

Social relationships and functional status among Japanese elderly adults living in a suburban area

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Ethical considerations

The University of Tsukuba ethics committee approved this study (1331).

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Abstract

Objectives

Social relationships may help in maintaining functional status among older adults. This study examined the types of social relationships that were related to functional status among Japanese community-dwelling older adults.

Study design

Prospective cohort study

Methods

We used baseline data from 2008 and conducted follow-up surveys six years later. Participants included individuals over age 65 who lived in a suburban community in Japan. The Index of Social Interaction measure was used to assess multiple elements of social relationships. Two functional status outcomes were set: 1) functional decline and 2) functional decline and mortality. A multiple logistic regression model was used to examine the association between social relationships and functional decline six years later.

Results

After controlling for age, sex, family structure, and disease status in 2008, poor social curiosity (OR = 1.31, 95%CI: 1.02-1.69) and interaction (OR = 2.57, 95%CI: 1.20-5.51) were associated with functional decline. Furthermore, social curiosity (OR = 1.39, 95%CI: 1.14-1.69) and interaction (OR = 2.84, 95%CI: 1.44-5.59) were associated also with composite outcome.

Conclusions

Social curiosity and interacting with others were significantly associated with functional status. Promotion of social interaction may be essential for preventing future need for care.

Keywords: Ageing, older adults, functioning, care prevention, social relationships

Introduction

As global ageing is accelerating, ageing-related health and social issues will become more serious public health problems. For an ageing society, planning how to live successfully into old age is essential for both the society and individuals. Maintaining physical and mental functioning into old age is one of the critical requirements for successful ageing,¹ which is a pressing issue from both political and research perspectives.

Social relationships help maintain one's health and contribute to survival.^{2,3} Numerous studies have reported that social relationships have a positive effect on several health outcomes such as cancer⁴ and depression.⁵ Furthermore, empirical studies have examined the effects of social relationships on both disease and functional status in the older adults.

Social relationships influence both basic and instrumental abilities of daily living (BADL and IADL, respectively). A prospective cohort study showed that social ties were significantly positively related to the maintenance and restoration of the ADL function.⁶ Another study that targeted older Japanese community-dwelling adults showed that having a 'social role' was significantly associated with both BADL and IADL.⁷ Furthermore, previous studies have shown that social isolation predicts mortality as effectively as well-documented clinical risk factors of mortality such as smoking, alcohol consumption, and obesity.⁸ Therefore, social relationships are important for decreasing functional decline and achievement of longevity.

Previous studies have measured social relationships using social networks, social supports, and social integration.^{2,9} More broadly, one's interaction with his/her social environment is reported to have an effect on cognitive functioning among the older adults.¹⁰ Conceptual-pathway models that link social relationships to health,^{2,11} show that social relationships contribute to health through two pathways: stress buffering and main effect. The stress-buffering model suggests that social support influences health by reducing the impact of stress. Stress affects health by modifying health behaviours and promoting physiological systems that increase the risk of physical and psychiatric disorders. Social support might buffer this adverse effect, and thus contribute to maintaining health. On the other hand, the main-effect model suggests that social connections are effective irrespective of the existence of stress. Social connections might promote a positive psychological status through a sense of purpose and positive-affect, and provide feelings of responsibility that increase one's self-care motivation.³

These hypotheses suggest that each aspect of a social relationship may influence different health outcomes through different pathways. However, recent studies have focussed on a limited range of social relationships; the connection of these relationships with functional status requires more extensive analysis. Examining the types of social interaction that impact functional status may contribute to knowledge for developing effective preventive interventions using social relationships and improvement of the current public health practice. A previous study showed that social curiosity was associated with functional status 3 years later.¹² However, a further longitudinal study is needed because more time might

be necessary to capture functional status. To address this issue, this study examined the types of social relationships that are related to functional status with a 6-year follow up, using tools to evaluate the various social relationship behaviours among Japanese community-dwelling older adults.

