



HHS Public Access

Author manuscript

J Aging Health. Author manuscript; available in PMC 2016 February 16.

Published in final edited form as:

J Aging Health. 2015 June ; 27(4): 730–750. doi:10.1177/0898264314556616.

Social capital, socioeconomic status, and health-related quality of life among older adults in Bogotá (Colombia)

Diana Lucumi, PhD¹, Luiz Fernando Gomez, PhD², Ross C. Brownson, PhD³, and Diana Parra, PhD³

¹Fundacion para la Education y el Desarrollo Social, Bogota, Colombia

²Pontificia Universidad Javeriana, Bogota, Colombia

³Prevention Research Center in St. Louis, Brown School, Washington University in St. Louis, St. Louis, MO

Abstract

The main goal of this study was to evaluate the relationship between levels of cognitive social capital and health related quality of life (HRQOL). A multilevel, cross-sectional study was conducted in 2007 in Bogotá Colombia. A total of 1,907 older adults completed the Spanish version of the SF-8 in order to assess HRQOL. Cognitive dimension of social capital was assessed. Hierarchical linear regressions were conducted to determine the associations between social capital variables and HRQOL. Only 20% to 25% of the population reported trust in others and shared values. Ninety three percent reported that people in their neighborhood would try to take advantage of them if given a chance. Higher social capital indicators were positively associated with the mental and physical dimension of HRQOL. Results from this study support evidence on the disintegration of the Colombian society, which may be influenced by high levels of social inequality.

Keywords

social capital; older adults; health related quality of life; socioeconomic status

Introduction

There is growing evidence that social capital is an important determinant of disease risk and risk of mortality (Kawachi, Kennedy, Lochner, & ProthrowStith, 1997; Muennig, Cohen, Palmer, & Zhu, 2013). Associations between social capital and multiple health outcomes, including self-reported health, depression, and functional limitations (Nieminen et al., 2010; Pollack & voldem Knesebeck, 2004), have been reported in the literature. Although there is no single, unified theory on social capital, in this paper we focus on its cognitive dimension, which have been termed cognitive social capital. Cognitive social capital refers to attitudes and norms including trust (How much trust do people have in others), shared values (common shared values of solidarity and fairness with others), and reciprocity (How much can people rely in others to help in various ways) (Harpham, Grant, & Thomas, 2002).

Social capital is a determinant of a successful and healthy aging, contributing to higher quality of life of the older population (Cannuscio, Block, & Kawachi, 2003; Cramm, van Dijk, & Nieboer, 2013; Nilsson, Rana, & Kabir, 2006). For example, studies of social capital that involve adults and older adults from high- and middle-income countries have found a positive association with well-being even after adjusting for relevant confounders (Helliwell & Putnam, 2004; Nieminen et al., 2010; Yamaoka, 2008; Yip et al., 2007). Moreover, as people age they often lose close social ties, and may benefit from more access to the social capital available in their communities to satisfy needs related to health and well-being. Social capital is associated with collective actions and organization to obtain resources to build communities (Glass & Balfour, 2003). For instance, older adults living in a neighborhood with high levels of social support may be more inclined to work together to preserve residential areas such as a park, a walking trail, or to make formal petitions for the maintenance of these areas. In turn, the presence of well-maintained physical areas contributes to the social interactions between neighbors (Leyden, 2003). In addition, cognitive aspects of social capital may increase self-satisfaction, self-esteem, involvement with the community, and confidence in individual coping skills in the older adult population (Harpham et al., 2002). Finally, social capital has been found to act as a mediator of the effects of income inequality on health related quality of life (HRQOL) (Kim & Kawachi, 2007).

Neighborhood socioeconomic status (SES) can influence social capital through compositional and contextual mechanisms (Subramanian, Lochner, & Kawachi, 2003). The compositional explanation posits that socioeconomic characteristics of neighborhood residents enhance social interaction. This is supported by findings that demonstrate that social capital is predicted by individual characteristics such as education attainment, income, and marital status (Aida et al., 2011). In turn, the contextual mechanism posits that neighborhood SES influences the levels of social capital by increasing opportunities that affect social relations (Veenstra, 2000). In affluent neighborhoods, for example, residents may have resources to invest in social networking, as well as means that enable easier and more frequent contacts and interactions. Advantaged areas may be also more capable of providing resources to support the development of activities in which residents come together to form and sustain social relations that can have a lasting impact on cognitive social capital. Affluent neighborhoods may have safer places, a condition particularly important for older adults, which enable social gathering and exchange (R. Sampson & Morenoff, 2000). Moreover, affluent neighborhoods tend to have better built environment characteristics such as higher walkability and presence of parks, which in turn enable residents to meet their neighbors and be socially engaged (Leyden, 2003).

According to the compositional and contextual explanations, social capital might be higher in affluent rather than disadvantaged areas. Since people living in low SES areas are more likely to have poor health and lower quality of life as a consequence of adverse circumstances during their life, they could benefit more from high levels of social capital than their counterparts living in more advantaged neighborhoods, who could have better health status, more diverse sources of social interactions, and a reduced exposure to chronic stress (Stephoe & Feldman, 2001). However, the evidence supporting a higher social capital in advantaged neighborhoods is challenged by sociology research that has demonstrated that

poor urban areas can be in fact socially cohesive (Altschuler, Somkin, & Adler, 2004; Glass & Balfour, 2003). The lack of consensus in this area of research indicates the importance of conducting studies for extending current evidence of the relationship between social capital, neighborhood SES, and relevant public health outcomes, particularly in contexts where these issues have been less examined.

