

## 「憩いのサロン」参加者の健康情報源と情報の授受： サロンは情報の授受の場になっているか？

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保健師ジャーナル69（9）：712-719，2013.9

### 要旨

介護予防では、まちづくりなどによる 1 次予防が注目される一方で、その効果と影響経路は十分に明らかにされていない。本調査の目的は、1 次予防としての「憩いのサロン事業」（以下、サロン）への参加者において、サロンが健康に関する情報の入手源となっているか、サロン参加で情動的サポートの授受が増えるかを検討することである。

A 町の介護予防事業であるサロンの参加者で 2 年連続で自記式調査に協力が得られた 172 人を対象に、参加形態（ボランティア、一般参加者）別に 2010（平成 22）年度は健康関連の情報、2011（平成 23）年度は食・運動に関する情報の入手源（複数回答）の割合と情動的サポート授受に関する変化を分析した。

情報の入手源はテレビやラジオが最も多かったが、より高齢で情報源の数が少ない一般参加者において、健康関連の情報源ではサロンが 3 番目に多く、食、運動の情報源ではサロンが 2 番目に多かった。ボランティアでも、サロンが食で 4 番目、運動で 3 番目に多かった。サロン参加によって健康関連の情動的サポートの授受とも増えた者の割合は、ボランティアで 61.7%、一般参加者で 57.6% だった。

サロンは、とくに一般参加者にとって主要な健康関連情報の授受の場になっており、健康情報の伝達と情動的サポートの増加により介護予防への寄与が期待できると思われた。

# Social Participation and Dental Health Status among Older Japanese Adults: A Population-Based Cross-Sectional Study

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## Abstract

**Background:** Although social participation is a key determinant of health among older adults, few studies have focused on the association between social participation and dental health. This study examined the associations between social participation and dental health status in community-dwelling older Japanese adults.

**Methods and Findings:** In 2010, self-administered postal questionnaires were distributed to all people aged  $\geq 65$  years in Iwanuma City, Japan (response rate, 59.0%). Data from 3,517 respondents were analyzed. Data on the number of remaining natural teeth, for determining the dental health status, and social participation were obtained using self-administered questionnaires. The number, type, and frequency of social activities were used to assess social participation. Social activities were political organizations or associations, industrial or professional groups, volunteer groups, senior citizens' clubs, religious groups or associations, sports groups, neighborhood community associations, and hobby clubs. Using ordinal logistic regression, we calculated the odds ratios (OR) and 95% confidence intervals (95% CI) for an increase in category of remaining teeth based on the number, type, and frequency of social activities. Sex, age, marital status, current medical history, activity of daily living, educational attainment, and annual equivalent income were used as covariates. Of the respondents, 34.2% reported having  $\geq 20$  teeth; 27.1%, 10–19 teeth; 26.3%, 1–9 teeth; and 12.4%, edentulousness. Social participation appeared to be related with an increased likelihood of having a greater number of teeth in old age, even after adjusting for covariates (OR = 1.30, 95% CI = 1.10–1.53). Participation in sports groups, neighborhood community associations, or hobby clubs was significantly associated with having more teeth.

**Conclusions:** Our results suggest a protective effect of social participation on dental health. In particular, participation in sports groups, neighborhood community associations, or hobby clubs might be a strong predictor for retaining more teeth in later life.

**Citation:** Takeuchi K, Aida J, Kondo K, Osaka K (2013) Social Participation and Dental Health Status among Older Japanese Adults: A Population-Based Cross-Sectional Study. PLoS ONE 8(4): e61741. doi:10.1371/journal.pone.0061741

**Editor:** Michael Glogauer, University of Toronto, Canada

**Received:** October 19, 2012; **Accepted:** March 15, 2013; **Published:** April 17, 2013

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**Funding:** The study was supported in part by a Strategic Research Foundation Grant-Aided Project for Private Universities grant from the Ministry of Education, Culture, Sports, Science, and Technology, Japan (MEXT <http://www.mext.go.jp/english/>), 2009–2013, Comprehensive Research on Aging and Health (24140701), and Grant-in-Aid for Scientific Research (B) (22390400 & 24390469) and (C) (22592327) from the Japan Society for the Promotion of Science (JSPS <http://www.jsps.go.jp/>). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

**Competing Interests:** The authors have declared that no competing interests exist.

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## Introduction

Enhanced social participation, a social determinant of health [1,2], is one of the 3 pillars of a World Health Organization (WHO) policy framework for an active aging society [3]. Social participation is a source of social relations and describes a person's participation in formal and informal group activities [4,5,6]. As many older retired people are assumed to have more time to participate in other activities, the role of social participation in the health of older adults is increasing in today's aging society.

Previous studies have examined the association between social participation and various health outcomes. A meta-analysis determined that social participation reduced the risk for mortality and that the magnitude of this effect was comparable with smoking cessation [7]. A study conducted in Asia reported that maintaining

or initiating social participation in later life benefited the mental health of older adults [8]. A study conducted in Japan reported that lack of social participation was significantly related to an increased risk for onset of long-term care insurance certification [9]. In addition to the effect itself, social participation is important because it is a component of social capital [10]. According to Putnam, social capital refers to “features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit” [11]. Recent studies have demonstrated a positive association between social capital and various health outcomes, including dental health [12,13,14,15,16,17].

Social participation is also considered to affect dental health [18,19]. Previous studies have demonstrated that lower levels of social participation were associated with a higher risk for

edentulism [18] or periodontitis [19]. There are 2 plausible relationship mechanisms between social participation and dental health: social network as a main effect, and stress buffering [20]. The main effect of social participation is obtained from social relationships, and this mechanism is beneficial regardless of whether individuals are under stress. Participation in a broad range of social relationships develops a person's social network. Individuals in a social network are subject to social controls and peer pressure that influence normative dental health behaviors (e.g., developing good dental habits and quitting smoking). For example, the cessation of smoking in one person appears to be highly related to the smoking behavior of others nearby in that person's social network [21]. Social network ties also provide multiple sources of information that could influence behaviors relevant to oral health, result in the effective use of available dental health services, or help people avoid stressful or other high-risk situations. In addition to this main effect, stress buffering is also considered a pathway to good dental health. A systematic review of the literature suggests that psychological stress causes periodontal disease, which is a key risk factor for tooth loss [22]. Social networks are a source of social support, which in turn provides psychological and material resources intended to benefit an individual's ability to cope with stress. As social support promotes less threatening interpretations of adverse events and effective coping strategies, it can shield individuals from the effects of stressful experiences. This mechanism is called stress buffering.

Despite a recent increase in studies on social participation and health, only a small number of studies have focused on the association between social participation and oral health. In addition, previous oral epidemiological studies have defined social participation as only belonging or not belonging to social relationships, or as high or low frequency of social engagement. A meta-analysis revealed that definitions of social participation mostly focused on questions of who, how, what, with whom, and where [6]. To our knowledge, the present study is the first to focus on the number, type, and frequency of social activities. This study aimed to quantify the associations between social participation and dental health status in community-dwelling older Japanese adults.

## Methods

### Study sample

The present analysis was based on a subset of the Japan Gerontological Evaluation Study (JAGES) project data. The JAGES project is an ongoing prospective cohort study investigating factors associated with the loss of health related to functional decline or cognitive impairment among individuals aged 65 years or older. In 2010, self-administered postal questionnaires were distributed to all people aged  $\geq 65$  years in Iwanuma City, Miyagi Prefecture, Japan ( $n = 8,576$ ), and 5,058 (response rate, 59.0%) people returned the questionnaires. After excluding respondents who failed to provide information on sex, dental health status, or social participation, the data from 3,517 respondents were analyzed. If the respondents did not respond to the other variables, the corresponding observations were assigned to "missing" categories. Ethical approval for the study was obtained from the Ethics Committee at Tohoku University and Nihon Fukushi University.

### Outcome variable

The number of remaining natural teeth, derived from responses collected through the self-administered questionnaire, was used as an indicator of dental health status. Respondents were asked to classify their dental health status into one of 4 categories:  $\geq 20$

teeth remaining, 10–19 teeth remaining, 1–9 teeth remaining, or no teeth remaining.

