

A Study of Social Capital Patterns and Loneliness of the Elderly in Rural Areas

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Abstract Given the growing concerns about loneliness among the elderly in rural areas, this study investigates the patterns of social capital in rural area elderly, and examines the levels of loneliness associated with each pattern. Employing data from 253 rural area elderly, latent profile analysis, multinomial logistic regression, and ANOVA were performed. The results reveal that the social capital of elderly in rural areas can be divided into three classes: 1) trust and cohesion 2) multi-capital 3) low-capital. For determining the patterns, gender, education, and chronic disease were shown to be influencing variables. In the ANOVA results, elderly people who fell into the low-capital pattern showed significantly higher loneliness than the other two patterns. Based on these results, the study suggests policy and practical implications for relieving the loneliness of elderly people in rural areas.

Keywords Social Capital · Loneliness · Rural area elderly · Latent Profile Analysis

Introduction

There is growing interest in the loneliness of older people in Korea. It is no longer surprising news that the suicide rate of Korean elderly ranked in first place among OECD countries six

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years in a row, and the number of elderly who live alone is continuously increasing (NEWSIS, 2017). According to KOSTAT (2017), the ratio of elderly living alone in 2016 was 33.5 among entire single families, and the number of elderly living alone has increased 1.8-fold in 10 years (2005: 776,996 → 2015: 1,379,066). In particular, older people in rural areas feel more loneliness due to the rapid decline of the population and the lack of familial bonds as a result of urban concentration (Oh & Lee, 2015). Existing studies confirm that loneliness is worse in rural elderly than in those who live in urban areas (Cho, 1994; Yim, Lee, & Park, 2014). It is hard to ignore the importance of loneliness for older people in rural areas.

Loneliness is one of the most important factors in the quality of life of elderly people, and many studies have suggested that it also used be as an outcome variable. Peplau and Periman (1982) defined loneliness as a negative emotion evoked by the discordance between the expectations and the actual social relations of an individual. Loneliness can derive from emotional and social isolation, and it can be found easily in the period of old age because this is the time when people experience partings due to death or separation from family and familiar surroundings (Choi & Park, 2009; Kim & Nam, 2015; Weiss, 1973). Among the elderly, loneliness can be both an outcome and an influencing variable. As an outcome variable it includes socioemotional factors (Bang, 2014; Chen, Hicks, & While, 2014; Choi & Park, 2009; Nam & Kim, 2015), individual health (Choi & Park, 2009; Kim, 2014), and other social factors (Oh & Lee, 2015; Yi, Kang, Jang, & Yun, 2014). As an influencing variable, loneliness can affect depression (Cho & Kim, 2015;), suicidal ideation (Bang, 2014; Park, 2014), and successful aging (Nam & Kim, 2015).

Among related variables, social capital is suggested as a variable for relieving the loneliness of the elderly in rural areas. Social capital refers to collective characteristics within a community, including trust, norms, and networks of the community that have reciprocal characteristics (Hong, Hwang, & Kim, 2017; Putnam, 2001). Like its name, a compound of society and capital, social capital consists of a number of subcategories. This study uses the definition from Aida, et al.'s (2011) study; namely trust, network, civic participation, social cohesion, and social support. In terms of loneliness, social capital can relieve the negative feelings of the elderly because it can fill the social need, which can prevent social isolation (Lauder, Mummery, & Sharkey, 2006). Existing studies support the usefulness of social capital by explaining that a person who has a strong-enough support network can relieve loneliness by developing a greater network in their surroundings (Hong, Hwang, & Kim, 2017; Gray, 2009). In particular, Oh & Lee's (2015) study examined that social capital can play a mediating role in the loneliness of rural elderly, and a high level of social capital led to decreased loneliness. Therefore, it can be inferred that social capital can play a more effective role in alleviating the loneliness of the elderly in rural areas where there is a lack of public support and human resources by reconstructing the social bonds of the community (Choi & Park, 2009).