To our knowledge, no prior studies in Latin America have examined the association between cognitive social capital and health related quality of life (HRQOL) in older adults from neighborhoods with different SES. The extrapolation of evidence from other regions may be problematic due to the particular social, economic, and demographic characteristics of Latin America. This study seeks to fill this gap in the literature using data from the Built Environment and Older Adults Project of Bogotá (BEOAP). First, we examine the perceptions of trust, shared values, and reciprocity among older adult residents of Bogotá, capital city of Colombia, one of the largest urban centers in Latin America. Second, we measure the association between these indicators of cognitive social capital and neighborhood SES with the physical and mental dimensions of HRQOL. Finally, we examine the extent to which neighborhood SES moderates the relationship between each indicator of cognitive social capital and the physical and mental health dimensions of quality of life.

This study is guided by the conceptual model from Figure 1. The model operationalizes our study variables and posits that cognitive social capital operates at the individual level directly influencing the physical and mental dimensions of HRQOL in older adults. Furthermore, social capital is influenced by contextual and individual level characteristics. Particularly, at the contextual level, is hypothesized that neighborhood SES has a direct effect on HRQOL of older adults. The model also suggests a moderating effect of neighborhood SES on the relationship between cognitive social capital and HRQOL. To develop our conceptual model we followed guidelines from various authors and recommendations of simplicity after careful consideration and understanding of underlying variables and operational concepts, deliberately omitting other factors and pathways (Carpiano & Daley, 2006; Earp & Ennett, 1991).

Social and health conditions of the older adult population in Bogotá

Bogotá has the highest proportion of population aged 65 years and over in Colombia. According to the last national census, in 2005 14.4 % of the total population of the city is 65 or older (5.91 men and 8.48 women) (Departamento Administrativo Nacional de Estadísticas, 2005). In addition, Colombia has a higher proportion of older adult women compared to men (Ministerio de Salud y Protección Social, 2014). This population faces important social and economic disadvantages, for instance, only 10% of the older adult population of Bogotá receives a retirement pension, and 43% have suffered from internal displacement at some point in their lives (Cano et al., 2014). Moreover, the average prevalence of disability among this group is 53% (45.9% in males and 58.3%), 12% of the older adult population lives alone, and 7.8% lives in conditions of extreme poverty (Cano et al., 2014).

In light of this scenario it is important to understand in more depth the conditions of the older adult population of Bogota in terms of their social capital and the relationship with health related quality of life.

Methods

Study design and data

As part of the BEOAP, a multilevel cross-sectional study was conducted in 2007 in order to establish the associations between built environment and physical activity and quality of life in older adults (Gomez et al., 2010; Parra et al., 2010). The sampling design had a two-stage approach. First, we created a sampling frame of 1,734 neighborhoods from low to middle-high socioeconomic status (SES), which were defined by taking into account the homogeneity of urban forms and physical attributes. Middle-high SES combines both middle and high SES since less than 3% of the population belongs to high SES. This sampling frame comprises about 97% of Bogotá's population. Fifty-eight neighborhoods were randomly selected as primary sampling units with oversampling of middle-high SES neighborhoods in order to increase statistical power. Second, approximately 40 adults aged 60 years and older were randomly selected in each urban area using Kish tables (Németh, 2004). Only older adults who resided at least one year in the neighborhood were included in the study. A door-to-door, structured survey was administered by interviewers with experience in population surveys who received a standardized training prior to data collection. Institutional Review Board approval at Fundacion FES Social was obtained prior to data collection.

We obtained effective information from 1,966 participants with a response rate of 67.8%. Since 489 records had missing values in social capital questions, we restricted the multivariate analysis to 1,477 older adults. The 489 participants who were not included in the adjusted models had a lower average age (70.4 years versus 71.9 years $p < .001$), a higher proportion of males (82.4% versus 75.4% $p < .001$), and a lower scoring of the mental dimension of the HRQOL (47.9% versus 45.9% $p < .001$). No significant differences were found by education level and physical dimension of the HRQOL.

Outcome variables: the Spanish version of the SF-8 was used in order to assess HRQOL. The scores of physical and mental domains of this instrument were determined using the procedures recommended by QualityMetric (Qualimetric, 2008), ranging from 19.5 to 58.6 for the physical dimension, and from 17.9 to 59.3 for the mental dimension. Cronbach's alpha (an estimated of internal consistency) was 0.86 for the present study. The SF-8 uses eight question items to measure each of the eight domains of health covered by the SF-36, including physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional and mental health (SF-8 Health Survey Measurement Model).

Social capital variable

We assessed the cognitive dimension of social capital using four questions about trust in others and shared values: 1) *How much do you trust in the people of your neighborhood?* (Perceived trust), 2) *How much can you rely in your neighbors to help in various ways if*

someone is destructive to a nearby place such as a park? (Perceived solidarity), 3) *How much do the people in your neighborhood share the same values?* (Perceived common values), and 4) *How much would the people in your neighborhood try to take advantage of you if they got a chance?* (Perceived fairness). Response options for these questions were “nothing at all or very little, moderately, quite a lot, and very much”. These questions have been used in previous studies of social capital (Kawachi et al., 1997; R. J. Sampson, Raudenbush, & Earls, 1997). Forward and backward translations of the questions were performed. Cognitive interviews to determine comprehension and acceptability of the items were conducted using focus groups and semi-structured interviews prior to the application of the instrument. A low Cronbach’s alpha (0.58) restricted the aggregation of these items into scales (DeVellis, 2003). Given this limitation and for the sake of methodological simplicity and empirical comprehensibility, we dichotomized the response options for each question with “nothing at all, very little, or moderately” as the reference category for the first three questions and “quite a lot and very much” as the reference category for the last question.

Covariates—We adjusted for some of the most relevant confounding factors described in the literature on social capital, including age, gender, educational attainment, living arrangements, and proximity to family members (Harpham et al., 2002). Age was grouped into two categories: 60 to 74 years and 75 to 98 years. Living arrangements were classified as living with spouse, living with family member or friend and living alone. Educational attainment was categorized as none, incomplete elementary, complete elementary, incomplete secondary, complete secondary and more than secondary. This variable was recoded in the multivariate analysis in two categories: “less than complete secondary” versus “complete secondary or more”. Proximity to family members was determined by the question “Walking from your house, how far do the members of your family live?” and categorized as very far, far, neither far nor close, close and very close. Given the scarce number of observations in some categories, this variable was recoded in “Very far, far, or neither far nor close” versus “close or very close”.