Materials and Methods

Participants

The data were from a 2008 community-empowerment cohort study, which conducted a survey of suburban community residents (population = 4539) near a large city in central Japan. Drop-off/pick-up surveys and mailed surveys were conducted using self-administered questionnaires. Interviews were also conducted by research staff with the participants who needed help in responding to the questionnaire. In the 2008 sample, of the 1068 individuals, 903 responded to the baseline survey (response rate = 84.6%). We followed-up with participants (n = 674) who were functionally independent and provided valid responses (including all data for basic characteristics). During the 6-year follow-up period, 108 participants had died and 94 were lost to attrition.

Instruments

Measure of functional status

This study introduced composite outcomes and set two functional status outcomes: 1) functional decline and 2) functional decline and mortality. If subjects died during 6 years of the follow-up period, our interest; functional declining were not observed in this study. In this case, mortality and functional decline are competing risks, and observations of functional decline could be

underestimated. Thus, we introduced mortality as a composite outcome as described above. Outcome 1 was evaluated with one questionnaire item, ‘Do you need some help or care in your daily life?’ If the participant responded ‘*No need for any care in their life*’, they were defined as the steady group. The other respondents who stated that they need care were defined as the declining group. For outcome 2, participants were defined as the declining group if they answered that they need any care for their life or if they had died during the 6-year follow-up period, otherwise, they were defined as steady. Although functional declining was evaluated subjectively, we checked the consistency of the results using these two outcomes.

Measure of social relationships

Social relationships were measured by the Index of Social Interaction (ISI),¹³ which was developed to measure various aspects of social relationships. The ISI consists of 18 items and five subscales: 1) ‘independence’, which measures motivation to live an active life, taking an active approach toward life, motivation to live a healthy life, and having a regular or routine lifestyle; 2) ‘social curiosity’, which evaluates reading (e.g. newspapers, books, or magazines), trying to use new equipment, having a hobby, and having feelings of importance; 3) ‘interaction’, which includes family communication, non-family communication, and interactions with non-family persons; 4) ‘participation’, which measures social-group participation, neighbourhood-activity participation, watching television, and taking an active role in society; and 5) ‘feeling safe’, which evaluates receiving counselling and having someone who will provide support in an emergency. One point was given for each item with a positive response, and

zero points were given for a negative response, and each subscale score was calculated by summing the item scores. ISI scores were used as continuous variables in the analysis.

Covariates

Similar to previous studies, age, sex, family structure, and disease status were considered confounding factors. Age was entered as a continuous variables (years). Family structure was divided into living alone or living with others; it included one item asking the respondents whom they lived with. Medical conditions including having diabetes, heart disease and strokes were evaluated if they answered ‘yes’ to having these medical conditions.

Statistical analysis

We examined the association between ISI and functional status decline. First, Mann-Whitney U tests, chi-square tests, and Fisher’s exact test were conducted to examine the bivariate associations between characteristics and functional decline. Second, logistic regression analyses were conducted to clarify which ISI subscales showed significant associations with functional decline. Crude odds and adjusted odds for age, sex, family structure and disease status were calculated to examine the confounding factor effects on ISI. Each ISI subscale was added separately into the models. For missing data, list wise deletions were made. SAS 4.3 was used for analysis, and p-values <0.05 were considered statistically significant.

Results

Results of the bivariate association of participants' characteristics and social relationships by functional status are shown in Table 1. Participants with a functional decline after six years tended to be older ($p < 0.01$), female ($p = 0.02$), and to have a heart disease ($p < 0.01$). Moreover, participants who experienced functional decline or had died tended to be older ($p < 0.01$) and had heart disease ($p < 0.01$); however, there were no differences by sex. Regarding social relationships, participants with a functional decline after six years reported lower social curiosity ($p < 0.01$) and interaction ($p = 0.03$). Furthermore, participants who experienced functional decline or had died reported lower independence ($p < 0.01$), social curiosity ($p < 0.01$), interaction ($p < 0.01$) and social participation ($p < 0.01$).

