possibly in other LAMICs, particularly those that share similar key and circumstantial demographic and socioeconomic characteristics with Ghana.

The influence of educational levels and rural/urban residential status in aspects of social support

and PWB associations is a major finding. First, among the more educated participants, significant specific interactions between those married and also receiving help from households increased better PWB but showed a negative relationship with emotional bonds. This may indicate that older persons who have attained higher education could improve access to information from various sources and better understand what it takes to provide support for their spouses in old age (Zhang and Hayward, 2006) than the less educated or uneducated respondents. This finding suggests a direct association with the functional social support received by older persons from their households to enhance the PWB in later life. Moreover, although older persons who reside in urban areas and attend social events surprisingly reported poor PWB, those who received remittances were more likely to report better PWB. These findings may be related to the view that frequent outings to observe communal events can often be chaotic in urban environments and may actually increase stress levels. Indeed, in line with this finding, other studies have found that urban areas tend to be more stressful than rural communities (Adli, 2011; Peen *et al.*, 2010). However, remittances from distant adult children who have often become a significant source of external financing (Anzoategui *et al.*, 2014; Gyasi *et al.*, 2018; Phillips and Feng, 2015) could relieve older people from financial stress, potentially another way to improve PWB.

Interestingly, our study found important gendered disparities in social support. Levels of emotional bonds, receipt of help from households and remittance support from distant adult children were generally higher in women, but women were significantly less likely to be couple-focused. In line with findings of several previous studies, these observed gendered-social support patterns appear to reflect the view that older women are often and better embedded in complex social networks than older men and are also predisposed to receiving various supports from more interrelated sources (Antonucci and Akiyama, 1987; Fuhrer and Stansfeld, 2002). Studies have contended that as long as women perceive their external social relationships beneficial and more rewarding, they will develop and maintain such social ties better compared to men. However, older women being less couple-focused may be strongly related to the gender-survival paradox theory which posits that men are generally healthier but tend to die earlier than women, leaving many older women as widows. Moreover, spatial variations in certain aspects of social support was evident: urban dwellers have more family and friends contacts and also maintain spousal cohabitation when compared with rural residents. Urban living could potentially

predispose older people to a wider space and provide greater systemic network opportunities compared with more closed and possibly socially constrained rural settings. We also found, perhaps not surprising, that participants who were least-resourced (the less educated, unemployed and lower income earners) reported enjoying more help from household members and also remittances from distant children. These findings are consistent with some previous studies in LAMICs (Litwin, 2004) where older people with low education and income received more social support.

Finally, it is important to note that older people who suffer various levels of chronic conditions, functionally impaired and perhaps become physically inactive are more likely to receive household help and remittances but were less likely to live with spouses. These cohorts were also less likely to actively participate in social activities and report better PWB. This does of course somewhat reflect health-related realities and suggests social needs were somewhat being met, but can also suggest potential social isolation. Conjecturally, this finding may point to the overall resilience and capabilities of the older population.

Our findings should be evaluated in the context of some research limitations. Our investigation did not capture all aspects of social support for older persons including network size and changes in the size of the social support over time, which may be quantified in diverse ways and could indeed have potential effects on PWB. However, the multiple aspects included in our analysis do present a good picture of the reality of social support in Ghana today. This study draws on self-reported data, which are potentially subject to a number of social and subjective biases and which could in turn affect the accuracy of the responses involving either underestimation or overestimation. Moreover, the cross-sectional design of our study while providing a way to analyze desired associations between social support and PWB, may not provide causality and directionality between the study variables. Also, long-term accounts of the impacts of aspects of social support on PWB of the older persons cannot be established. Although, clearly, longitudinal studies are possibly desirable, this particular study could potentially be repeated at future dates. Nevertheless, the strengths of the study are notable. It is one of the few studies to investigate the various aspects of informal social support associated with PWB among older persons in sub-Saharan Africa. These findings are valuable for both academic and policy-related purposes, given the growing need for older cohorts to maintain independence, particularly in LAMICs where formal social support systems are generally very limited.