### Main predictors

Social participation was defined as the person's involvement in social activities. First, respondents were asked whether they belonged to political organizations or associations, industrial or professional groups, volunteer groups, senior citizens' clubs, religious groups or associations, sports groups, neighborhood community associations, or hobby clubs. Second, respondents were asked to indicate the frequency of participation in each group: 2–3 times per week, once per week, several times per month, several times per year, or almost never. As there were very few "2–3 times per week" responses for 6 groups (political organizations or associations, industrial or professional groups, volunteer groups, senior citizens' clubs, religious groups or associations, and neighborhood community associations), we re-categorized these social participation variables: once or more per week, several times per month, several times per year, almost never. As our study also focused on the number of social activities, we calculated the numbers of social activities and created 6 categories: 0 groups, 1 group, 2 groups, 3 groups, 4 groups, and  $\geq 5$  groups.

### Covariates

It was assumed that physical health status was associated with both social participation and dental health status. Activity of daily living and current medical history were used as indicators of physical health status. Activity of daily living was categorized as independent, partially dependent, and dependent. Current medical history was measured by the question, "Do you receive treatment now?" to which respondents answered "yes" or "no." Sex, age, and marital status were used as socio-demographic characteristics. Age groups were categorized as 65–69, 70–74, 75–79, 80–84, and  $\geq 85$  years. Marital status was categorized as married, widowed, separated, never married, and other. Educational attainment and annual equivalent income were used as indicators of socioeconomic status. Educational attainment was categorized as  $< 6$ , 6–9, 10–12, and  $\geq 13$  years. Annual equivalent income was divided into quartiles: lowest, low-middle, high-middle, and highest.

### Statistical analysis

Descriptive statistics were used to characterize the respondents. We performed ordinal logistic regressions to examine the associations between social participation and dental health status. We calculated the odds ratios (OR) and 95% confidence intervals (95% CI) for an increase in the remaining teeth category based on the number, type, and frequency of social activities. To estimate the overall effect of social participation, we used a dichotomized variable of social participation (1 = participating in  $\geq 1$  groups, 0 = not participating in any group). Variables on social participation were included separately in the different models. In the univariate model (Model 1), we calculated the crude OR for dental health status based on the number of social activities and the type and frequency of social participation. In the multivariable model (Model 2), we added all covariates into the univariate model. In order to assess the public health impact of social participation, we calculated the population-attributable fraction (PAF) of having  $\geq 20$  teeth to social participation. The PAF is generally defined as the reduction in the burden of disease (or risk factor) that would be achieved if the population had been entirely unexposed, compared with its current exposure pattern [23]. In this study, we treated the PAF as the increase in the number of people with  $\geq 20$  remaining

teeth that would be achieved if the entire population participated in some kind of social group, compared with its current participation pattern. We calculated a PAF for  $\geq 20$  remaining teeth because the retention of a minimum of 20 functional natural teeth at the age of  $\geq 65$  years is a goal for oral health specified by the WHO/*Federation Dentaire Internationale* in 2000 [24]. The goal for an acceptable level of oral health determined by the Japan Dental Association is the retention of at least 20 functional teeth until the age of 80 years (8020 movement). A previous study also indicated that among older people, those with  $\geq 20$  teeth had higher food intakes than those with  $\leq 19$  teeth [25]. All analyses were performed using SPSS statistical software (version 17.0, SPSS, Chicago, IL).

## Results

The demographic and health characteristics of all respondents ( $n = 3,517$ ; average age, 73.5 years for men and 75.0 years for women) in the study are shown in Tables 1 and 2. Of the respondents, 34.2% reported having  $\geq 20$  teeth, 27.1% reported having 10–19 teeth, 26.3% reported having 1–9 teeth, and 12.4% reported having no teeth. Of the respondents, 13.9% belonged to political organizations or associations, 15.2% to industrial or professional groups, 16.4% to volunteer groups, 15.7% to senior citizens' clubs, 7.3% to religious groups or associations, 24.5% to sports groups, 46.8% to neighborhood community associations, and 41.1% to hobby clubs.

Of all respondents, 69.6% participated in  $\geq 1$  groups, and 30.4% did not participate in any group. Compared to the non-participants, participants had significantly higher odds of having a greater number of teeth (OR = 2.40, 95% CI = 2.10–2.74). After adjusting for sex, age, marital status, current medical history, activity of daily living, educational attainment, and annual equivalent income, social participation appeared to be related with an increased likelihood of having a greater number of teeth in old age (OR = 1.30, 95% CI = 1.10–1.53).

Table 3 illustrates the association between dental health status and the number of social activities. Participating in  $\geq 1$  groups was significantly associated with odds of having more remaining teeth that were more than twice as high as compared with non-participation (Model 1). After adjusting for all covariates, participating in 4 groups was associated with significantly higher odds (OR = 1.46, 95% CI = 1.11–1.93) of having more remaining teeth compared with non-participation (Model 2). Table 4 shows the association between dental health status and the type and frequency of social participation. The groups significantly associated with a higher number of remaining teeth were industrial or professional groups, volunteer groups, sports groups, neighborhood community associations, and hobby clubs (Model 1). After adjusting for all covariates, participating in sports groups (2–3 times per week, OR = 1.31, 95% CI = 1.01–1.69), neighborhood community associations (several times per year, OR = 1.19, 95% CI = 1.02–1.39), or hobby clubs (2–3 times per week, OR = 1.36, 95% CI = 1.05–1.76; once per week, OR = 1.39, 95% CI = 1.10–1.75; several times per year, OR = 1.41, 95% CI = 1.11–1.81) was significantly associated with having more teeth (Model 2). With the exception of these 3 groups, although most types of participation were associated with higher odds of having more teeth, the associations were explained by covariates. This indicates that healthier people tend to have more teeth and participate in groups.

The PAFs, or the contribution of social participation to having  $\geq 20$  teeth, are shown in Tables 3 and 4. The PAFs for the number of social activities and 3 types of social participation variables that were significantly associated with dental health (i.e., sports groups,

**Table 1.** Characteristics of respondents.

	n	%		n	%
<b>Sex</b>			<b>Educational attainment (years)</b>		
Men	1,681	47.8	<6	86	2.4
Women	1,836	52.2	6–9	1,071	30.5
<b>Age (years)</b>			10–12	1,521	43.2
65–69	1,147	32.6	$\geq 13$	762	21.7
70–74	950	27.0	Missing	77	2.2
75–79	649	18.5	<b>Annual equivalent income (quartiles)</b>		
80–84	418	11.9	Lowest	718	20.4
$\geq 85$	346	9.8	Low-middle	731	20.8
Missing	7	0.2	High-middle	801	22.8
<b>Marital status</b>			Highest	792	22.5
Married	2,416	68.7	Missing	475	13.5
Widowed	855	24.3	<b>Number of remaining natural teeth</b>		
Separated	111	3.2	$\geq 20$	1,203	34.2
Never married	50	1.4	10–19	952	27.1
Other	28	0.8	1–9	925	26.3
Missing	57	1.6	No	437	12.4
<b>Current medical history</b>			<b>Number of social activities (groups)</b>		
Yes	2,741	77.9	0	1,068	30.4
No	731	20.8	1	749	21.3
Missing	45	1.3	2	644	18.3
<b>Activity of daily living</b>			3	456	13.0
Independent	3,155	89.7	4	281	8.0
Partially dependent	208	5.9	$\geq 5$	319	9.1
Dependent	122	3.5			
Missing	32	0.9			

doi:10.1371/journal.pone.0061741.t001

neighborhood community associations, and hobby clubs) were 7.5%–31.6%. The largest PAF (31.6%) was for participation in  $\geq 1$  social groups.

## Discussion

Our study demonstrates a significant positive association between social participation and dental health status in a representative sample of men and women aged  $\geq 65$  years in a municipality in Japan. Among those with  $\geq 20$  remaining teeth, 31.6% of cases in the population might be attributed to participation in  $\geq 1$  social groups. To our knowledge, no published reports have examined the associations between dental health status and the number, type, and frequency of social activities. In relation to the type and frequency of social participation, frequent participation in sports groups, rare participation in neighborhood community associations, or participation in hobby clubs with little regard to frequency were significantly associated with dental health status, even after adjusting for demographic variables and social class indicators. In relation to the number of social activities, almost all amounts of social participation were significantly positively associated with dental health.