Neighborhood SES—SES of neighborhoods was determined using the criteria established by the Planning Department of Bogotá and classified in the following categories: low, middle-low, and middle-high SES. This classification takes into account the physical attributes of the households, such as construction type, materials and surrounding environments including sidewalks and road infrastructure.

Statistical analysis

Means and proportions were calculated for quantitative and qualitative variables, respectively. Hierarchical linear regressions were conducted to assess the associations between social capital variables and mental and physical scores of HRQOL. In a first stage, intra class correlation coefficients and between variances in the empty models were calculated. Subsequently, models were constructed by adding simultaneously all exposure variables and covariates following a theoretical criterion. Cross level interactions between social capital variables and neighborhood socioeconomic status were explored. Interactions were included in the models one at a time and for the inclusion of each interaction term we adjusted for the complete set of variables. All the models assumed a random intercept form

and the slopes were managed as fixed. Collinearity was assessed using variance inflation factor. In addition, endogeneity between social capital items and HRQOL scores was assessed using Hausman's test. Neither collinearity nor endogeneity were found. The univariate and bivariate analysis were conducted in Stata 12 and the hierarchical linear regressions in HLM 6.02.

Results

The majority of the sample population was female (62.5%), which reflects the distribution of the older adult population of Bogotá. The mean age of the sample was 70.7 years old and the average time of residence in the neighborhood was 24.5 years. Thirty percent of the sample had an educational attainment of incomplete elementary. Almost 50% of the population lived with a wife or husband. Only 34% of the sample reported living close to family members (Table 1). Sixty percent (n=35) of the 58 neighborhoods were from middle-low and middle-high socio economic status.

Regarding the first goal, 20.1% of the sample reported that they trust quite a lot or very much in their neighbors (Table 2). Almost 25% reported they could rely quite a lot or very much on their neighbors to help in various ways if someone is destructive to a nearby place such as a park. Twenty percent reported that they share quite a lot or very much the same values with their neighbors. Ninety three percent reported that people in their neighborhood would try to take advantage of them if they could. The mean value for the physical dimension of quality of life was 44.9 (SD=10.2) and the mean value for the mental dimension was 45.5 (SD=10.0).

Results shows in Table 3 supported the suggested relationship depicted in the conceptual model of the study between cognitive physical capital and the mental dimension of HRQOL. A significant positive association was found among the perceived fairness variable and the mental dimension of HRQOL. That is, those who perceived that people in their neighborhood would not take advantage of them had higher score in the mental dimension of HRQOL (adjusted $b= 2.09$, p value = .014). Although the association between perceived trust and mental HRQOL was also positive, the statistical significance was marginal (Table 3; model 1). Contrary to the suggested in the conceptual model, Model 1 in Table 3 shows that there is no an association between neighborhood SES and the mental dimension of HRQOL.

Similar to the mental dimension perceived fairness was positively and significantly associated with the physical dimension of quality of life (adjusted $b= 2.88$, $p < .005$) (Table 4; model 1). This model also shows a marginally significant association between perceived common values and the physical dimension of HRQOL ($b=1.29$, p value = .700). In addition, a significant positive association was detected between middle-low/middle-high SES neighborhoods and the physical dimension of quality of life ($b=1.77$, $p < .001$).

Regarding the third goal of the study, as shown in model 2 in the table 3, a significant interaction term was found between perceived fairness and middle-low/middle-high SES with the mental dimension of HRQOL ($b= 1.92$, p value = .036). In table 4, model 2 that

describes the interactions terms for the physical dimension of HRQOL we only found one marginally significant interaction between perceived common values and middle-low/middle-high SES ($b=1.12$, p value = .087).

Discussion

The aging of the Colombian population is a pressing and relatively neglected issue in public health research and public policy (Nieto & Alonso, 2007). In this study we examined the associations between indicators of cognitive social capital and both physical and mental dimensions of health related quality of life in older adults living in the urban area of Bogotá. The results show a low proportion of cognitive social capital among participants (ranges from 7.1% to 24.9%), a positive association between some indicators of cognitive social capital and physical and mental health, and a higher score of physical health among older adults living in high SES neighborhoods. Finally, we found an effect modification of neighborhood SES in the associations between perceived fairness and mental HRQOL. The empirical testing of the conceptual model that guided the study is more supportive of the moderation pathway (dashed line in the conceptual model) than the hypothesized mediation of social capital in the association between SES neighborhoods and HRQOL.

Despite the heterogeneity of the measures and samples used in social capital research, the low levels of cognitive social capital in this study are in some extent similar to those reported in previous studies in Colombia. For instance, low levels of trust have been found in young (Harpham, Grant, & Rodriguez, 2004) and adult population (Hurtado, Kawachi, & J, 2011) in Colombia. Furthermore, Sudarsky (2008) found that based on a question of perceived social mistrust at the national level, the percentage of interpersonal social capital was 10.1% in 1997 and 14.3% in 2005.

Evidence from our study and prior research in the area suggests a social fragmentation or division of the Colombian society (Sudarsky, 1999, 2008) and highlights the importance of examining the low levels of cognitive social capital observed in this study. Yet, potential explanations for these findings include the striking income inequality of Colombia. Based on the Gini coefficient, which reflects absence of inequality when is equal to 0 and indicates maximum inequality when is 1, Colombia is one the most unequal countries in the world (Colombia's Gini: 0.55) (United Nations Development Programme, 2013). Social capital has been suggested as mediator of the association between income inequality and health (Kim & Kawachi, 2007; Wilkinson, 1997). Among the pervasive effect of income inequality is the erosion of the social fabric by widening the gap between the rich and the poor and generating more mistrustful relationships between citizens, which are in turn associated with increased morbidity and mortality rates (Kawachi et al., 1997; World Health Organization, 2002). Research has demonstrated that the more compact and homogeneous the society is in terms of income, race, and religion, the greater the trust (Alesina & La Ferrara, 2000). This finding implies that the vast income inequality in Colombia is likely to create mistrust and divisions in the society (Sudarsky, 1999, 2008).