In conclusion, the findings support the hypothesis that specific aspects of informal social support directly

relate to PWB among older people. The key implications are that policies targeted at increasing the nature of and opportunities for interpersonal ties with older persons be strengthened. These results could also inform future studies evaluating social support as an *intervention* for improving mental health especially in later life.

Conflict of Interest

None.

Description of author roles

R. M. Gyasi conceived and designed the study under the PhD supervision of D. R. Phillips. R. M. Gyasi supervised the fieldwork, analyzed the data, and wrote the initial version of the article. D. R. Phillips and K. Abass undertook critical review and revision of the article. All authors read and approved the final article.

Acknowledgments

This work was supported by Lingnan University, Hong Kong, through its Studentship Awards for Research Postgraduates [RPD1129310]. The funders, however, played no role in designing the study, collecting and analyzing data, manuscript preparation and the decision to publish the manuscript. We are particularly grateful to the editor of this journal and the anonymous reviewer for their gracious comments which helped to improve the initial version of this paper.

References

- Adli, M. (2011). Urban stress and mental health. LSE Cities, An International Centre supported by Deutsche Bank. <https://lsecities.net/media/objects/articles/urban-stress-and-mental-health/en-gb/>.
- Antonovsky, A. (1979). *Health, Stress and Coping*. San Francisco, CA: Jossey-Bass.
- Antonucci, T. C. (1990). Social supports and social relationships. In: *Handbook of Aging and the Social Sciences* (pp. 205–226). New York, NY: Academic Press.
- Antonucci, T. C., Ajrouch, K. J. and Birditt, K. S. (2014). The convoy model: explaining social relations from a multidisciplinary perspective. *Gerontologist*, 54, 82–92. doi: 10.1093/geront/gnt118.
- Antonucci, T. C. and Akiyama, H. (1987). An examination of sex differences in social support among older men and women. *Sex Roles*, 17, 737–749. doi: 10.1007/bf00287685.
- Antonucci, T. C., Birditt, K. S., Sherman, C. W. and Trinh, S. (2011). Stability and change in the