Our results may support the earlier-described mechanisms linking social participation and dental health status (i.e., social network as a main effect and stress buffering). There was a

**Table 2.** Characteristics of respondents according to type and frequency of social participation.

	2–3 times per week n (%)	Once per week n (%)	Several times per month n (%)	Several times per year n (%)	Almost never n (%)
<b>Type and frequency of social participation</b>					
Political organization or association	45 (1.3)	32 (0.9)	90 (2.6)	321 (9.1)	3,029 (86.1)
Industrial or professional group	56 (1.6)	36 (1.0)	126 (3.6)	318 (9.0)	2,981 (84.8)
Volunteer group	52 (1.5)	59 (1.7)	192 (5.5)	275 (7.8)	2,939 (83.6)
Senior citizens' club	27 (0.8)	61 (1.7)	185 (5.3)	280 (8.0)	2,964 (84.3)
Religious group or association	23 (0.7)	34 (1.0)	81 (2.3)	120 (3.4)	3,259 (92.7)
Sports group	259 (7.4)	245 (7.0)	183 (5.2)	176 (5.0)	2,654 (75.5)
Neighborhood community association	44 (1.3)	61 (1.7)	282 (8.0)	1,260 (35.8)	1,870 (53.2)
Hobby club	284 (8.1)	350 (10.0)	500 (14.2)	311 (8.8)	2,072 (58.9)

doi:10.1371/journal.pone.0061741.t002

significant association with better dental health status for participants in the groups with higher social participation rates. In groups with high participation rates that include many social ties, people may easily develop social networks and receive social support.

In addition to these positive effects of social participation on health, social participation can have negative effects on health. Social networks provide opportunities for conflict, exploitation, stress transmission, misguided attempts to help, and feelings of loss and loneliness [20]. These potentially negative aspects of social networks can cause psychological stress, which in turn adversely affects dental health. The results of this study showed no significant association between frequent participation in neighborhood community associations and dental health, but there was a significant association between relatively rare participation and dental health. The negative effects of social participation on health may be a reason for this. Participation in neighborhood community associations might include obligatory activities characterized by the negative aspects of social networks. People who frequently participate in obligatory activities may experience stress, leading to oral disease. Therefore, frequent participation in neighborhood community associations might not be significantly associated with having more teeth. Similarly, where participation in  $\geq 5$  groups is concerned, social participation might not be

significantly associated with having more teeth for an increase in the type of social participation that has negative effects on health.

Our findings are generally consistent with those of previous studies indicating that participating in social activities benefits dental health status among middle-aged and older people. Rodrigues et al. suggested that social participation is significantly associated with a lower prevalence of edentulism among older adults [18]. Merchant et al. also suggested that men who participate in religious meetings are associated with a reduced risk of developing periodontitis [19].

To our knowledge, no study has specifically examined the differences between men and women in relation to the association between social participation and dental health status, though previous work has indicated that such differences exist. Among women, participation in social networks may increase levels of psychological stress [26]. In our study, 75.3% of men participated in  $\geq 1$  groups compared to 64.5% of women. However, with respect to the main results, we found few differences between men and women.

The results of this study have public health implications. Our goal was to estimate the PAF associated with participation in social activities (compared to non-participation) for having  $\geq 20$  remaining teeth. The largest PAF (31.6%) was for participation in  $\geq 1$  social groups, which implies that in 31.6% of cases in the population, presence of  $\geq 20$  remaining teeth may be attributed to

**Table 3.** Association of dental health status with number of social activities determined by ordinal logistic regression.

	Model 1	Model 2	n of $\geq 20$ teeth (%)	PAF <sup>b</sup> (%)
	Crude OR (95% CI)	Adjusted OR <sup>a</sup> (95% CI)		
<b>Number of social activities (groups)</b>				31.6
0	1.00	1.00	250 (23.4)	
1	2.21 (1.86–2.62)	1.31 (1.07–1.59)	279 (37.2)	
2	2.22 (1.85–2.65)	1.21 (0.98–1.49)	231 (35.9)	
3	2.84 (2.32–3.48)	1.36 (1.07–1.72)	194 (42.5)	
4	2.90 (2.28–3.70)	1.46 (1.11–1.93)	125 (44.5)	
$\geq 5$	2.31 (1.84–2.90)	1.25 (0.96–1.62)	124 (38.9)	

OR = odds ratio; CI = confidence interval.

<sup>a</sup>Odds ratio adjusted for sex, age, marital status, current medical history, activity of daily living, educational attainment, and annual equivalent income.<sup>b</sup>Population-attributable fraction.

doi:10.1371/journal.pone.0061741.t003

**Table 4.** Association of dental health status with type and frequency of social participation determined by ordinal logistic regression.

	Model 1	Model 2		
	Crude OR (95% CI)	Adjusted OR <sup>a</sup> (95% CI)	n of ≥20 teeth (%)	PAF <sup>b</sup> (%)
<b>Type and frequency of social participation</b>				
<i>Political organization or association</i>				1.4
Once or more per week	1.15 (0.77–1.74)	0.97 (0.61–1.53)	26 (33.8)	
Several times per month	1.33 (0.91–1.95)	1.06 (0.69–1.61)	35 (38.9)	
Several times per year	1.14 (0.93–1.41)	0.89 (0.70–1.11)	120 (37.4)	
Almost never	1.00	1.00	1,022 (33.7)	
<i>Industrial or professional group</i>				3.6
Once or more per week	1.29 (0.88–1.87)	1.03 (0.68–1.58)	33 (35.9)	
Several times per month	1.75 (1.26–2.44)	1.17 (0.82–1.67)	55 (43.7)	
Several times per year	1.51 (1.22–1.87)	1.05 (0.83–1.32)	132 (41.5)	
Almost never	1.00	1.00	983 (33.0)	
<i>Volunteer group</i>				4.3
Once or more per week	1.38 (0.98–1.96)	1.11 (0.76–1.61)	44 (39.6)	
Several times per month	1.85 (1.41–2.42)	1.31 (0.97–1.76)	89 (46.4)	
Several times per year	1.37 (1.10–1.72)	1.02 (0.79–1.31)	108 (39.3)	
Almost never	1.00	1.00	962 (32.7)	
<i>Senior citizens' club</i>				–1.7
Once or more per week	0.76 (0.52–1.12)	0.89 (0.58–1.36)	27 (30.7)	
Several times per month	0.77 (0.59–1.01)	0.76 (0.56–1.02)	58 (31.4)	
Several times per year	0.80 (0.65–1.00)	0.89 (0.70–1.14)	87 (31.1)	
Almost never	1.00	1.00	1,031 (34.8)	
<i>Religious group or association</i>				0.4
Once or more per week	0.99 (0.61–1.58)	0.87 (0.51–1.48)	18 (31.6)	
Several times per month	1.06 (0.71–1.58)	1.07 (0.68–1.68)	28 (34.6)	
Several times per year	1.34 (0.96–1.87)	1.31 (0.90–1.90)	47 (39.2)	
Almost never	1.00	1.00	1,110 (34.1)	
<i>Sports group</i>				7.5
2–3 times per week	1.90 (1.50–2.41)	1.31 (1.01–1.69)	115 (44.4)	
Once per week	1.73 (1.36–2.20)	1.20 (0.92–1.56)	104 (42.4)	
Several times per month	1.64 (1.25–2.16)	0.99 (0.74–1.34)	75 (41.0)	
Several times per year	1.54 (1.17–2.04)	1.02 (0.75–1.39)	69 (39.2)	
Almost never	1.00	1.00	840 (31.7)	
<i>Neighborhood community association</i>				14.5
Once or more per week	1.42 (0.99–2.02)	0.98 (0.65–1.47)	34 (32.4)	
Several times per month	1.63 (1.30–2.05)	0.93 (0.72–1.19)	100 (35.5)	
Several times per year	1.83 (1.60–2.08)	1.19 (1.02–1.39)	522 (41.4)	
Almost never	1.00	1.00	547 (29.3)	
<i>Hobby club</i>				16.8
2–3 times per week	1.98 (1.58–2.49)	1.36 (1.05–1.76)	122 (43.0)	
Once per week	2.06 (1.67–2.54)	1.39 (1.10–1.75)	157 (44.9)	
Several times per month	1.84 (1.54–2.20)	1.16 (0.95–1.42)	194 (38.8)	
Several times per year	2.13 (1.71–2.65)	1.41 (1.11–1.81)	140 (45.0)	
Almost never	1.00	1.00	590 (28.5)	

OR = odds ratio; CI = confidence interval.

