



Community social capital and inequality in depressive symptoms among older Japanese adults: A multilevel study

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ABSTRACT

Although studies have suggested that community social capital contributes to narrow income-based inequality in depression, the impacts may depend on its components. Our multilevel cross-sectional analysis of data from 42,208 men and 45,448 women aged 65 years or older living in 565 school districts in Japan found that higher community-level civic participation (i.e., average levels of group participation in the community) was positively associated with the prevalence of depressive symptoms among the low-income groups, independent of individual levels of group participation. Two other social capital components (cohesion and reciprocity) did not significantly alter the association between income and depressive symptoms.

1. Introduction

Ageing is a major risk factor for many chronic diseases and physical and mental illnesses. Specifically, in Japan, Wada demonstrated that in the years 2000/2001, 33.5% of older people in four rural towns had depressive symptoms, defined as scoring more than 5 points on the Geriatric Depression Scale (GDS-15) (Wada et al., 2004). Depression can cause other critical health issues including suicide, frailty, functional disability, and mortality (Waern et al., 2003; Kondo et al., 2008; Wada et al., 2004). Therefore, depression is a key target of the public health actions targeted to older adults in Japan and worldwide (World Health Organization, 2010; Ministry of Health Labour and Welfare, 2012).

Socioeconomic inequalities in the prevalence of depressive symptoms among older adults are also major targets of public health actions, as social epidemiology studies have identified depression as strongly concentrated among the socially disadvantaged older population (Murata et al., 2008; Cole and Dendukuri, 2003).

Depression can be affected by psychosocial conditions in the community. Recent studies have suggested that high community social capital—defined as “resources that are accessed by individuals as a result of their membership in a network or a group”—is associated with fewer individual risks for depressive symptoms in older adults (Ivey et al., 2015; Kawachi et al., 1999). However, the evidence is scarce on whether or not high community social capital is associated with the smaller

socioeconomic disparity in depressive symptoms. Poverty puts one at risk for social isolation, which, in turn, puts one at risk for depression. Therefore, we could hypothesize that communities rich in social capital may contribute more to those who are worse off, according to their contextual characteristics as positive externalities (Berkman et al., 2014). Our previous ecological study in Japan showed an inverse relationship between community-level social capital and income-based inequality in depressive symptoms among older adults (Haseda et al., 2018). Although this ecological study supported the hypothesis, it could not distinguish the compositional and contextual effects of community social capital in reducing income-based inequality in depressive symptoms; thus, a more sophisticated study is necessary: that is, a multilevel analysis to assess whether or not community-level social capital modifies the association between individual income and the prevalence of depressive symptoms. Moreover, we also hypothesize that the association between community social capital and income-based inequality in depressive symptoms may differ by the dimensions of the former. Specifically, based on recent discussions, we focused on the structural and cognitive aspects of community social capital, which when evaluated as cognitive social cohesion may contribute to individuals who comprise the community universally, regardless of socioeconomic background. This is because people inhabiting a community can reap the benefits of social cohesion equally, given that cohesion is nonexcludable (Berkman et al., 2014). In theory and practice, cognitive social capital should and has been evaluated in terms of

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the levels of social cohesion (trust and reciprocity) (Berkman et al., 2014). However, community social capital evaluated as a structural aspect (levels of civic participation or the opportunities for participation (Berkman et al., 2014)) may not necessarily benefit all people. This may be specifically so in a highly segregated community, because the organizations for the rich and the poor may be completely different, making positive spillover less likely to occur. Hence, the average level of structural social capital cannot reflect equality in the opportunities for social interaction. To differentiate the structural and cognitive aspects of community social capital, we used a recently developed validated social capital scale.

Thus, the purpose of this study was to evaluate the variable associations between individual income and depressive symptoms across communities with different levels of structural and cognitive social capital, using large-scale multilevel data of older Japanese adults.

2. Methods

2.1. Data

We used cross-sectional data of the 2013 wave of the Japan Gerontological Evaluation Study (JAGES). The JAGES 2013 wave was an anonymous self-administered mail-in survey across 30 municipalities in 13 out of 47 prefectures in Japan. Although the participating municipalities are not nationally representative, they vary significantly and include small rural towns to large metropolitan cities from areas in the North (Hokkaido) and South (Kumamoto) ends. Their population ranged between 1246 and 3.7 million people, and the share of the older population was between 18.0% and 47.6% (Statistics Bureau; Ministry of Internal Affairs and Communications, 2013). Participants who were aged 65 years or older were functionally independent in their daily living; that is, they did not receive benefits from public long-term care insurance at that time. Participants living in 16 large municipalities were randomly selected by multistage sampling, while all eligible individuals living in 14 small municipalities were selected. We mailed 193,694 questionnaires, of which 137,736 were returned (response rate = 71.1%). We excluded the responses without valid values for key variables (age, gender, the area of residence, and depressive symptoms) from the analyses.