- intergenerational family: a convoy approach. *Ageing Society*, 31, 1084–1106. doi: [10.1017/S0144686X1000098X](https://doi.org/10.1017/S0144686X1000098X).
- Anzoategui, D., Demircuc-Kunt, A. and Peria, M. S. M.** (2014). Remittances and financial inclusion: evidence from El Salvador. *World Development*, 54, 338–349. doi: [10.1016/j.worlddev.2013.10.006](https://doi.org/10.1016/j.worlddev.2013.10.006).
- Biritwum, R. B., Mensah, G., Yawson, A. and Minicuci, N.** (2013). *Study on Global Ageing and Adult Health (SAGE) Wave 1: The Ghana National Report*. Geneva: World Health Organization.
- Cantor, M. H.** (1979). Neighbours and friends: an overlooked resource in the informal support system. *Research on Ageing*, 1, 434–463.
- Chi, I. and Chou, K. L.** (2001). Social support and depression among elderly Chinese people in Hong Kong. *International Journal of Aging and Human Development*, 52, 231–252. doi: [10.2190/v5k8-cnmg-g2up-37qv](https://doi.org/10.2190/v5k8-cnmg-g2up-37qv).
- Choi, S.-J.** (2000). Ageing in Korea: issues and policies. In: D. R. Phillips (ed.), *Ageing in the Asia-Pacific Region* (pp. 223–242). London: Routledge.
- Chou, K. L. and Chi, I.** (2005). Reciprocal relationship between pain and depression in elderly Chinese primary care patients. *International Journal of Geriatric Psychiatry*, 20, 945–952. doi: [10.1002/gps.1383](https://doi.org/10.1002/gps.1383).
- Cohen, S. and McKay, G.** (1984). Social support, stress and the buffering hypothesis: a theoretical analysis. In: A. Baum, S. E. Taylor, and J. E. Singer (eds.), *Handbook of Psychology and Health* (Vol. IV, pp. 253–267). Hillsdale, NJ: Erlbaum.
- Fiori, K. L., Antonucci, T. C. and Cortina, K. S.** (2006). Social network typologies and mental health among older adults. *Journal of Gerontology*, 61, P25–P32. doi: [10.1093/geronb/61.1.p25](https://doi.org/10.1093/geronb/61.1.p25).
- Fuhrer, R. and Stansfeld, S. A.** (2002). How gender impacts patterns of social relations and their impact on health: a comparison of one or multiple sources of support from “close persons.” *Social Science and Medicine*, 54, 811–825. doi: [10.1016/s0277-9536\(01\)00111-3](https://doi.org/10.1016/s0277-9536(01)00111-3).
- Ghana Statistical Service (GSS).** (2012). *Population and Housing Census, 2010 Summary of Report of Final Results*. Accra: Ghana Statistical Service (GSS).
- Gyasi, R. M.** (2018). *Ageing, health and health-seeking behaviour in Ghana* (Unpublished PhD thesis, Lingnan University, Hong Kong). Retrieved from http://commons.ln.edu.hk/post_otd/.
- Gyasi, R. M. and Phillips, D. R.** (2018). Gender, self-rated health and functional decline among community-dwelling older adults. *Archives of Gerontology and Geriatrics*, 77, 174–183. doi: [10.1016/j.archger.2018.05.010](https://doi.org/10.1016/j.archger.2018.05.010).
- Gyasi, R. M., Phillips, D. R. and Buor, D.** (2018). The role of a health protection scheme in health services utilisation among community-dwelling older persons in Ghana. *The Journals of Gerontology: Series B*. doi: [10.1093/geronb/gby082](https://doi.org/10.1093/geronb/gby082).
- Hajek, A. et al.** (2015). Gender differences in the effect of social support on health-related quality of life: results of a population-based prospective cohort study in old age in Germany. *Quality of Life Research*, 25, 1159–1168. doi: [10.1007/s11136-015-1166-5](https://doi.org/10.1007/s11136-015-1166-5).
- Hajek, A. et al.** (2017). How does social support affect functional impairment in late life? Findings of a multicenter prospective cohort study in Germany. *Age and Ageing*, 46, 813–820. doi: [10.1093/ageing/afx012](https://doi.org/10.1093/ageing/afx012).