<sup>a</sup>Odds ratio adjusted for sex, age, marital status, current medical history, activity of daily living, educational attainment, and annual equivalent income.<sup>b</sup>Population-attributable fraction.

doi:10.1371/journal.pone.0061741.t004



participation in  $\geq 1$  social groups. Similarly, the PAFs for participation in sports groups, neighborhood community associations, and hobby groups were 7.5%, 14.5%, and 16.8%, respectively, for having  $\geq 20$  remaining teeth. Therefore, promoting and supporting opportunities for social participation, especially in sports groups, neighborhood community associations, or hobby clubs, as a public health intervention may contribute to an increase in the number of older people with  $\geq 20$  remaining teeth.

Our study has several limitations as well as strengths. First, the response rate was moderate (59.0%); hence, our results may have been affected by selection bias. Second, our research data were derived from self-reported questionnaires, raising issues of information bias regarding the true number of remaining teeth. However, self-reports have yielded reasonably valid estimates for the number of teeth in national epidemiological surveys in several prior studies [27,28]. In a study of 2,496 Japanese older people, the difference between the self-reported number of teeth and the clinically examined number of teeth was very small and insignificant according to the *t*-test, and the correlation between the 2 groups was very high ( $r = 0.93$ ) [28]. Therefore, it is reasonable to assume that self-reported questionnaires can provide sufficiently reliable data about the number of remaining teeth. Third, our study was cross-sectional; therefore, it was not possible to generate any statements on causation. The present cross-sectional study could not exclude the possibility of reverse causation, in that people with good oral health tend to participate in social activities. Longitudinal studies or intervention studies are needed to examine the effects of social participation on dental health status. Lastly, our study participants were from one medium-sized municipality in Japan; hence, the generalizability of our results is limited. Caution should be exercised when interpreting our results, as it requires the somewhat strong assumption that the data we used for our analysis are generalizable to the entire population.

However, the population sample also could be considered a strength, as our data were less affected by geographic and cultural factors between municipalities, which provides some assurance of internal validity. The level of detail included in the social participation variable is another strength. Lastly, our data were reliable because all of the older residents in one city were recruited for our survey, and a large number of people participated.

## Conclusion

Social participation was significantly and positively associated with better dental health status among older Japanese adults. Approximately one-third of the participants had  $\geq 20$  teeth, which may have been attributable to their participation in  $\geq 1$  social groups, though the present cross-sectional design could not exclude the possibility that people with good oral health tend to participate in social activities. In addition, our results indicate the possibility that participation in sports groups, neighborhood community associations, or hobby clubs in later life is protective of dental health beyond individual differences in demographic variables and social class indicators.

## Acknowledgments

We are grateful to the subjects who participated in this study. This study used data from the JAGES. The Tohoku University and the Nihon Fukushi University Center for Well-being and Society conducted the survey as one of those research projects.

## Author Contributions

Conceived and designed the experiments: KT JA KK KO. Performed the experiments: KT KO. Analyzed the data: KT JA. Contributed reagents/materials/analysis tools: KT JA KO. Wrote the paper: KT JA KK.

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## RESEARCH ARTICLE

## Open Access

# Social participation and mental health: moderating effects of gender, social role and rurality

Daisuke Takagi<sup>1\*</sup>, Katsunori Kondo<sup>2</sup> and Ichiro Kawachi<sup>3</sup>**Abstract**

**Background:** Previous studies have reported that older people's social participation has positive effects on their health. However, some studies showed that the impacts of social participation on health differ by gender. We sought to examine whether the effects of social participation on mental health differ for men and women in a Japanese population. We also examined the moderating influence of social position within the organization as well as urban/rural locality.

**Methods:** We used two waves of the Aichi Gerontological Evaluation Study's longitudinal survey, which targeted residents with aged 65 years or over ( $n = 2,728$ ) in a central part of Japan. The first wave survey was conducted in 2003, and the second wave in 2006. Depressive symptoms of the study participants were assessed using the short version of the Geriatric Depression Scale (GDS-15). A multilevel logistic regression model was used with individual-level as level 1 and the school district-level as level 2.

**Results:** We found that higher social participation and performing key roles in the organization had protective effects on depressive symptoms for women. However, there were no main effects of these variables for the mental health of men. We found an interaction between social participation, organizational position, and rural residence among men only. That is, men who occupied leadership positions in organizations reported better mental health, but only in rural areas.

**Conclusions:** Our findings support the notion that increasing the opportunities for social participation improves older people's health, especially for women. However, in the rural Japanese context, offering men meaningful roles within organizations may be important.

**Keywords:** Japan, Social participation, Older people, Gender difference, Depressive symptoms, Key roles, Rural areas, Multilevel analysis

**Background**

Studies from the field of gerontology have reported that older people's social participation is associated with higher life satisfaction, higher self-esteem, lower rates of admission to a nursing homes, as well as lower mortality [1-3]. Generally, it is thought that social participation contributes to health by providing a sense of meaning in people's lives as well as increasing access to social support [4]. For example, volunteer activities improve mental health by

increasing the participants' range of social networks, as well as their social prestige, access to resources and emotional gratification [5]. People's social relationships formed by social participation lead to fulfillment of attachment, esteem, social approval, belongingness, social identity and security. Antonucci & Jackson [6] and Bandura [7] stated that such social relationships are useful because they are helpful to develop self-efficacy.

Some studies have reported that the effects of social participation vary depending on people's background social characteristics. For example, previous reports found that social participation produces bigger benefits for the health of women than for men. Kavanagh et al. [8], for example,

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examined whether the effect of neighborhood-level political participation on self rated health differs according on gender. They found that neighborhood-level political participation enhanced women's self rated health, but had no significant effect on men's health. Spanish research on older people also showed that friendship connections are associated with a protective effect on cognitive impairment for women, but not for men [9]. A gender difference in the health effects of religious participation has also been reported. Norton et al. [10] reported that frequent attendance at church is associated with low prevalence of depressive symptoms among women, but it is associated in the opposite direction (i.e. with higher prevalence of depression) among men.

In contrast to the foregoing studies, some findings indicate that women can be negatively affected by social participation. Under certain circumstances, high social participation can contribute to higher psychological distress for women because of "role strain" associated with the duty of providing support to others [4]. Strazdins & Broom [11] refer to the gendered norms regarding the duty to provide "emotional labor" within social relations.

Based on the concept of role strain, Morrow-Howell et al. [12] examined the interaction effects of gender and participation in volunteer activities on self rated health, functional dependency and depressive symptoms, using panel data from three time points in the U.S. Although their results suggested that participation in volunteer activities positively affects the three health outcomes, none of the interaction effects between gender and participation were statistically significant. It is possible that there is a socially optimal level of social participation. Musick et al. [13] pointed out that both too little participation and too frequent participation in volunteer activities are more likely to be associated with negative impacts on the health of older people.

In the present study, we sought to address the question of whether the health effects of social participation vary by gender in a Japanese population. In addition, we sought to examine whether the gender difference in the effect of social participation has further interaction effects with other factors. First, the effect of social participation on health may vary according to the position occupied by the individual within the organization in which she/he participates. The theory of role strain suggests that it is more emotionally taxing when people assume positions of responsibility over others in the organization. Generally, because the role strain and emotional labor tend to be a burden for women [4,11], we predict that the interaction effect of social participation and performing key roles is stronger for women's mental health than for men's.

A second possible factor relevant for the health effects of social participation is urban/rural location. Personal networks in rural areas are more exclusive and closer than those in urban areas. In Japanese rural areas, the

predominantly agricultural mode of production (i.e. rice farming) ensures that social bonds are tightly knit. For centuries, rice farmers in rural communities have developed norms of cooperation regarding water allocation (for irrigation of rice paddies) and mutual assistance during times of planting/harvesting. While highly functional in the sphere of production, these closely-knit communities may also cramp people's freedom by producing sanctions against non-conformists. In places where such bonding networks exist, negative externalities such as intolerance are likely to be produced. Portes [14] pointed out the "excess claims on group members" as one of the downsides of social capital. Under such circumstances, over-involvement in the community (via social participation) may actually be a burden on people's mental health. In Japan, the proportion of older people is much higher in rural areas than in urban areas, and tight bonding capital is also more likely to be observed in such areas. Thus, we were interested in examining the interaction effects between social participation and rural location in the Japanese context.