A logistic regression model was conducted for each outcome. The odds for functional declining with and without controlling for confounding factors are shown in Table 2. Poor social curiosity (OR = 1.31, 95%CI: 1.02-1.69) and interaction (OR = 2.57, 95%CI: 1.20-5.51) were associated with functional decline. In addition, the odds for functional declining and mortality are shown in Table 3. Poor social curiosity (OR = 1.39, 95%CI: 1.14-1.69) and interaction (OR = 2.84, 95%CI: 1.44-5.59) were associated also with composite outcome. Social curiosity and interaction were significantly associated with both of these two outcomes after controlling for confounding factors.

Discussion

This study examined the types of social relationship behaviours that were associated with the functional status of Japanese older adults living in suburban

151 areas. Results indicated that social curiosity and interaction with others were
152 significantly associated with functional status, even after controlling for potential
153 confounding factors. Two outcomes, self-reported functional status and self-
154 reported function combined with mortality, were identified as reflecting
155 functional decline in this study. The results were observed consistently in both
156 outcomes. This study indicates that social curiosity, which includes intellectual
157 activities and interaction with others, may be an important factor for preventing
158 functional decline among various social relationships. This result suggests that
159 the importance of interaction with the social environment should be considered
160 for public health practices. It may add to the existing literature and encourage the
161 development of effective interventions for promoting interactions with the social
162 environment in public health practice. Since social isolation is becoming more
163 common, interaction with family and friends and promotion of intellectual
164 activities could be essential for preventing functional decline and achieving
165 successful ageing.

166
167 Previous studies had reported associations similar to that found in our study.
168 Social curiosity, which was found to have a significant association with functional
169 decline, involves interacting with one's social environment, including reading
170 newspapers, reading books, and having hobbies. Recent studies have shown that
171 intellectual activities, including reading newspapers, were associated with a lower
172 risk of IADL decline^{7,14} and functional decline.¹⁵ A cognitively stimulating
173 environment, including intellectual and leisure activities, contributes to the
174 maintenance of cognitive functioning and a lowered risk of dementia due to brain
175 stimulation.^{10,16} Since declining cognitive function can lead to a decline in

physical function,¹⁷ intellectual activities may help in maintaining physical function through cognitive stimulation.

Regarding interaction with others, recent studies have shown that having a friendship network is significantly associated with reduced mortality among older adults.¹⁸ In addition, marital status and contact with relatives has been shown to be negatively related to the mortality of women in Japan.¹⁹ Consistent with previous studies, this study showed an association between interacting with others and decreased functional decline after controlling for potential confounding factors. Interaction with others appears to be an important factor influencing functional decline in Japanese older adults. Since social isolation is increasing, interaction with family and friends could be essential to preventing the need for care.

While the subscales of social curiosity and interacting with others showed a significant association with less functional decline after six years, independence, participation, and feeling safe did not show such a significant association. Some previous studies had reported that these aspects of social relationships had a significant effect on several health factors, including declining cognitive function and mortality.^{20,21,22} Therefore, future studies should examine these aspects of social relationships in more detail. Furthermore, considering that social support buffers the effect of stress and psychological and physiological disease pathways, its role in influencing functional maintenance requires further analysis.

The following information confirms the strength of the findings of this study.

First, the survey was conducted in a suburban area that was not under populated. The baseline survey response rate (84.6%) was high because data were collected through drop-off/pick-up surveys, mailed surveys, and interviews, making the sample more representative. Furthermore, we had defined two outcomes as functional status indicators: self-reported functional decline and self-reported functional decline combined with mortality, which showed consistent results. Introducing composite outcomes might enhance the reliability of the results.

Limitations of this study should be noted. First, since this is a specific-population based study, the results may not be generalizable to other populations. However, considering that the survey was conducted for all residents and included a sample that was representative of the nationwide population, the results are applicable.

Second, although this study controlled for the effects of age, sex, family structure, and disease status as potential confounding variables, the information about socio-economic status including income and education were not collected in this survey, because people were reluctant to respond to these items. Future studies considering the effect of socio-economic status are needed. Third, the possibility that absence of statistical significance of social relationship behaviours, which were not found to be associated with functional status, could be due to the small sample size and lesser definition of social relationships cannot be rejected. Fourth, the measurement of functional status in this study involved a subjective evaluation. There could be bias in terms of gaps between the reported and actual situations. However, this study also introduced objective evaluation as mortality in the composite outcome, and the consistency of the two outcomes was confirmed. Fifth, because we aimed to clarify which social relationships at

baseline related to the future onset of functional decline, we did not analyze social relationships as time-varying covariates. Further detailed investigations are expected to grasp the changes in social relationships and functional status over time. Through further studies that address these limitations, we would like to accumulate more evidence regarding the role of social relationships in preventing future need for care.