In addition to the potential effects of income inequality on the levels of social capital, a violent conflict within a country has the potential to weaken population's social ties

(Colletta & Cullen, 2000). This may be an effect of the long lasting internal conflict that Colombia has experienced for almost six decades. In fact, past or recent experiences of physical violence and forced relocation or displacement could have a negative impact on the levels of trustworthiness in the population (Colletta & Cullen, 2000). For instance, memory of direct or indirect violence may reduce levels of solidarity, undermine interpersonal and collective trust, and generate permanent feelings that others are trying to take advantage. Although we do not have evidence of the exposure of participants to any form of violence or forced displacement, it is plausible to consider that they may have been part of the massive wave of migrants that arrived to the capital city to escape from the conflict in rural areas, which accelerated the rate of urbanization in Colombia since the 1950's (Dufour & Piperata, 2004).

Participants of this study with the highest perception of trust in their neighborhood and sense of fairness had better mental health scores compared to their counterparts with lowest perception of trust and fairness. Our findings are in the same direction of a prior study that found that mental health and well-being are associated with social capital and cohesion in different age groups (Cramm et al., 2013; Fone et al., 2007). For instance, Fone and colleagues found that mental health was associated with area-level income advantage and high social cohesion after adjusting for individual risk factors (Fone et al., 2007). However, the participants of that study included adults 18 to 74 years from a European city, thus the findings cannot be easily translated to the Latin American context. Our findings may be explained by several reasons. Elders with higher level of "trust in others" and a sense of fairness are more likely to develop and maintain supportive social relationships that can help them to buffer negative events and adverse circumstances. Moreover, trustful social interactions may not only reduce negative emotions, stress levels, and anxiety, but also increase feelings of security and self-esteem and lead to better mental health (Kawachi & Berkman, 2001; Phongsavan, Chey, Bauman, Brooks, & Silove, 2006).

We found that better physical health was associated with shared common values and a sense of fairness. Although literature directly assessing the role of cognitive social capital on physical health and functional disabilities is limited, there are two plausible pathways for explaining our findings. First, people who trust more in their neighborhoods are more open to be involved in networks that may enable the rapid diffusion of information and resources regarding healthy behaviors such as walking or exercise groups, or available preventive and health care services. For example, there is evidence that higher levels of trust in neighbors are associated with higher odds of physical activity (Ueshima et al., 2010). However, other studies do not provide strong support for this association (Kim, Subramanian, Gortmaker, & Kawachi, 2006; Murayama, Wakui, Arami, Sugawara, & Yoshie, 2012). Cognitive social capital enables people to participate in and undertake collective and coordinated actions to improve resources and opportunities that might directly promote health among older adults (e.g. well-maintained parks and public spaces) and positively promote their social participation, thus limiting or delaying the onset of disease and functional disability (Aida et al., 2013). The specific contribution of these pathways needs further examination.

A significant interaction term was found in this study. Those living in more socioeconomically advantaged neighborhoods have more mental health benefits from having

a high perception of fairness. For the physical dimension of HRQOL, we found a marginally statistical significant interaction. This interaction term suggests that the beneficial effect of the perception of common values on physical HRQOL is higher for older adults living in higher SES neighborhoods in comparison with their counterparts living in poorer areas. Although elders living in more disadvantaged neighborhoods may be more exposed and vulnerable to adverse physical and social conditions and may have more need for the potential benefits of social capital, the results of this study suggest that they benefit less from positive cognitive social capital. Thus, initiatives aimed at increasing social capital should recognize this unequal effect of social capital in order to avoid the exacerbations of health inequalities that might originate from population-based interventions (Frohlich & Potvin, 2008).

Some strengths of this study can be highlighted. First, several attributes of the sampling design, including sample size and the representation of participants of different SES levels allowed sufficient statistical power to detect associations and statistically infer our results to the older adult population living in the urban area of Bogotá. Second, although the possibility of self-selection cannot be ruled out, this may have been minimized by the inclusion criterion of residing at least one year in the neighborhood and to the fact that the average time of residence was 24.5 years. Third, this study included some of the main confounding variables to be considered in the relationship between social capital a health (e.g. length of residence in the neighborhood, educational attainment, and living arrangements) (Harpham, et al., 2002). Finally, similar to previous studies (Harpham et al., 2004), we found that the question of whether people in the neighborhood/community are likely to take advantage, was a strong predictor of mental and physical health. Thus, future studies should consider the use of this short measurement of trust to identify associations between social capital and health.

Several limitations should be noted. First, the cross-sectional design does not allow ruling out reverse causality as those older adults with higher scorings of HRQOL may be more likely to establish social interactions with other residents of their neighborhoods. Second, the assessment of HRQOL by means of self-perception instruments may generate classification bias, as people who have lived in deprived conditions during several years may develop good perceptions of HRQOL as a protective strategy to cope with social adversities (Sen, 2002). Third, this study did not measure the contribution of structural social capital (e.g. participation in groups) to mental and physical health. Although both structural and cognitive social capital may be associated with these outcomes, the latter are more likely to be associated with cognition and feelings that are more influential to mental health status (Harpham et al., 2004). Fourth, it was not possible to obtain a continuous scoring of social capital since we did not have a large enough cell size in some of the items to generate a scale. This could have affected the statistical efficiency of the models and hindered the possibility to explore more robust interactions terms. Finally, given the complex urban and social contexts in which this study was conducted, the results are restricted only to the city of Bogotá. This fact enhances the necessity to carry out similar studies in other cities of the region.