- Hajek, A. and König, H.-H.** (2016). The effect of intra- and intergenerational caregiving on subjective well-being—evidence of a population based longitudinal study among older adults in Germany. *PLoS One*, 11, e0148916. doi: [10.1371/journal.pone.0148916](https://doi.org/10.1371/journal.pone.0148916).
- Hakulinen, C. et al.** (2015). Structural and functional aspects of social support as predictors of mental and physical health trajectories: Whitehall II cohort study. *Journal of Epidemiol Community Health*, 70, 710–715. doi: [10.1136/jech-2015-206165](https://doi.org/10.1136/jech-2015-206165).
- Hobfoll, S. E. and Vaux, A.** (1993). Social support: resources and context. In: L. Goldberger and S. Breznitz (eds.), *Handbook of Stress: Theoretical and Clinical Aspects*, 2nd ed. (pp. 685–705). New York, NY: Free Press.
- Holt-Lunstad, J., Smith, T. B. and Layton, J. B.** (2010). Social relationships and mortality risk: a meta-analytic review. *PLoS Medicine*, 7, e1000316. doi: [10.1371/journal.pmed.1000316](https://doi.org/10.1371/journal.pmed.1000316).
- Kauppi, M. et al.** (2017). Characteristics of social networks and mortality risk: evidence from two prospective cohort studies. *American Journal of Epidemiology*, 187, 746–753. doi: [10.1093/aje/kwx301](https://doi.org/10.1093/aje/kwx301).
- Kemp, A. H., Arias, J. A. and Fisher, Z.** (2017). Social ties, health and wellbeing: a literature review and model. In: A. Ibáñez *et al.* (eds.), *Neuroscience and Social Science*. Cham: Springer.
- Kessler, R. C. et al.** (2002). Short screening scales to monitor population prevalence and trends in non-specific psychological distress. *Psychological Medicine*, 32, 959–956. doi: [10.1017/S0033291702006074](https://doi.org/10.1017/S0033291702006074).
- Litwin, H.** (2004). Social networks, ethnicity and public home-care utilization. *Ageing and Society*, 24, 921–939. doi: [10.1017/S0144686X04002491](https://doi.org/10.1017/S0144686X04002491).
- Lubben, J. et al.** (2006). Performance of an abbreviated version of the Lubben social network scale among three European community-dwelling older adult populations. *The Gerontologist*, 46, 503–513. doi: [10.1093/geront/46.4.503](https://doi.org/10.1093/geront/46.4.503).
- Moussavi, S. et al.** (2007). Depression, chronic diseases, and decrements in health: results from the World Health Surveys. *Lancet*, 370, 851–858. doi: [10.1016/s0140-6736\(07\)61415-9](https://doi.org/10.1016/s0140-6736(07)61415-9).
- Ng, A. C. Y., Phillips, D. R. and Lee, W. K. M.** (2002). Persistence and challenges to filial piety and informal support of older persons in a modern Chinese society: a case study in Tuen Mun, Hong Kong. *Journal of Aging Studies*, 16, 135–153. doi: [10.1016/s0890-4065\(02\)00040-3](https://doi.org/10.1016/s0890-4065(02)00040-3).
- Oakley, A.** (1985). Social support in pregnancy: the ‘soft’ way to increase birthweight? *Social Science and Medicine*, 21, 1259–1268. doi: [10.1016/0277-9536\(85\)90275-8](https://doi.org/10.1016/0277-9536(85)90275-8).
- Oladeji, D.** (2011). Family care, social services, and living arrangements factors influencing psychosocial wellbeing of elderly from selected households in Ibadan, Nigeria. *Education Research International*, 2011, 1–6. doi: [10.1155/2011/421898](https://doi.org/10.1155/2011/421898).
- Peen, J., Schoevers, R. A., Beekman, A. T. and Dekker, J.** (2010). The current status of urban-rural differences in psychiatric disorders. *Acta Psychiatrica Scandinavica*, 121, 84–93. doi: [10.1111/j.1600-0447.2009.01438.x](https://doi.org/10.1111/j.1600-0447.2009.01438.x).