To our knowledge, there is little research that examines the interaction effect of older people's social participation, role in organizations, and the urban/rural context of community on their mental health. Thus, the present study contributes to theoretical aspect of this field by revealing the complex interaction effect and develops practical aspect by suggesting the different manner of older people's social participation according to sex and community characteristics.

## Methods

### Data

Data from the Aichi Gerontological Evaluation Study (AGES) project [15] were used for this study. The present study used longitudinal data from two time points. First, in 2003, investigators for the AGES project mailed a postal survey to 23,152 residents over the age of 65 years residing in 5 municipalities in Aichi Prefecture, Japan (The prefectures of Japan are the country's 47 subnational jurisdictions. Prefectures are government bodies larger than cities, towns and villages – comparable of the states in the U.S.). In one of the five municipalities, simple random sampling ( $n = 5,000$ ) was carried out from the Census of all individual aged over 65 years. In the remaining four municipalities, all residents aged 65 or older were sampled (i.e. a census was taken). The participation rate across the five sites was 52.0%, which is comparable to community-based surveys of this type.

In 2006, the investigators conducted the second wave survey based on the baseline respondents. In the second wave survey, the investigators mailed a postal survey to 11,991 residents who responded to the first survey. The response rate was 65.5% ( $n = 7,855$ ). Our study protocol and informed consent procedure were

approved by the Ethics Committee of Nihon Fukushi University.

In the analysis, respondents with missing values in sex, age, annual household income, the number of family members, years of education, marital status, social participation, roles in the organizations, and the Geriatric Depression Scale were omitted. 3,477 respondents were omitted because they were missing values for the above variables. In addition, in order to analyze the incidence (i.e. new occurrence) of depressive symptoms from 2003 to 2006, respondents who already had depressive symptoms in 2003 were omitted (i.e. 1,650 respondents were excluded due to depressive symptoms at baseline). As a result, the number of individual observations used in the analysis was 2,728 (Men = 1,541, Women = 1,187).

We conducted a multilevel regression analysis to take account of neighborhood-level contexts. The spatial unit in our multilevel analysis was elementary school district, of which there were 31 in our dataset. The school district-level data of this project was prepared by Hanibuchi [16]. For Japan as a whole, there are 19,672 school districts, and the average area of each school district is 16.86 km<sup>2</sup> (SD = 38.59). In our dataset each district has an average area of 6.34 km<sup>2</sup> (SD = 3.86). In Japan, a school district is defined as the primary residential spatial unit of people because local residents' communities, senior citizens clubs, sports clubs etc. are organized within each district. Generally, a school district represents a geographical scale in which the elderly can travel easily by foot or bicycle. Thus, the present study used the school district as a proxy for the neighborhoods of people in our sample. The average number of respondents used in analysis per school district was 88.

## Measurements

### Demographic variables

Sex of respondents, age, annual household income, the number of family members, years of education, and marital status were included as sociodemographic covariates. For annual household income, respondents were asked to identify their income level from the 14 predetermined categories (1 = less than 500 thousand yen, 2 = 500 thousand - 1 million yen, 3 = 1–1.5 million yen, 4 = 1.5 - 2 million yen, 5 = 2–2.5 million yen, 6 = 2.5 - 3 million yen, 7 = 3–4 million yen, 8 = 4–5 million yen, 9 = 5–6 million yen, 10 = 6–7 million yen, 11 = 7–8 million yen, 12 = 8–9 million yen, 13 = 9–10 million yen, 14 = more than 10 million yen). Using the annual household income and the number of family members, we created a variable of equalised annual income, dividing the household income by the square root of the number of family members.

Years of education was obtained from responses to the question asking them to mark one response out from 4

categories (1 = less than 6 years, 2 = 6–9 years, 3 = 10–12 years, 4 = more than 13 years).

For marital status, respondents who were married and their spouse was alive at the time of survey were coded as 1 otherwise coded as 0.

All of these variables used in the analysis were responses from the first wave survey.

### Social participation and key roles

Social participation was assessed by asking whether the respondents participated in the following 8 types of group in their neighborhood: Political group, Industry group / Trade association, Volunteer group, Civic / Consumer movement group, Religious group, Sport group, Neighborhood association / Senior citizens' club, and Hobby group. Responses to each item was binarized (i.e., respondents who participated in the group was coded as 1 otherwise coded as 0 for each item). We chose not to create an index of participation by summing the groups because the alpha coefficient of the combined items was low (0.521 for Kuder-Richardson's KR20). Thus, the present study used the 1st principal component score of these items as the social participation index variable. Table 1 shows a summary of the principal component analysis. We used the tetrachoric correlation matrix in this analysis because these items were binary.

After asking the social participation question, we asked respondents whether they have occupied key roles within the organization such as president, facilitator or treasurer. Respondents responded in the affirmative were coded as 1 otherwise coded as 0.

For the variables of social participation and key role, we used the measurements from the baseline wave survey.

### Outcome variable

We used depressive symptoms as our health outcome. This variable was measured both at the baseline survey in 2003 and the second wave survey in 2006. Depressive symptoms

**Table 1 Summary of the principal component analysis**

	Factor loading	Communality
	1st principal component	
Political group	.641	.410
Industry group/ Trade association	.480	.231
Volunteer group	.760	.578
Civic/Consumer movement group	.803	.644
Religious group	.368	.135
Sport group	.556	.309
Neighborhood association/Senior citizens'club	.582	.338
Hobby group	.602	.363
Eigenvalue	3.001	
Contribution	37.600	

were measured by the short version of the Geriatric Depression Scale (GDS-15), using simple yes/no format, suitable for self-administration [17]. We used a cut-off point of 5 or above to indicate crassness of depressive symptoms. Previous validation studies of the short form GDS have reported that the sensitivity for clinical depression using a cut-off point of 5 ranges from 80% to 100%, while the specificity ranges from 56% to 90.5%. Therefore, the studies have concluded that a cut-off point of 5 was appropriate for the use of GDS as a screening tool for depression among community-dwelling elderly in the U.S. and Japan [17-20].

The present study used responses from respondents who did not report depressive symptoms at the first wave survey. That is, respondents who reported newly developed depressive symptoms from 2003 to 2006 were coded as 1, and respondents who remained symptom-free were coded as 0.

#### Neighborhood-level urban/rural location

We predicted that neighborhood rural location affects the effect of social participation on health. Thus, in order to create a cross-level interaction term, we used the school district-level proportion of workers engaged in primary industry (agriculture), following Hanibuchi [16] who used the primary industrial workers rate as one of indicators of rurality.

#### Statistical analysis

On average, 88 respondents were nested within 31 neighborhoods (school district). A multilevel logistic regression model was used with individual-level as level 1 and the school district-level as level 2. The software used was HLM6.

To examine whether there were gender differences in the relationship between social participation and depressive symptoms, we stratified the analyses by gender. In the analysis, we included the interaction term of social participation (centered on the mean) and key role in order to examine how social participation with key roles affects mental health. In addition, to test whether neighborhood rural location moderates the association between social participation and health, we included a third-order cross-level interaction term, individual-level social participation x key roles x neighborhood rural location.

#### Results

Table 2 contains the descriptive statistics for individual-level variables and neighborhood rural location.

For the percentage of depressive symptoms, we found no major difference between men and women. For equivalised annual income, the proportion of respondents who have an income less than 150 million yen is slightly higher for women than for men. In addition the

**Table 2 Descriptive statistics**

	Men (n = 1,541)		Women (n = 1,187)	
	n	%	n	%
Age				
65-69	707	45.9	539	45.4
70-74	491	31.9	337	28.4
75-79	237	15.4	205	17.3
≥80	106	6.9	106	8.9
Equivalised annual income (million yen)				
<1.50	200	13.0	246	20.7
1.50-1.99	290	18.8	187	15.8
2.00-2.49	373	24.2	251	21.1
2.50-2.99	105	6.8	89	7.5
3.00-3.49	232	15.1	141	11.9
3.50-3.99	136	8.8	102	8.6
4.00-4.49	80	5.2	73	6.1
4.50-4.99	45	2.9	42	3.5
≥5.00	80	5.2	56	4.7
Years of education				
<6	19	1.2	39	3.3
6-9	728	47.2	621	52.3
10-12	507	32.9	441	37.2
≥13	287	18.6	86	7.2
GDS_15				
Depressive symptoms (≥5)	196	12.7	185	15.6
Non-depressed (≤4)	1345	87.3	1002	84.4
Marital status				
Married and spouse is alive	1450	94.1	767	64.6
Other	91	5.9	420	35.4
Role in social participation				
Having a certain key role	659	42.8	336	28.3
Other	882	57.2	851	71.7
	Mean	SD	Mean	SD
Social participation (0 - 8) <sup>a</sup>	1.82	1.45	1.72	1.37
<i>Neighborhood-level variable</i>				
	Mean		SD	
Rate of workers engaged in primary industry	11.56		10.98	

<sup>a</sup> Social participation shown in this table is not the 1st principal component score but the simple sum of 8 items.

percentage of respondents with 6 or fewer years of education is also slightly higher for women than for men. The proportion of respondents who are married and living with a spouse is higher for men than for women. The proportion of respondents who report playing a key role in organizations is also higher for men than for women.