When investigating the effect of social capital on loneliness, it is necessary to consider the existence of latent variables within social capital. Many of the existing studies focus on a simple causality between social capital and loneliness among older people (Fukuyama, 2001; Gray, 2009; Lauder, Mummery, & Sharkey, 2006; Nyqvist, et al., 2013; Oh & Lee, 2015). However, considering that social capital is a compound variable which has subcategories, there is a need for a more detailed analysis of the effects of the each subcategories on loneliness (Hong, Hwang, & Kim, 2017). Investigating patterns of social capital can provide another

approach to the loneliness of rural area elderly that enables tailored intervention. Cluster analysis, which has mostly been used for investigating the characteristics of subgroups, is based on existing results or theories. On the contrary, latent profile analysis (LPA), an analytical method used in this study, has a different approach to the subgroups of a variable; a person-based approach which finds appropriate latent groups from the answers of each respondent (Collins & Lanza, 2010). Therefore, LPA can provide more accurate latent patterns from the data, thus enabling the investigation of the differences in degrees of loneliness in social capital patterns.

The overall purpose of this study is to investigate the patterns of social capital in rural area elderly, and to examine the differences in loneliness in each pattern. The goal is to enable a deeper understanding of the social capital of elderly people in rural areas, along with presenting a more tailored approach for intervening in the loneliness of the population. Therefore we posit the following hypotheses:

1. There will be a number of patterns in social capital among rural area elderly.
2. There will be different determinant factors for each social capital pattern among rural area elderly.
3. The level of loneliness will be different for each social capital pattern among rural area elderly.

Method

Sample and data

Sample

The sample in this study was taken from the survey “A Study about Healthy Aging and Well-dying of Korean Elderly,” which was conducted from December 2017 to February 2018 by SSK Research Center for Aging Society in Seoul National University. The questionnaire of the survey was developed from a literature review and a former survey questionnaire, and the survey was conducted by interviewers in a survey agency who had completed education in research ethics. The population in this study was people whose age is greater than 65. The population was sampled by proportional probability with their gender, age, and place where they live. From the total sample of 2,067 elderly, data on 253 elderly who currently live in rural areas were extracted and used for the final analysis. In this study, rural area was defined based on the national administrative system; administrative districts which are designated as “Gun” were considered as rural areas. To earn the research ethics, Seoul National University Institutional Review Board reviewed and approved the study (# 1801/001-009).

Variables (social capital)

To investigate the patterns of social capital among the elderly in rural areas, five subcategories, —trust, network, civic participation, social cohesion, and social support—were selected from

Aida et al.'s (2011) study. Trust consisted of four items, which concern an individual's trust in others and others' trust in him or herself. Next, network was measured with five questions about the usage frequency of neighborhood, social network services, blood, school, and regional relationships. Third, civic participation consisted of six items concerning participation in local gatherings, civic groups, volunteering, and so on. Next, social cohesion has six items that deal with how closely respondents relate with the neighborhood. Finally, social support consisted of six questions about how easily respondents can use health, education, and welfare-related support from local institutions. All of these items were measured by a 5-point Likert scale from "strongly disagree" to "strongly agree," and earned appropriate reliabilities (Cronbach's $\alpha = .884$).

Variables (loneliness)

To measure the level of loneliness among the elderly, a short scale for measuring loneliness was used (Hughes, Waite, Hawkey, & Cacioppo, 2004). The scale consisted of three items: "How often do you feel that you lack companionship?," "How often do you feel left out?," and "How often do you feel isolated from others?" For each of these a 3-point Likert scale was used. For analysis, the scale was calculated as the mean scores, and a higher score meant higher loneliness. In the study, the scale obtained high reliability (Cronbach's $\alpha = .876$).