This study sheds light on the relevance of cognitive social capital as a determinant of mental and physical health of older adults in Bogotá. Particular attention is needed for those living in more disadvantaged socioeconomic neighborhoods as they have more exposure and vulnerabilities that negatively affect their health and well-being, and simultaneously benefit less from the positive effect of social capital. Improving the economic circumstances of people living in disadvantaged neighborhoods and promoting social capital among urban dwellers should be part of a common agenda in public health promotion. Future research should focus on understanding and influencing the mechanisms that link social capital and health in this population.

References

- Aida J, Kondo K, Kawachi I, Subramanian SV, Ichida Y, Hirai H, Watt RG. Does social capital affect the incidence of functional disability in older Japanese? A prospective population-based cohort study. *Journal of Epidemiology and Community Health*. 2013; 67(1):42–47.
- Aida J, Kondo K, Kondo N, Watt RG, Sheiham A, Tsakos G. Income inequality, social capital and self-rated health and dental status in older Japanese. *Social Science & Medicine*. 2011; 73(10): 1561–1568. [PubMed: 21982631]
- Alesina A, La Ferrara Eliana. Participation in Heterogeneous Communities. *The Quarterly Journal of Economics*. 2000; 115:847–904.
- Altschuler A, Somkin CP, Adler NE. Local services and amenities, neighborhood social capital, and health. *Social Science & Medicine*. 2004; 59(6):1219–1229. [PubMed: 15210093]
- Cannuscio C, Block J, Kawachi I. Social capital and successful aging: The role of senior housing. *Annals of Internal Medicine*. 2003; 139(5):395–399. [PubMed: 12965964]
- Cano, C.; Medina, M.; Samper, R.; Chavarro, D.; Borda, M.; Arciniegas, A. Iluminando las decisiones e intervenciones públicas para la población adulta mayor, Estudio SABE Bogota. Bogotá: 2014.
- Carpiano RM, Daley DM. A guide and glossary on postpositivist theory building for population health. *Journal of Epidemiology and Community Health*. 2006; 60:564–570. [PubMed: 16790824]
- Colletta, N.; Cullen, M. Social Capital Initiative Working Paper. Washington, DC: The World Bank; 2000. The nexus between violent conflict, social capital and social cohesion: Case studies from Cambodia and Rwanda.
- Cramm JM, van Dijk HM, Nieboer AP. The importance of neighborhood social cohesion and social capital for the well being of older adults in the community. *Gerontologist*. 2013; 53(1):142–152. [PubMed: 22547088]
- Departamento Administrativo Nacional de Estadísticas. [Retrieved 08, 15, 2014] Censo General 2005. Población Adulta Mayor. 2005. from <http://www.dane.gov.co/index.php/poblacion-y-demografia/proyecciones-de-poblacion>
- DeVellis, RF. Scale Development: theory and Applications. Vol. Second. Thousand Oaks: Sage Publications; 2003.
- Dufour DL, Piperata BA. Rural-to-urban migration in Latin America: An update and thoughts on the model. *American Journal of Human Biology*. 2004; 16(4):395–404. [PubMed: 15214058]
- Earp JA, Ennett ST. Conceptual models for health education research and practice. *Health Education Research*. 1991; 6(2):163–171. [PubMed: 10148689]
- Fone D, Dunstan F, Lloyd K, Williams G, Watkins J, Palmer S. Does social cohesion modify the association between area income deprivation and mental health? A multilevel analysis. *International Journal of Epidemiology*. 2007; 36(2):338–345.
- Frohlich KL, Potvin L. The inequality paradox: The population approach and vulnerable populations. *American Journal of Public Health*. 2008; 98(2):216–221. [PubMed: 18172133]
- Glass, T.; Balfour, J. Neighborhood, aging, and functional limiting. In: Kawachi, I.; Berkman, L., editors. *Neighborhood and Health*. New York (NY): Oxford University Press; 2003.