**Table 3 Multilevel logistic regression of depressive symptoms and social participation, key role and rate of primary industrial workers for men and women**

Independent variables	Men		Women	
	Odds ratio	95% CI	Odds ratio	95% CI
<i>Individual-level variables</i>				
Intercept	0.03 ***	(0.01-0.10)	0.11 ***	(0.00-0.01)
Age				
65-69	Reference		Reference	
70-74	0.89	(0.60-1.31)	1.40 *	(1.02-1.92)
75-79	1.30	(0.75-2.25)	1.71 **	(1.21-2.41)
80 or older	0.88	(0.52-1.50)	2.50 ***	(1.56-4.01)
Equivalised annual income (million yen)				
<1.50	3.14 *	(1.08-9.13)	0.71	(0.35-1.43)
1.50-1.99	1.55	(0.55-4.37)	0.73	(0.38-1.39)
2.00-2.49	1.81	(0.71-4.60)	0.69	(0.31-1.56)
2.50-2.99	1.28	(0.41-3.97)	0.38 †	(0.13-1.09)
3.00-3.49	1.61	(0.56-4.58)	0.68	(0.28-1.67)
3.50-3.99	1.82	(0.46-7.18)	0.33 **	(0.16-0.68)
4.00-4.49	2.72 †	(0.87-8.55)	0.58	(0.21-1.63)
4.50-4.99	2.27	(0.71-7.19)	0.17 *	(0.03-0.86)
≥5.00	Reference		Reference	
Years of education				
<6	4.26 **	(1.53-11.87)	2.74 **	(1.37-5.49)
6-9	1.50 †	(0.97-2.31)	1.62	(0.88-2.99)
10-12	1.21	(0.82-1.78)	1.74 †	(0.94-3.23)
≥13	Reference		Reference	
Living with spouse	1.68 †	(0.92-3.10)	1.15	(0.90-1.46)
Social participation	0.76	(0.31-1.87)	0.53 *	(0.28-0.99)
Role in social participation	0.81	(0.60-1.10)	0.57 *	(0.37-0.88)
Social participation * Role	0.32 †	(0.09-1.16)	0.34	(0.06-1.81)
<i>Individual × Neighborhood<sup>d</sup></i>				
Social participation * Role * Primary industry	0.28 ***	(0.16-0.50)	0.68	(0.16-2.89)

**Table 3 Multilevel logistic regression of depressive symptoms and social participation, key role and rate of primary industrial workers for men and women (Continued)**

Random Effect	Variance	Variance
	Component	Component
Intercept	0.01	0.01
Individual-level <i>n</i>	1541	1187
Neighborhood-level <i>n</i>	31	31

Note: \*\*\**p* < .001, \*\**p* < .01, \**p* < .05, †*p* < .10.

<sup>a</sup> Social participation and role are individual-level variables, and primary industry is a neighborhood-level variable.

Table 3 shows the main effects of social participation and key role in the organization on depressive symptoms, as well as the interaction terms.

First, Table 3 shows that social participation had a protective main effect on women's depressive symptoms, while it was not significant for men (odds ratio: 0.53 for women (95% CI: 0.28-0.99), 0.76 for men (95% CI: 0.31-1.87)).

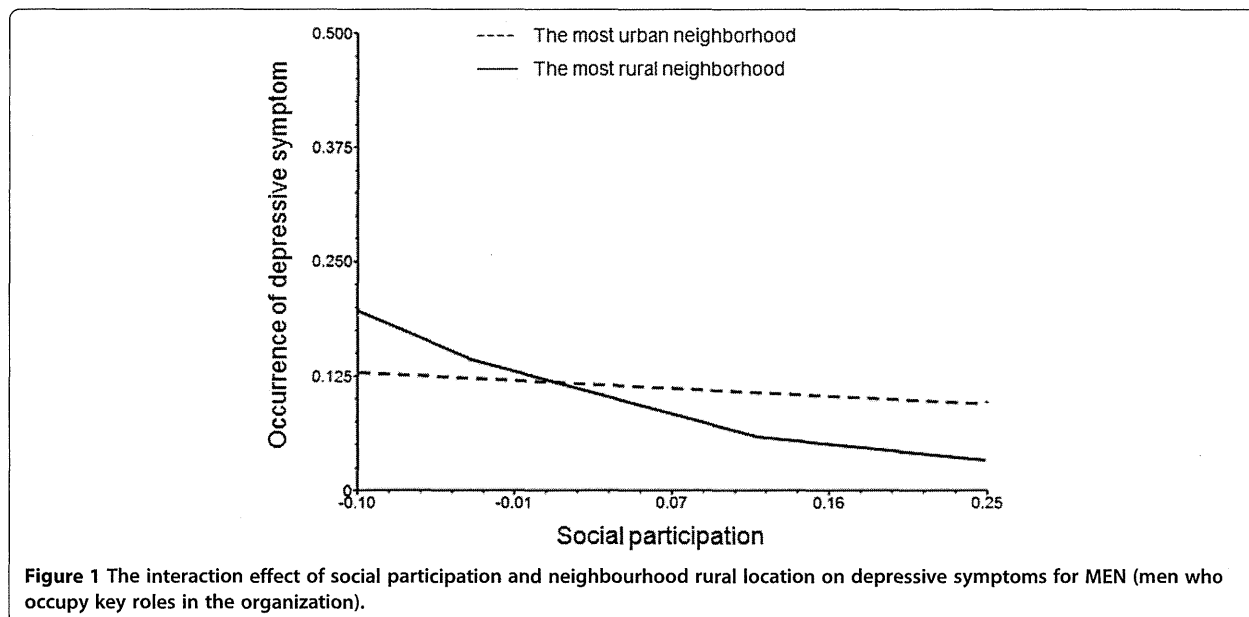
Second, and contrary to our expectation, performing a key role in the social organization had a protective main effect on women's depressive symptoms, while it did not have a significant impact on men's depression (odds ratio: 0.57 for women (95% CI: 0.37-0.88), 0.81 for men (95% CI: 0.60-1.10)).

Third, the interaction effect of social participation x key role was significant for men. That is, a protective effect on depressive symptoms was observed only for men who reported both high social participation and performing a key role in the organization. This interaction term was not statistically significant among women.

Fourth, Table 3 shows that the interaction effect of social participation and key roles are further enhanced for men residing in rural neighborhoods where the rate of primary industrial workers is high (odds ratio: 0.28 (95% CI: 0.16-0.50)). However, contrary to our prediction, the interaction effect on women's mental health was not affected by the rural location of the neighborhood (odds ratio: 0.68 (95% CI: 0.16-2.89)).

For ease of presentation, Figures 1 and 2 show the predicted probabilities of depressive symptoms including the interaction effects. In the figures, the predicted probabilities are based on contrasting neighborhoods with the highest and lowest proportions of agricultural workers (i.e. most rural vs. most urban).