Variables (influencing variables)

Variables that might influence social capital patterns among rural area elderly – age, gender, education, religion, and marital status – were selected. The age of the respondents was determined by the year of birth and recoded with their age, and gender was measured by a dichotomous question about their gender. The education level of respondents was measured from no education to bachelor's degree or more, and for religious status respondents were asked about their religion and their answers were recoded into a dichotomous variable. Finally, the marital status of the respondents was measured with the question "Do you currently live with your spouse?"

Data analysis

The data analysis of this study consists of four steps: latent profile analysis (LPA), crosstab analysis, multinomial logistic regression, and an analysis of variance (ANOVA). LPA is an analytical method for identifying latent patterns in the responses, and analysis of continuous variables can be distinguished by LCA (latent class analysis), which uses categorical variables (Collins & Lanza, 2010). Compared to the K-means cluster analysis that decides the number and characteristics of patterns by theoretical background, the classifying of the patterns of LPA is based on the respondents' answers, which is called a person-centered approach. Moreover, the decision on the number of classes is based on statistical values, such as AIC (Akaike Information Criteria), BIC (Bayesian Information Criteria), the Lo-Mendell-Rubin test, and the entropy of each class (Bergman & Magnusson, 1997). This statistical approach enables a more

accurate result in classifying the patterns. With the extracted classes of social capital in rural area elderly, a crosstab analysis was conducted to examine the characteristics of respondents in each class. Next, multinomial logistic analysis was conducted to estimate the transference possibilities of influencing variables among the patterns. Finally, ANOVA was conducted to compare the level of loneliness by social capital type. For these analyses, Mplus v.6.12 and SPSS 23.0 were used, and the significance level of all analyses was set to a *p*-value under .05.

Result

Sociodemographic characteristics of rural area elderly

The sociodemographic characteristics of older adults in rural areas are presented in Table 1. In this study, more female than male respondents participated (Male: *n* = 98, 37.9%, Female: *n* = 157, 62.1%). The mean age of study participants was 76.01, and the most frequent age range was 75 to 84. In terms of education, it turned out that lower education was prevalent among Korean elderly (elementary graduate or under: *n* = 162, 64.0%). About 60% of the participants answered that they are religious (58.5%), and only 26% answered that they have no chronic diseases. Pointing out that 37.5% of respondents have two or more chronic diseases shows that health management is crucial to them. As far as marital status, more than half of respondents answered that they have a spouse (*n* = 138, 54.5). Among the subcategories of social capital, the highest factor was social cohesion (3.74), and civic participation scored the lowest. This result implies there is a shortage of infrastructure in rural areas for civic participation such as leisure societies or local gatherings.

Table 1 Sociodemographic characteristics of study participants

		n(%)			n(%)
Gender	Male	98(37.9)	Religion	Yes	148(58.5)
	Female	157(62.1)		No	105(41.5)
Age (76.01)	65–74	105(41.5)	Chronic Disease	No	68(26.9)
	75–84	115(45.5)		1	90(35.6)
	More than 85	33(13.0)		2 or more	95(37.5)
Education	No education	33(13.0)	Marital Status	Spouse	138(54.5)
	Elementary school	129(51.0)		No spouse	115(45.5)
	Middle school	40(15.8)	Social capital	mean	
	High school	48(18.2)		Trust	3.61
	College or more	5(2.0)		Network	3.11
			Civic participation	2.12	
			Social cohesion	3.74	
			Social support	3.18	

Patterns of social capital among rural elderly

The results of LPA about social capital among rural elderly are given in Table 2. The optimal number of latent classes for social capital was decided by the value of AIC, BIC, entropy, and significance of the LMR test. Class classification was performed from 2 to 4 classes, and the 3-class result turned out to be the most appropriate model; the 3-class model showed the lowest BIC value (2555.681), the highest entropy (.835), and LMR test significance (68.047, $p < .01$).