- Gomez LF, Parra DC, Buchner D, Brownson RC, Sarmiento OL, Pinzon JD, Lobelo F. Built environment attributes and walking patterns among the elderly population in Bogota. *Am J Prev Med.* 2010; 38(6):592–599. [PubMed: 20494235]
- Harpham T, Grant E, Rodriguez C. Mental health and social capital in Cali, Colombia. *Social Science & Medicine.* 2004; 58(11):2267–2277. [PubMed: 15047083]
- Harpham T, Grant E, Thomas E. Measuring social capital within health surveys: key issues. *Health Policy and Planning.* 2002; 17(1):106–111. [PubMed: 11861592]
- Helliwell JF, Putnam RD. The social context of well-being. *Philosophical Transactions of the Royal Society of London Series B-Biological Sciences.* 2004; 359(1449):1435–1446.
- Hurtado D, Kawachi I, J S. Social Capital and health-rated health in Colombia: The good, the bad, and the ugly. *Social Science & Medicine.* 2011; 72:584–590. [PubMed: 21185633]
- Kawachi I, Berkman LF. Social ties and mental health. *Journal of Urban Health.* 2001; 78(3):458–467. [PubMed: 11564849]
- Kawachi I, Kennedy BP, Lochner K, ProthrowStith D. Social capital, income inequality, and mortality. *American Journal of Public Health.* 1997; 87(9):1491–1498. [PubMed: 9314802]
- Kim D, Kawachi I. U.S. state-level social capital and health-related quality of life: multilevel evidence of main, mediating, and modifying effects. *Annals of Epidemiology.* 2007; 17(4):258–269. [PubMed: 17324589]
- Kim D, Subramanian SV, Gortmaker SL, Kawachi I. US state- and county-level social capital in relation to obesity and physical inactivity: A multilevel, multivariable analysis. *Social Science & Medicine.* 2006; 63(4):1045–1059. [PubMed: 16644081]
- Leyden KM. Social capital and the built environment: the importance of walkable neighborhoods. *Am J Public Health.* 2003; 93(9):1546–1551. [PubMed: 12948978]
- Ministerio de Salud y Protección Social. [Retrieved 03, 20, 2014] Envejecimiento y Vejez. 2014. from <http://www.minsalud.gov.co/proteccion-social/promocion-social/Paginas/EnvejecimientoyVejez.aspx>
- Muennig P, Cohen AK, Palmer A, Zhu W. The relationship between five different measures of structural social capital, medical examination outcomes, and mortality. *Social Science & Medicine.* 2013; 85:18–26. [PubMed: 23540361]
- Murayama H, Wakui T, Arami R, Sugawara I, Yoshie S. Contextual effect of different components of social capital on health in a suburban city of the greater Tokyo area: a multilevel analysis. *Social Science & Medicine.* 2012; 75(12):2472–2480. [PubMed: 23068557]
- Németh R. Representativeness problems inherent In address-based sampling and a modification of the Leslie Kish grid. *Bulletin de méthodologie sociologique.* 2004; 83:43–60.
- Nieminen T, Martelin T, Koskinen S, Aro H, Alanen E, Hyyppä MT. Social capital as a determinant of self-rated health and psychological well-being. *International Journal of Public Health.* 2010; 55(6): 531–542. [PubMed: 20361226]
- Nieto M, Alonso L. ¿Está preparado nuestro país para asumir los retos que plantea el envejecimiento poblacional? *Salud Uninorte Barranquilla.* 2007; 23:292–301.
- Nilsson J, Rana A, Kabir ZN. Social capital and quality of life in old age - Results from a cross-sectional study in rural Bangladesh. *Journal of Aging and Health.* 2006; 18(3):419–434. [PubMed: 16648394]
- Parra DC, Gomez LF, Sarmiento OL, Buchner D, Brownson R, Schimd T, Lobelo F. Perceived and objective neighborhood environment attributes and health related quality of life among the elderly in Bogota, Colombia. *Soc Sci Med.* 2010; 70(7):1070–1076. [PubMed: 20138418]
- Phongsavan P, Chey T, Bauman A, Brooks R, Silove D. Social capital, socio-economic status and psychological distress among Australian adults. *Social Science & Medicine.* 2006; 63(10):2546–2561. [PubMed: 16914244]
- Pollack CE, vondem Knesebeck O. Social capital and health among the aged: comparisons between the United States and Germany. *Health & Place.* 2004; 10(4):383–391. [PubMed: 15491897]
- Sampson, R.; Morenoff, J. Public health and safety in context: Lessons from community-level theory on social capital. In: D, SB.; Syme, SL., editors. *Promoting health: Intervention strategies from social and behavioral research.* Washington, D.C: National Academies Press; 2000. p. 366-389.

- Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*. 1997; 277(5328):918–924. [PubMed: 9252316]
- Sen A. Health: perception versus observation. *British Medical Journal*. 2002; 324(7342):860–861. [PubMed: 11950717]
- Steptoe A, Feldman PJ. Neighborhood problems as sources of chronic stress: Development of a measure of neighborhood problems, and associations with socioeconomic status and health. *Annals of Behavioral Medicine*. 2001; 23(3):177–185. [PubMed: 11495218]
- Subramanian SV, Lochner KA, Kawachi I. Neighborhood differences in social capital: a compositional artifact or a contextual construct? *Health & Place*. 2003; 9(1):33–44. [PubMed: 12609471]
- Sudarsky, J. Colombia's social capital: The national measurement with the Barcas. Washington, DC; 1999.
- Sudarsky J. La evolución del capital social en Colombia, 1997–2005. *Revista Javeriana*. 2008; 144
- Ueshima K, Fujiwara T, Takao S, Suzuki E, Iwase T, Doi H, Kawachi I. Does social capital promote physical activity? A population-based study in Japan. *Plos One*. 2010; 5(8):e12135. [PubMed: 20808822]
- United Nations Development Programme. Human development report 2013. The rise of the South: Human progress in a diverse world. Human Development Report. 2013
- Veenstra G. Social capital, SES and health: an individual-level analysis. *Soc Sci Med*. 2000; 50(5): 619–629. [PubMed: 10658843]
- Wilkinson RG. Socioeconomic determinants of health - health inequalities: Relative or absolute material standards? *British Medical Journal*. 1997; 314(7080):591–595. [PubMed: 9055723]
- World Health Organization. Reducing risks, promoting healthy life. Geneva: World Health Organization; 2002. The World health report 2002.
- Yamaoka K. Social capital and health and well-being in East Asia: A population-based study. *Social Science & Medicine*. 2008; 66(4):885–899. [PubMed: 18158206]
- Yip W, Subramanian SV, Mitchell AD, Lee DTS, Wang J, Kawachi I. Does social capital enhance health and well-being? Evidence from rural China. *Social Science & Medicine*. 2007; 64(1):35–49. [PubMed: 17029692]