Conclusion

This study examined aspects of social relationships that were associated with functional status to accumulate knowledge for preventing the need for care. Social curiosity and interacting with others were significantly associated with functional status. Therefore, social health services could use these results to initiate public healthcare interventions that promote social interaction and social curiosity, which may be essential for preventing future need for care.

Author statement

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Ethical considerations

The ethics committee approved this study.

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Conflicts of interests

None declared.

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Table 1. Participants' characteristics at baseline (2008)

		Steady	Functional decline	P^a	Functional decline + mortality	P^b
		n	n		n	
Mean age in years (\pm SD)		72.0 (\pm 5.31)	77.4 (\pm 6.47)	<0.01	78.4 (\pm 6.63)	<0.01
Sex	Female	158	48	0.02	88	0.53
Chronic disease	Diabetes	29	5	0.50	19	0.71
	Heart disease	17	12	<0.01	22	<0.01
	Stroke	5	4	0.08	7	0.14
Family structure	Living alone	9	3	0.71	3	0.55
	Other	294	68		176	
Mean ISI (\pm SD)	Independence	3.94 (\pm 0.30)	3.90 (\pm 0.43)	0.34	3.84 (\pm 0.48)	<0.01
	Social curiosity	4.17 (\pm 1.06)	3.47 (\pm 1.38)	<0.01	3.32 (\pm 1.38)	<0.01
	Interaction	2.95 (\pm 0.24)	2.83 (\pm 0.52)	0.03	2.77 (\pm 0.56)	<0.01
	Social participation	3.62 (\pm 0.61)	3.51 (\pm 0.66)	0.20	3.42(\pm 0.70)	<0.01
	Feeling of safety	1.90 (\pm 0.36)	1.89 (\pm 0.36)	0.69	1.94 (\pm 0.26)	0.33

Note: p = compared to steady group.

Table 2. Crude and adjusted odds of ISI for functional declining

	Crude OR			Adjusted OR		
	OR	95%CI	<i>P</i>	OR	95%CI	<i>P</i>
Independence	1.40	0.70-2.78	0.34	1.18	0.54-2.61	0.68
Social curiosity	1.61	1.29-2.02	<0.01	1.31	1.02-1.69	0.03
Interaction	2.44	1.16-5.09	0.02	2.57	1.20-5.51	0.01
Social participation	1.32	0.85-2.05	0.22	1.29	0.77-2.14	0.33
Feeling of safety	1.08	0.52-2.22	0.84	1.34	0.60-3.02	0.47

Note: Adjusted for age (1 year), sex, family structure and chronic disease status; OR = odds ratio; CI = confidence interval.

Sample size for adjusted model: independence, 343; social curiosity, 329; interaction, 318; social participation, 278; feeling of safety, 350.

Table 3. Crude and adjusted odds of ISI for functional declining and mortality

	Crude OR			Adjusted OR		
	OR	95%CI	<i>P</i>	OR	95%CI	<i>P</i>
Independence	1.97	1.15-3.37	0.01	1.55	0.86-2.81	0.15
Social curiosity	1.75	1.47-2.08	<0.01	1.39	1.14-1.69	<0.01
Interaction	3.30	1.80-6.04	<0.01	2.84	1.44-5.59	<0.01
Social participation	1.59	1.15-2.20	<0.01	1.43	0.98-2.10	0.06
Feeling of safety	0.68	0.35-1.29	0.24	0.72	0.35-1.47	0.37

Note: Adjusted for age (1 year), sex, family structure and chronic disease status; OR = odds ratio; CI = confidence interval.

Sample size for adjusted model: independence, 444; social curiosity, 425; interaction, 417; social participation, 368; feeling of safety, 462.