Table 2 Patterns of social capital of rural area elderly

	2 Classes	3 Classes	4 Classes
AIC (Akaike Information Criterion)	2536.043	2477.947	2464.733
BIC (Bayesian Information Criterion)	2592.577	2555.681	2563.668
Adjusted BIC	2541.854	2485.937	2474.903
Entropy	.809	.835	.727
Lo-Mendell-Rubin (p -value)	189.526***	68.047**	24.476
Social capital	Pattern 1 (54.2%) (Trust & cohesion)	Pattern 2 (13.4%) (Multi-capital)	Pattern 3 (32.4%) (Low-capital)
Trust	3.86	3.43	3.29
Network	3.33	3.59	2.53
Civic participation	2.05	3.57	1.61
Social cohesion	4.19	3.74	2.98
Social support	3.42	3.62	2.59

The bottom of Table 2 and Figure 1 show the details of the 3-class model. The first pattern was named “trust and cohesion capital” because it shows a higher level of trust and social cohesion than the other groups. The ratio of the pattern among the study respondents was 54.2%. Next, the “multi-capital” pattern, which took up 13.4% of the population, was characterized as a high level in all five subcategories and well-balanced. Third, the “low capital” pattern showed relatively low scores in every category, and it occupied 32.4%. From the appearance of the trust and cohesion pattern we can infer that elderly people in rural areas put stress on achieving trust and cohesion with community members, which could be a unique characteristic of this population.

Features of social capital patterns

The distribution of the sociodemographic characteristics of each pattern was presented in Table 1. Crosstab analysis was conducted, and the results showed that gender, education, and chronic disease were significantly influencing variables to classify the patterns. In gender distribution, the trust and cohesion group showed a similar ratio, but females belonged more in the low-capital pattern (35.7%) and males were more in the multi-capital pattern (19.8%). This might be explained by the traditional Korean prejudice on gender roles; women were forced to be at home, and they had less chance to develop these resources. In terms of education, less-educated elderly people were more likely to belong in the low-capital pattern, but as their education level went up, they were affiliated more with the other two groups ($X^2 = 27.613$, $p < .01$). In terms of

chronic disease, as people had more chronic diseases, they were more likely to be affiliated with the low-capital pattern (0 = 19.1%, 2 or more = 45.3%, $X^2 = 15.437, p < .01$). It could be said that physical hardship leads to less social participation. However, the age and religion of rural elderly did not show any significant influence on their social capital patterns. The results are shown in Table 3.

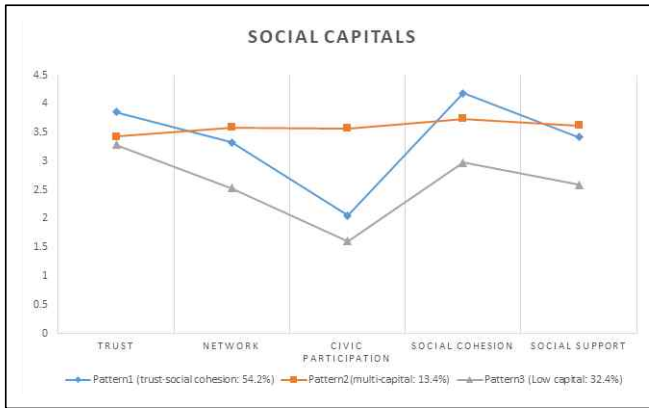


Fig. 1 Category distribution of each pattern

Table 3 Features of each social capital pattern

Variables		Trust & cohesion	Multi-capital	Low capital	X^2 (p-value)
Gender	Male	53.1	19.8	27.1	6.031*
	Female	54.8	9.6	35.7	
Age	65–74	59.0	14.3	26.7	3.023
	75–84	50.4	12.1	37.4	
	85 or more	51.5	15.2	33.3	
Education	No education	30.3	6.1	63.6	27.613**
	Elementary School	60.5	10.1	29.5	
	Middle school	62.5	15.0	22.5	
	High school	45.7	23.9	30.4	
	College or more	60.0	40.0	0.0	
Religion	Yes	51.4	12.4	36.2	1.186
	No	56.1	14.2	29.7	
Chronic Disease	0	63.2	17.6	19.1	15.437**
	1	61.1	10.0	28.9	
	2 or more	41.1	13.7	45.3	
Spouse	Yes	47.8	14.8	37.4	3.454
	No	59.4	12.3	28.3	