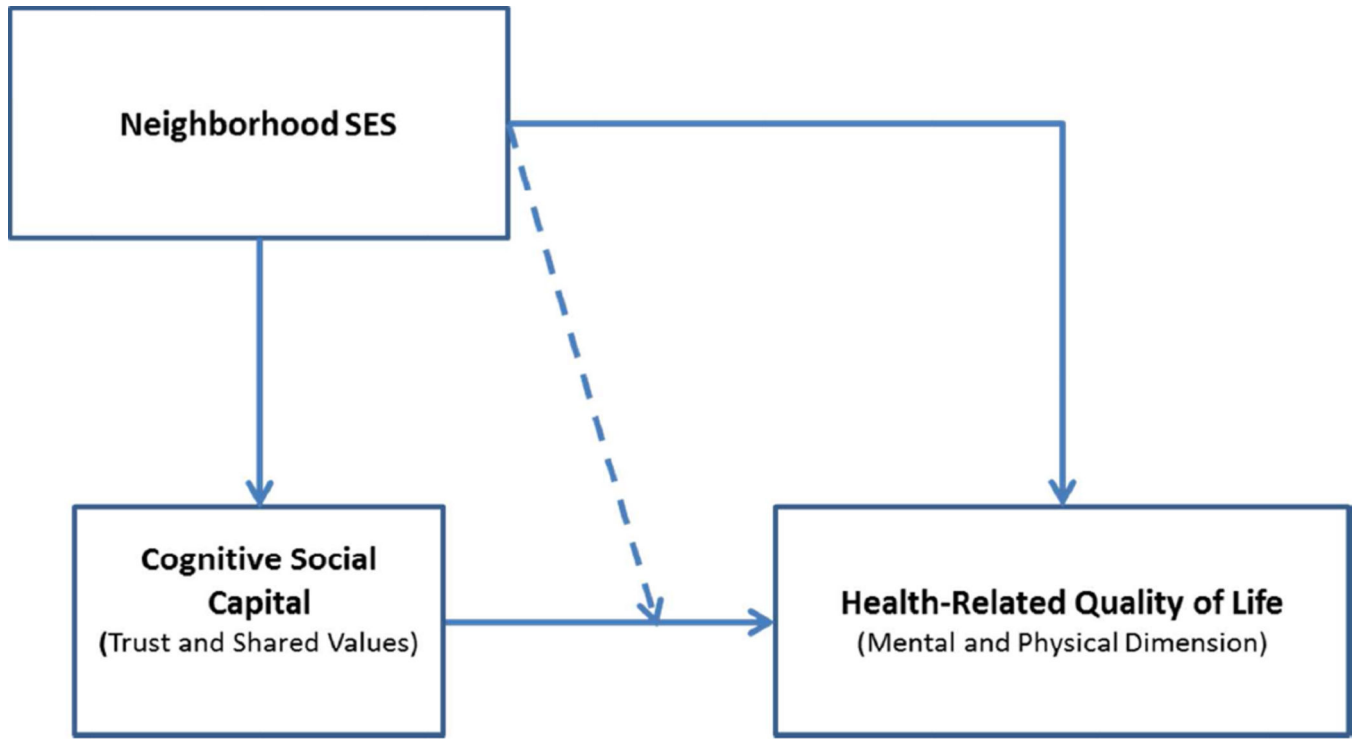


Figure.
Conceptual Model of the Study

Table 1

Descriptive characteristics of the study population (n= 1966).

Variable	n ^a	% or mean (SD)
Gender		
Male	737	37.5
Female	1229	62.5
Age in years	1625	70.7 (7.7)
Age groups		
60–74 y	1366	69.5
75–98 y	600	30.5
Years of residence	1966	24.6 (16.1)
Educational attainment		
None	267	13.6
Incomplete elementary	594	30.2
Complete elementary	441	22.4
Incomplete secondary	279	14.2
Complete secondary	188	9.6
More than secondary	197	10.0
Living arrangements		
Living with spouse	977	49.7
Living with family member or friend	811	41.3
Living alone	178	9.0
Walking from your house, how far do the members of your family live?		
Very far	467	23.8
Far	599	30.5
Neither far nor close	162	8.2
Close	596	30.2
Very close	70	3.6
Do not have family in Bogota	72	3.7
Trust in the people of your neighborhood		
Nothing at all or very little	845	44.3
Moderately	678	35.4
Quite a lot	333	17.5
Very much	51	2.8
Missing values	59	-
Rely on your neighbors for help if someone is destructive to a nearby place.		
Nothing at all or very little	879	47.8
Moderately	502	27.3
Quite a lot	395	21.5
Very much	62	3.4
Missing values	128	-
People in your neighborhood share the same values		

Variable	n^a	% or mean (SD)
Nothing at all or very little	798	46.8
Moderately	560	32.8
Quite a lot	302	17.7
Very much	46	2.7
Missing values	260	
People in your neighborhood try to take to advantage of you		
Nothing at all or very little	1,371	78.4
Moderately	254	14.5
Quite a lot	88	5.0
Very much	36	2.1
Missing values	217	
HRQOL physical dimension	1966	44.9(10.2)
HRQOL mental dimension	1966	47.5(10.0)

HRQOL: Quality of life scores ranged from 0 to 100, with higher scores indicating higher HRQOL. The number of observations differ from 1966 as some variables had missing values

Table 2
Distribution of social capital and Health Related Quality of Life variables among study populations, by socio-demographic characteristics.

Variable	Trust in the people of your neighborhood.	Rely on your neighbors for help if someone is destructive to a nearby place.	People in your neighborhood share the same values?	People in your neighborhood try to take to advantage of you?	HRQOL physical dimension	HRQOL mental dimension
	% Quite a lot, very much	% Quite a lot, very much	% Quite a lot, very much	% Quite a lot, very much	Mean(SD)	Mean(SD)
All participants	20.1	24.9	20.4	7.1	44.9(10.2)	47.5(10.0)
Gender						
Male	22.0	26.7	21.3	7.3	46.9(9.7)**	49.1(9.3)**
Female	19.0	23.7	19.8	7.0	43.7(10.3)	46.6(10.4)
Age groups						
60–74 y	19.7	25.0	19.7	7.8	46.0(9.8)**	47.9(9.8)*
75–98 y	21.0	24.6	22.0	5.4	42.4(10.7)	46.6(10.5)
Years of residence						
1 to 5 y	16.3	20.7	14.0*	4.0*	43.8(10.5)	46.8(9.9)
5 years and more	20.7	25.5	21.4	7.6	45.1(10.1)	47.7(10.0)
Educational attainment						
<u>Less than complete secondary</u>	18.3	20.9*	15.8**	7.7	42.7(10.3)**	46.0(10.5)**
Complete secondary or more	21.6	27.9	23.9	6.6	46.6(9.8)	48.7(9.6)
Living arrangements						
Living with spouse	21.9	26.1	21.2	7.1	46.0(9.8)**	48.5(9.5)**
Living with family member or friend	17.7	22.9	19.9	6.8	43.9(10.6)	47.0(10.3)
Living alone	21.4	26.7	17.8	8.3	43.9(10.3)	44.6(10.8)
Walking from your house, how far do the members of your family live?						
Very far, far, neither far nor close	17.5**	23.0*	19.5	7.5	44.3(10.3)*	47.2(10.1)*
Close, very close	25.9	28.8	23.1	5.8	45.9(9.9)	48.3(9.8)
Neighborhood SES						
Low	.17.1*	22.7	13.9**	8.4	43.5(10.4)**	47.2(10.3)
Middle-low and middle-high	22.1	26.3	24.7	6.3	45.8(10.0)	47.8(9.9)