From Figure 1, it can be seen that for men who occupy key roles in the organization, higher social participation is associated with lower risk of depressive symptoms – and the association is stronger in more rural neighborhoods (i.e. neighborhoods with higher proportion of agricultural workers). The same trend is not observed in neighborhoods with low proportion of agricultural workers. By contrast, Figure 2 shows that



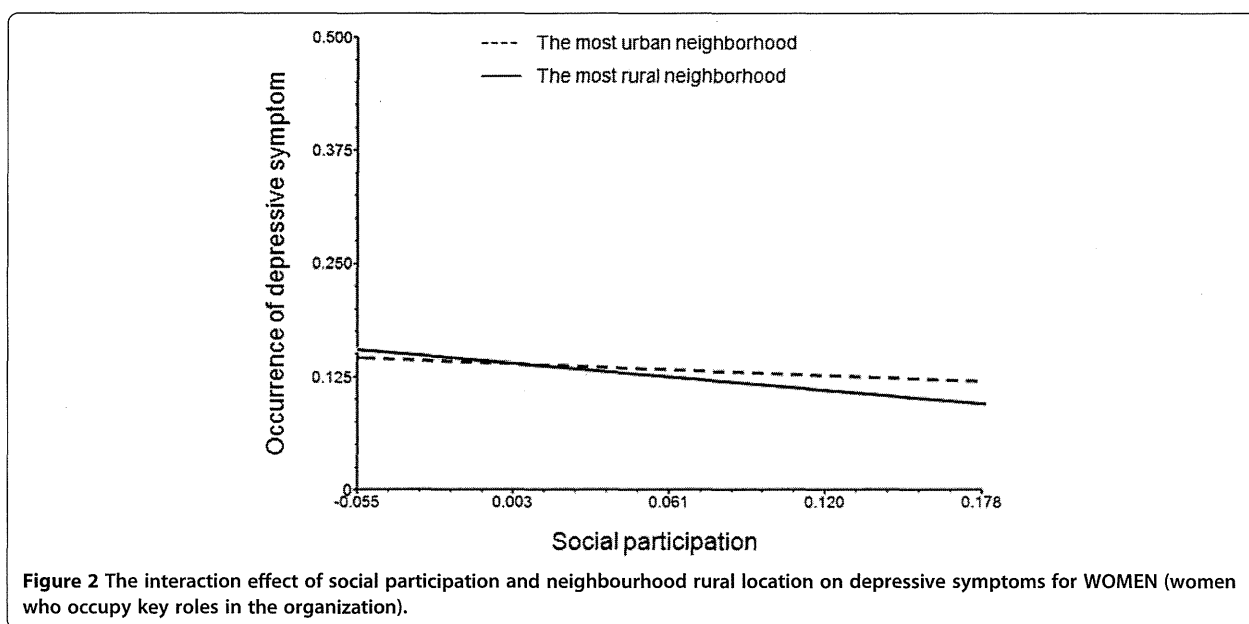
among women there appears to be no difference in risk according to rural/urban location.

**Discussion**

We summarize our main findings. First, the main effects of social participation and performing key roles in the participation were significant only for women. Contrary to our prediction that performing a role with responsibilities may have negative impacts on women’s health (from the perspective of role strain theory and emotional labor), the results of our study found the opposite. Thus, this result is consistent with Kavanagh et al.’s [8] and Norton et al.’s [10]

arguments that women receive more benefit from their social participation than men. Because women are more likely than men to make close friends from their large and diverse networks [21], they may tend to receive positive benefits from social participation.

Our next notable finding was that among men there was an interaction effect between social participation and performance of key roles. In contrast to Kawachi and Berkman’s [4] argument that frequent social participation may bring about psychological distress for women, this suggests that social participation which provides the individual with a social role does not adversely impact the



mental health of women, and may even promote the mental health of men. This also suggests that occupying a key position within an organization a necessary condition for men to receive positive effects from their social participation. The same interaction effect was not found for women's depressive symptoms. In Japanese society, which is characterized by strong patriarchal values, males seek meaning and identity by being valued in the workplace (as opposed to in the home). This orientation may spill over into retirement, such that men feel rewarded by seeking positions of authority of responsibility within the social organizations in which they participate. The present study's suggestion that it is important to have roles in social participation for retired men is critical for developing community-based interventions to promote the health of elders.

A third notable finding of our study is the cross-level interaction effect between social participation x performance of key roles x rural residence. As Figure 1 shows, this result suggests that the interaction effect of social participation and key roles on depressive symptoms is enhanced (for men) in rural areas, while the interaction effect is non-significant in urban areas. Although we predicted that closed networks are more likely to be formed in rural areas and that such networks might be associated with adverse effects on mental health, our results suggested the opposite – primarily boosting the mental health of men who perform key roles. In contrast to rural areas, open and mobile networks are more likely to be formed in urban areas, but the extent of cohesion in such networks tends to be low and the degree of members' cooperation may also be low. In such a setting, performing key roles may add to mental burden. Our results offer new insight into health promotion among the elderly, and shed light on the interaction between the social context and social participation.

In addition, because our analyses focused on only new occurrence of depressive symptoms (i.e. respondents who already had depressive symptoms at baseline were excluded), the causal interpretation of our findings is strengthened.

Parallel with providing some novel insights into the theoretical aspects of older people's social participation, our results also suggest some practical implications. In the health promotion literature, increasing the opportunities for social participation has been suggested as a means of improving older people's health [22-24]. Our findings support that notion, but also suggest complexities based on gender.

Some limitations of our study should be noted. The present study used the proportion of agricultural workers as a proxy indicator of rural status. In addition, the characteristics of social network (tightly bonded) in Japanese rural areas described in this paper are speculative, and require further ethnographic elaboration. Ideally, instead of using urban/rural as the indicator, a more theoretically-grounded

approach would have been to stratify the analyses based upon network characteristics such as size, closeness, openness and mobility. Future studies should measure such detailed characteristics and incorporate them into the analyses.

Second, a high number of respondents were omitted from our analyses because of missing values. Generally, missing responses tend to be higher among older people and in mail surveys. The missing responses may have biased the findings of our study.

## Conclusion

Our findings support the notion that increasing the opportunities for social participation improve older people's health, especially for women, but also suggest nuances based on the social context (Japanese society), sociodemographic characteristics (gender), social position (whether occupying key roles within organizations), and location (rural vs. urban) – that is, in the rural Japanese context, offering men meaningful roles within organizations may be important.

## Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

DT performed the statistical analysis and drafted the manuscript. KK made substantial contributions to design and acquisition of data. IK revised the drafted manuscript critically for important intellectual content. All authors read and approved the final manuscript.

## Acknowledgements

This study used data from the Aichi Gerontological Evaluation Study (AGES), conducted by the Nihon Fukushi University Center for Well-being and Society as one of their research projects. This study was supported in part by a grant of Strategic Research Foundation Grant-aided Project for Private Universities from Ministry of Education, Culture, Sport, Science, and Technology, Japan (MEXT). The authors thank Drs Toshiyuki Ojima, Tatsuo Yamamoto, Masayo Kojima, Naoki Kondo, Masashige Saito and Yukinobu Ichida for their helpful comments on this study.

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Received: 17 March 2013 Accepted: 29 July 2013

Published: 31 July 2013

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doi:10.1186/1471-2458-13-701

Cite this article as: Takagi et al.: Social participation and mental health: moderating effects of gender, social role and rurality. *BMC Public Health* 2013 **13**:701.

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特別寄稿

# 健康の社会的決定要因と医療経済・政策学

近藤 克則\*

本年度（平成26年版）の厚生労働白書<sup>1)</sup>のテーマは「健康長寿社会の実現に向けて～健康・予防元年～」である。その第3章第1節「国の取組み」の冒頭に、厚生労働大臣告示「国民の健康の増進の総合的な推進を図るための基本的な方針」<sup>2)</sup>（健康日本21〔第二次〕）が取り上げられている。その「基本的な方向」は「健康寿命の延伸と健康格差の縮小」である。

「健康寿命の延伸」をめざすことには異論は少ないが、「健康格差（地域や社会経済状況の違いによる集団間の健康状態の差）」となると、いろいろな異見がある。筆者は社会経済的に厳しい環境に置かれた人や地域の健康状態が悪いという健康格差の研究に取り組んできたので、異見や疑問を投げかけられたことも多い。例えば「小泉首相も言ったように『格差のない社会はあり得ない』。だから健康格差をなくすのをめざすことには無理がある」「日本は他国に比べ健康格差は小さいのではないか」「健康格差の縮小の理念はわかるが、現実的にできることはあるのか」などである。私が直接聞く機会が多かったのは、学識経験者からのものである。言い換えれば、国の政策の「基本的方向」に掲げられているにもかかわらず、「健康格差の縮小」に関しては、共通認識とすべき学術的な基盤が、まだ弱いことを意味している。