- Phillips, D. R. and Feng, Z.** (2015). Challenges for the ageing family in the People's Republic of China. *Canadian Journal on Aging*, 34, 290–304. doi: [10.1017/S0714980815000203](https://doi.org/10.1017/S0714980815000203).
- Phillips, D. R., Siu, O. L., Yeh, A. G. O., and Cheng, H. C. K.** (2005). The impacts of dwelling conditions on older persons' psychological well-being in Hong Kong: the mediating role of residential satisfaction. *Social Science and Medicine*, 60, 2785–2797. doi: [10.1016/j.socscimed.2004.11.027](https://doi.org/10.1016/j.socscimed.2004.11.027).
- Phillips, D. R., Siu, O. L., Yeh, A. G. O. and Cheng, K. H. C.** (2008). Informal social support and older persons' psychological well-being in Hong Kong. *Journal of Cross-Cultural Gerontology*, 23, 39–55. doi: [10.1007/s10823-007-9056-0](https://doi.org/10.1007/s10823-007-9056-0).
- Rodriguez-Artalejo, F. et al.** (2006). Social network as a predictor of hospital readmission and mortality among older patients with heart failure. *Journal of Cardiac Failure*, 12, 621–627. doi: [10.1016/j.cardfail.2006.06.471](https://doi.org/10.1016/j.cardfail.2006.06.471).
- Siu, O. L. and Phillips, D. R.** (2002). A study of family support, friendship, and psychological well-being among older women in Hong Kong. *International Journal of Aging and Human Development*, 55, 299–319. doi: [10.2190/2k1w-hwlp-jkd5-lrp6](https://doi.org/10.2190/2k1w-hwlp-jkd5-lrp6).
- Smith, K. P. and Christakis, N. A.** (2008). Social networks and health. *Annual Review of Sociology*, 34, 405–429. doi: [10.1146/annurev.soc.34.040507.134601](https://doi.org/10.1146/annurev.soc.34.040507.134601).
- Stoeckel, K. J. and Litwin, H.** (2016). The impact of social networks on the relationship between functional impairment and depressive symptoms in older adults. *International Psychogeriatrics*, 28, 39–47. doi: [10.1017/s1041610215000538](https://doi.org/10.1017/s1041610215000538).
- Thoits, P. A.** (1986). Social support as coping assistance. *Journal of Consulting and Clinical Psychology*, 54, 416–423. doi: [10.1037//0022-006x.54.4.416](https://doi.org/10.1037//0022-006x.54.4.416).
- Uchino, B. N.** (2009). Understanding the links between social support and physical health: a life-span perspective with emphasis on the separability of perceived and received support. *Perspectives on Psychological Science*, 4, 236–255. doi: [10.1111/j.1745-6924.2009.01122.x](https://doi.org/10.1111/j.1745-6924.2009.01122.x).
- United Nations.** (2016). Sub-Saharan Africa's growing population of older persons. United Nations Department of Economic and Social Affairs, Population Division. http://www.un.org/en/development/desa/population/publications/pdf/popfacts/PopFacts_2016-1.pdf.
- United Nations DESA.** (2017). World Population Prospects– Population Division Esa.un.org. 2015-07-29. Retrieved 2015-09-29. <https://esa.un.org/unpd/wpp/>.
- van der Geest, S.** (2016). Will families in Ghana continue to care for older people? Logic and contradiction in policy. In: J. Hoffman and K. Pye (eds.), *Ageing in Sub-Saharan Africa: Spaces and Practices of Care* (pp. 21–41) London: Policy Press.
- Vaux, A.** (1988). *Social Support: Theory, Research, and Intervention*. New York, NY: Praeger.
- Wenger, G. C.** (1991). A network typology: from theory to practice. *Journal of Aging Studies*, 5, 147–162. doi: [10.1016/0890-4065\(91\)90003-b](https://doi.org/10.1016/0890-4065(91)90003-b).
- World Bank.** (2018). Sub-Saharan Africa. The World Bank Group, IBRD, IDA. <https://data.worldbank.org/region/sub-saharan-africa>.
- World Health Organization.** (2002). *Active Ageing: A Policy Framework*. Madrid: World Health Organization.
- World Health Organization.** (2014). Health Statistics and information systems. Proposed Working Definition of an Older Person in Africa for the MDS project. Available from: <http://www.who.int/healthinfo/survey/ageingdefolder/en/>.
- World Health Organization.** (2015). *World Report on Ageing and Health*. Geneva: WHO. <http://www.who.int/ageing/events/world-report-2015-launch/en/>, accessed 18 October 2016.
- Yang, Y. C. et al.** (2016). Social relationships and physiological determinants of longevity across the human life span. *Proceedings of the National Academy of Sciences of the United States of America*, 113, 578–583. doi: [10.1073/pnas.1511085112](https://doi.org/10.1073/pnas.1511085112).
- Zhang, Z. and Hayward, M. D.** (2006). Gender, the marital life course, and cardiovascular disease in late midlife. *Journal of Marriage and Family*, 68, 639–657. doi: [10.1111/j.1741-3737.2006.00280.x](https://doi.org/10.1111/j.1741-3737.2006.00280.x).
- Zunzunegui, M.-V., Alvarado, B. E., Del Ser, T. and Otero, A.** (2003). Social networks, social integration, and social engagement determine cognitive decline in community-dwelling Spanish older adults. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 58, S93–S100. doi: [10.1093/geronb/58.2.s93](https://doi.org/10.1093/geronb/58.2.s93).