The p values were obtained by Chi square test of independence in social capital variables and by ANOVA and T-test in HRQOL

p<0.001.

**

p<0.05

*

HRQOL: Quality of life scores ranged from 0 to 100, with higher scores indicating higher QOL

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 3

Hierarchical Linear regression analysis of mental dimension of the HRQOL and social capital (n= 1,477).

Variables	Mean	Model 1 ^a	Model 2 ^b
		<i>b</i> (SE)	<i>b</i> (SE)
How much do you trust in the people of your neighborhood?			
Nothing at all or very little, moderately	47.3	Ref	Ref
Quite a lot, very much	49.0	+1.52* (0.87)	+1.54* (0.87)
How much can you rely in your neighbors to help in various ways if someone is destructive to a nearby place such as a park?			
Nothing at all or very little, moderately	47.6	Ref	Ref
Quite a lot, very much	48.1	-0.58(0.66)	-0.60(0.67)
How much do the people in your neighborhood share the same values?			
Nothing at all or very little, moderately	47.6	Ref	Ref
Quite a lot, very much	48.4	+0.02(0.74)	+0.06(0.74)
How much would the people in your neighborhood try to take to advantage of you if they got a chance?			
Quite a lot, very much	45.8	Ref	Ref
Nothing at all or very little, moderately	48.1	+2.09**(0.85)	+2.07**(0.85)
Neighborhood SES			
Low	47.7	Ref	Ref
Middle-low and middle-high	47.1	-0.01(0.60)	-1.88*(1.00)
Interactions terms			
Trust in neighbors (Quite a lot, very much) *SES (Middle-low and middle-high)			+0.52(0.53)
Rely on your neighbors (Quite a lot, very much) *SES (Middle-low and middle-high)			+0.09(0.82)
Neighbors share the same values (Quite a lot, very much) *SES (Middle-low and middle-high)			-0.76(0.60)
Neighbors would take advantage of you if they could (Nothing at all or very little, moderately) *SES (Middle-low and middle-high)			+1.92**(0.89)

^aModel adjusted by age, gender, years of residence in the neighborhood, living arrangements, neighborhood SES, educational attainment; proximity to family members and social capital variables,

^bModel adjusted by age, gender, years of residence in the neighborhood, living arrangements, neighborhood SES, educational attainment; walking from your house how far do the members of your family live; social capital variables and interaction terms.

Variance components. Tau: empty model (1.22000; p= 0.017), model 1 (0.1744; p= 0.374), model 2 (0.1121; p= 0.416). ICC: empty model (0.0120), model 1 (0.00189), model 2 (0.0012).

* p .01;

** p .05;

*** p .01

Table 4

Hierarchical Linear regression analysis of physical dimension of the HRQOL and social capital (n= 1,477).

Variables	Mean	Model 1 ^a	Model 2 ^b
		<i>b</i> (SE)	<i>b</i> (SE)
How much do you trust in the people of your neighborhood?			
Nothing at all or very little, moderately	44.5	Ref	Ref
Quite a lot, very much	46.2	-0.03 (0.81)	-0.04 (0.81)
How much can you rely in your neighbors to help in various ways if someone is destructive to a nearby place such as a park?			
Nothing at all or very little, moderately	44.3	Ref	Ref
Quite a lot, very much	46.5	+0.76 (0.72)	+0.77 (0.72)
How much do the people in your neighborhood share the same values?			
Nothing at all or very little, moderately	44.5	Ref	Ref
Quite a lot, very much	46.7	+1.29* (0.70)	+1.29* (0.70)
How much would the people in your neighborhood try to take to advantage of you if they got a chance?			
Quite a lot, very much	45.8	Ref	Ref
Nothing at all or very little, moderately	48.1	+2.88*** (1.02)	+2.89*** (1.02)
Neighborhood SES			
Low	43.2	Ref	Ref
Middle-low and middle-high	45.2	+1.77*** (0.49)	+2.56*** (0.86)
Interactions terms			
Trust in neighbors (Quite a lot, very much) *SES (Middle-low and middle-high upper)			+0.96(0.77)
Rely in your neighbors (Quite a lot, very much) *SES (Middle-low and middle-high)			-0.77(0.63)
Neighbors share the same values (Quite a lot, very much) *SES (Middle-low and middle-high)			+1.12* (0.56)
Neighbors would take advantage of you if they could (Nothing at all or very little, moderately) *SES (Middle-low and middle-high)			-0.81 (0.77)

^aModel adjusted by age, gender, years of residence in the neighborhood, living arrangements, neighborhood SES, educational attainment; walking from your house, how far do the members of your family live and social capital variables,

^bModel adjusted by age, gender, years of residence in the neighborhood, living arrangements, neighborhood SES, educational attainment; walking from your house, how far do the members of your family live; social capital variables and interaction terms.

Variance components. Tau: empty model (2.1822; p<0.001), model 1 (0.2126; p=0.376), model 2 (0.1186; p=0.422). ICC: empty model (0.0214), model 1 (0.0023), model 2 (0.0013).

* p .01;

** p .05;

*** p .01