To investigate the determinant factors of each social capital pattern, multinomial regression analysis was conducted with the low-capital pattern as reference. The analysis results are presented in Table 4 ($X^2 = 32.011, p < .01$). In the comparison between the trust and cohesion

and low-capital patterns, chronic disease was the only factor that significantly affected the transference of these two patterns. As the number of chronic diseases increases, the possibility of falling into the low-capital pattern increases by 1.35 times (OR = .738, $p < .05$). In general, an elderly person who has health issues shows lower frequency of social participation, so it is hard to build trust with others. Thus, it is quite reasonable that chronic disease was revealed to be a determining factor between these two patterns. Comparing the multi-capital and low-capital patterns, gender, education, and marital status were factors to distinguish these two patterns. Females showed more possibilities for belonging to the low-capital pattern than males (OR = 3.041, $p < .05$). In terms of education, as education level was lower, the likelihood of affiliation with the low-capital pattern increased by 2.28 times (OR = 2.282, $p < .01$). In addition, elderly people who had no spouse were 3.35 times more likely to belong to the low-capital pattern than those who had a spouse (OR = 3.437, $p < .05$).

Table 4 Multinomial logistic regression results on social capital patterns

	class1 vs class3			class2 vs class3		
	B	S.E.	OR	B	S.E.	OR
Gender	-.082	.355	.921	1.112*	.547	3.041
Age	-.006	2.153	.994	.017	.039	1.017
Education	.195	.188	1.215	.825**	.259	2.282
Religion	-.300	.296	.741	-.655	.460	.519
Chronic disease	-.304*	.141	.738	-.182	.219	.834
Marital status	-.210	.361	.811	1.235*	.580	3.437

$$X^2 = 32.011 \quad p < .01$$

Comparison of loneliness by social capital pattern

In this section, the mean difference of loneliness for the three patterns was compared by ANOVA, and the results are presented in Table 5. The score of loneliness was similar in the trust and cohesion (1.39) and multi-capital patterns (1.37), but the loneliness score of the low-capital pattern was significantly higher than the other two groups (1.65). This result was confirmed with a post-hoc test ($F = 8.651$, $p < .001$). The differences in the loneliness scores could imply that obtaining trust and social cohesion with community members is a solution for relieving the loneliness of rural area elderly.

Table 5 Mean difference of loneliness among social capital patterns

	Loneliness (SD)	F(post hoc: Scheffe)
Trust & cohesion (a)	1.39(.45)	8.651*** (a, b < c)
Multi-capital (b)	1.37(.45)	
Low-capital (c)	1.65(.51)	

Discussion and conclusion

This study was designed to investigate the patterns of social capital among rural area elderly,

and the association of these patterns with loneliness in the population. For this purpose, we used data from the SSK Research Center for Aging Society, and performed LPA, cross-tab analysis, multinomial logistic regression, and ANOVA. The results from the data are as follows.