2.2. Measures

2.2.1. Depressive symptoms

We used the Japanese short version of the Geriatric Depression Scale (GDS-15) developed for self-administered surveys to assess depressive symptoms (Yesavage and Sheikh, 1986; Niino et al., 1991). We set a cut-off score of 4/5, which has been universally adopted as indicating a depressive tendency based on validation studies (Nyunt et al., 2009).

2.2.2. Income

We gathered information on annual income by asking, “What was your pretax annual household income for 2012 (including pension)?” in 15 predetermined categories (in thousands of yen). We calculated household income equalized by dividing each response by the square root of the number of household members and further dividing them into tertiles.

2.2.3. Community social capital

We used the Health-Related Social Capital Scale developed and validated among older Japanese people by Saito et al. (2017). The scale has three subscales that assess civic participation, social cohesion, and reciprocity. Scores for each subscale are derived from the summation of the percentage that responded to multiple questions and are standardized. Items for civic participation concern participation in five types of groups in the community: volunteering, sports, hobby, culture, and skill

teaching. Social cohesion items concern trust (“Do you think that people living in your area can be trusted, in general?”), others’ perceived intention to help (“Do you think that people living in your area try to help others in most situations?”), and attachment to the residential area (“How attached are you to the area in which you live?”). The sum of the percentage of those who answered “very” or “moderately” to the items formed the score. Reciprocity items concern having someone to provide or receive emotional support or to receive instrumental support: “Do you have someone who listens to your concerns and complaints?” “Do you listen to someone’s concerns and complaints?” and “Do you have someone who looks after you when you are sick and confined to a bed for a few days?” The sum of the percentage of those who designated anyone to the questions formed the score.

2.3. Covariates

Referring to recent social epidemiology studies, we considered the following variables as potential confounding factors in the association between income and depression among older adults: age, years of education (less than nine years or not), marital status (having a spouse or not), living alone or not, comorbidities (having past medical history of stroke, heart disease, diabetes mellitus, cancer, dementia, or Parkinson’s disease), and frequency of going out (Chang-Quan et al., 2010; Yan et al., 2011; Stahl et al., 2016; Evans et al., 2005; Cohen-Mansfield et al., 2010). We also considered the fixed effect of each municipality.

2.4. Statistical analysis

We conducted a multilevel Poisson regression analysis incorporating both individuals and school districts. As recent studies report that community-level factors had different impacts with regard to gender, we modeled men and women separately (Eriksson et al., 2011; Pattyn et al., 2011; Haseda et al., 2018). School districts are the smallest areal units identifiable using JAGES data. Within 30 municipalities, there are 565 school districts. The district originally represents the district unit determining the catchment area of each public school. We chose to use this areal unit because a school district is likely to represent Japanese “communities” developed in its local history, such as “*kyu-son*” (former village areas). We believed that the school district could represent the adequate areal size to reflect community social capital that could work as the informal resource contributing to community autonomy.

We statistically investigated the effect modifications of community social capital in terms of civic participation, social cohesion, and reciprocity on the association between income and depressive symptoms. To do so, in the Poisson regression, we modeled cross-level interaction terms between each standardized community social capital component and income besides those variables’ main effects. In addition to the covariates explained above, we modeled individual responses to each social capital component as potential confounders. Each individual-level social capital component was binarized in our analyses; that is, those who participated in any of the five kinds of groups in their community were considered to engage in individual civic participation; those who showed trust, others’ intention to help, or attachment to the residential area were regarded as individually socially cohesive; and those who answered that they have someone to provide or receive emotional or instrumental support were considered to have individual social support. We took into account missing values assigning dummy variables for the missing category. We used Stata version 14.1 for these statistical analyses. (Stata Corp. Texas, USA)

3. Results

We analyzed 87,656 individuals (42,208 men and 45,448 women) after excluding those with missing responses to key variables ($n = 7996$

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