First, from the result of the LPA, it could be determined that three patterns existed among older people in rural areas: 1) trust & social cohesion (high in both trust and social cohesion), 2) multi-capital (generally high in every subcategory), 3) low-capital (low in every subcategory). Trust and social cohesion can be found similarly in a view of community-related variables. Also, this sketches out the current situation in rural areas in Korea. With strong interregional population mobility, rural regions have become mixed communities of newly arrived incomers and existing residents. In Park, Yoon, & Kang's (2006) study, the life satisfaction of rural newcomers depended on their relationship with other community members. From this we can infer the importance of the community variable in social capital. Compared to Hong, Hwang, & Kim's (2017) study, the number of patterns was the same, but each pattern was different; the earlier study suggested patterns of social capital as being latent, disconnected, and affluent. The difference in the patterns might derive from the use of different methodologies and differences in the populations. However, considering that both studies showed the existence of a mixed zone, which means the population group that shows high levels in certain categories, we can conclude that there is a need for a more tailored approach to social capital among older people. In particular, for interventions to be effective, merging the subcategories might be possible. For example, an intervention in the realm of trust and social cohesion can be understood as strengthening the relationship among community members. It might be possible to launch a community program that covers these two categories.

Next, among sociodemographic variables, gender, education level, and chronic disease were influencing factors on social capital patterns. In detail, older people who are female, have lower education, and have more chronic diseases are inclined to fall into the low-capital pattern. The result seems quite reasonable, and similar to other existing studies about factors of social capital (Cannuscio, Block, & Kawachi, 2003; Chung & Sung, 2012; Hong, Hwang, & Kim, 2017). Considering that people who have been socially disadvantaged have more possibilities to fall into the low-capital pattern, providing more support for these populations is needed to achieve better social capital.

Third, in the mean comparison, the loneliness score for the low-capital pattern was significantly higher than the scores for the other two patterns. In addition, the trust and cohesion and multi-capital patterns showed no significant differences. It can be thought that social capital can play an important role to relieve the loneliness of elderly people in rural areas. The result also indicates that older people whose social capital is not sufficient can be helped by fundamental actions to build their community trust and social cohesion.

Based on the study results, a number of social work implications for older people in rural areas are suggested. First, considering the sociodemographic characteristics of each social capital pattern, a political approach to older people who have been socially disadvantaged is urgently needed. The study results have proven that a low level of social capital in the elderly leads to more loneliness. Pointing out that loneliness leads to other negative outcomes, including suicide, improving their social capital can be the starting point for dealing with these negative outcomes. In addition to this, there are a number of factors that affect social capital patterns, so

a multidimensional approach is needed. For example, a social policy in Andong-si focuses on female farmers, including new incomers (Kwon, 2017). According to the news article, Andong-si provides a comprehensive policy for female farmers. As well as maternal support, such as postpartum care, the local government provides educational, recreational, and community gathering opportunities for the increase of female roles in rural areas. Many feelings of loneliness derive simply from being alone, so this effort that draws those who are socially disadvantaged into gatherings to accumulate social capital might be a solution.

Next, for lonely elderly, the results point out the importance of community-based consolidation with other community members, because the best solution for countering loneliness is increased contact with close community members. In rural areas, which show low population density, the regional senior community center (Gyoungro-dang) can be useful for community gatherings. Also, considering the increase in the number of elderly people who live alone, there is growing interest in using the place as a “group home.” Gimje-si has provided a policy since 2004 to transform regional senior community centers into group homes for elderly people who live alone (Choi & Won, 2016). According to the report about the community living of Gimje-si, group home residents answered that they feel vitality while communicating with other members at home (Lee, Cho, & Song, 2013). Community living in rural areas can help to combat loneliness by building trust and social bonds.

There are a number of limitations to this study. First, in terms of survey participants, 253 might not be a large-enough number to represent the whole of Korea. Even though the survey was conducted in every region of Korea, it is hard to say that the result of LPA can represent the whole of Korea. Future studies could use national panel data to obtain representativeness. Next, considering the period of older age is long, there is a need for age segregation. There is already 30 or more years of age gap in the sample, so it is hard to imagine that every age group shows similar patterning. By obtaining an appropriate sample size, age segregation might enable more accurate analysis. Despite these limitations, this study can have meaning by providing a different approach to examining the patterns of social capital and deepening our understanding of the relationship between social capital and loneliness. Future studies which use the social capital pattern suggested in this study might lead to better and loneliness-free lives for older people in rural areas.

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