そこで、健康格差とその背景にある「健康の社

会的決定要因（social determinants of health, SDH）」をテーマに取り上げ、1. 医療経済学におけるその位置づけを確認した後、2. 保健医療政策における課題としてそれが浮上してきた経過と背景、3. 健康の社会的決定要因に関わる研究課題・対象の枠組み、4. 健康格差の縮小に向けた対策の国内外の動向、5. 今後の課題をまとめたい。それによって「医療経済・医療政策研究の発展を図り、医療政策立案及び評価に学術的基盤を与える」ことを目的に掲げる本誌への寄稿論文としたい。

## 1. 医療経済学における健康格差の位置づけ

本誌に掲載されてきた論文や学会での発表演題を見ても、健康格差や健康の社会的決定要因（SDH）、公平・公正（equity）に関する研究は多いとは言えない。これらは、果たして医療経済・政策学で扱うべきテーマなのだろうか。

### 1) 経済学の定義（宇沢弘文、1989）

昨年逝去された宇沢氏によれば「経済学は、人間の営む経済行為を直接の対象とし、現実の経済現象の根底にひそむ本質的な諸要因を引き出し、経済社会の基本的な運動法則を明らかにすると同時に、貧困の解消、不平等の是正、物価の安定、さらには経済発展の可能性を探ろうという実践的な意図を持つ」<sup>3)</sup>という。例えば生活保護世帯の開始理由で傷病など（傷病＋急迫保護で医療扶助

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単給+要介護状態)が占める割合は平成24年度で32.3%<sup>4)</sup>と最大である。つまり不健康は貧困の最大の原因である。一方、貧困が不健康をもたらす側面もある。加えて、後述するように貧困世帯に生まれた子世代も不健康になりやすいことが判明してきており、貧困層では貧困とともに不健康も再生産される負の連鎖を形成している。その結果、健康格差(健康の不平等)は世代を超えて固定化し、それが社会経済的な不平等の固定化をも招く要因となる。もし経済学が「貧困の解消、不平等の是正」を意図するのであれば、とりわけ医療・健康に関わる経済学なら、貧困や不平等の原因およびその結果としての不健康やその格差の是正は追求されるべき課題であろう。

## 2) 医療経済学の枠組みにおける位置づけ

国際医療経済学会(International Health Economics Association, iHEA)の会長を務めたロペス-カサノヴァス(Guillem Lopez-Casasnovas)教授が、来日時の講演で示した医療経済学の枠組みを表に示す<sup>5)</sup>。医療経済学における8つの研究課題のうち、一番目が「何が健康に影響するのか?」である。その例として、教育や所得、職業に関わるリスクなど、まさに健康の社会的決定要因が示されている。

米国の医療経済学者フックスの本<sup>6)</sup>をはじめ、

## 表 医療経済学の枠組み

Lopez-Casasnovas, 2009

- A. 何が健康に影響するのか?
- B. 健康とは何か?その価値は?
- C. ヘルスケアへの需要
- D. ヘルスケアの供給
- E. 治療のミクロ経済学的評価
- F. 市場均衡
- G. 制度レベルの評価
- H. 制度の計画, 予算, モニタリングメカニズム

貧困・社会経済要因と健康との関連を取り上げたり、健康の決定要因や医療行為・資源(利用)の地域間較差、制度レベルの評価において公平・公正(equity)が重要な基準として取り上げられている医療経済学の書籍は少なくない。

## 2. 「健康格差」が政策課題となるまでの経過と背景

次に、日本の「健康日本21(第2次)」に「健康格差の縮小」が掲げられるまでの経過と背景となる国内外の動向を見ておこう。

### 1) WHOなどの国際動向

1980年にイギリスで公表されたブラック報告<sup>7)</sup>以降、健康の社会的決定要因やそれによる健康格差の問題は研究者の関心を集めてきた。WHOヨーロッパ地域委員会は、早くも1991年には、健康格差を25%削減することを目標に掲げ貧困をなくし不平等をなくすことが行政の責務としていた<sup>8)-10)</sup>。膨大な実証研究が蓄積され、それらをまとめたWHO「健康の社会的決定要因」報告書(1998)には「確固たる事実(The Solid Facts)」<sup>11)</sup>という副題がつき、第2版<sup>12)</sup>も出された。

米国では、1990年からの10ヵ年計画であったHealthy People 2000<sup>13)</sup>の3つの目標の一つに「健康格差の縮小(to reduce disparities in health status)」を掲げ人種別にデータを公表していたのに加え、2000年からのHealthy people 2010以降は所得階層別、教育歴別の医療保険加入率から健康指標までデータを公表するようになった。

イギリスでは、ブレア政権が設置したアチェソン委員会(1998)が、受診時原則無料のNHS(National Health Service, 国民保健サービス)が導入されたにもかかわらず健康格差がむしろ拡大したと報告した<sup>14)</sup>。それを受けて政府が健康格

差の縮小に責任を負うとして貧困や環境、雇用、交通政策など、社会環境への対策を含む行動計画<sup>15)</sup>を1998年に発表し5年後にその見直しも行った<sup>16)</sup>。その中では保健省だけでなく、首相官邸や内閣府、財務省、通商産業省まで関与する総合的な対策と2010年までの数値目標が掲げられた。

スウェーデンでは、2003年に改正された公衆衛生法の中で「経済と所得保障」が重要であることなどが明記され、その過程で教育、雇用、年金をはじめとする多くの政策による対応が検討された<sup>17)</sup>。

2005年にはWHOが「健康の社会的決定要因に関する委員会」を設置し、健康格差克服をテーマとしたEUサミットが開かれ、36ヵ国から大臣や政府高官が570人も参加し、健康の不平等の削減に向けた取り組みを強めることで合意した。オランダ、フィンランド、イギリス、アイルランドなどで、健康格差是正の数値目標が設定されるなど政策的な対策が始まった<sup>8)-10)</sup>。

WHO「健康の社会的決定要因に関する委員会」の最終報告書<sup>18)</sup>が2008年に出され、その翌年のWHO総会で決議まであげられている<sup>19)</sup>。

このように、健康格差や健康の社会的決定要因は、研究課題から各国政府やEU、WHO等が取り組む政策課題となり、公衆衛生関係者や実践家、さらには他の省庁も巻き込んで取り組みが始められた。

## 2) 日本における動向

日本でも「女工哀史」をはじめ、貧困と不健康の関連は古くから取り上げられてきた。2000年前後から、我が国でも再び社会格差と健康についての関心は高まり、英米に比べれば少数ながら、個票を用いて交絡要因を調整した研究が発表され、学術誌でのレビューや特集、書籍が出版されるようになった<sup>20)-26)</sup>。

日本公衆衛生学会学術集会でも、特別講演やシ

ンポジウムなどで取り上げられるようになり、学会に設置されたモニタリングレポート委員会から子ども<sup>27)</sup>、非正規雇用<sup>28)</sup>、自殺<sup>29)</sup>、高齢者<sup>30)</sup>を対象にした健康の社会的決定要因や、対策としての健康影響予測評価<sup>31)</sup>などに関わる提言が出されるようになった。そして日本学術会議も提言「わが国の健康の社会格差の現状理解とその改善に向けて」<sup>32)</sup>を発表した。

「健康日本21」(2000-2010)の見直しに向けた最終評価では、2000年に掲げた数値目標59項目のうち、目標値に達したものが10項目あった一方で、「日常生活における歩数」など2000年の数値よりも悪化した項目が9項目あった。2010年までの10年間、生活習慣の改善に重点が置かれていたが、それだけでは不十分であることが明らかになった。

当時の社会経済状況は、リーマンショック(2008)の影響も残り「経済状況は停滞し、完全失業率は5%まで上昇。非正規雇用が増加し、若年者の雇用情勢も依然として厳しい状況」「相対的貧困率は16.0%。生活保護受給者数は過去最高の205万人」<sup>1)</sup>であった。2011年3月11日には東日本大震災も起き、そこから地域の絆や助け合いなどの社会のあり様についての学びなどもあった。それらを背景に「健康日本21(第2次)」で10年後に目指す姿として「社会環境の改善を図り、健康格差の縮小を実現できる社会」が掲げられるに至ったのである<sup>1)</sup>。

## 3) 生活習慣改善の難しさと社会環境への着目

「健康日本21(第2次)」において社会環境が強調された背景として、もう一つ指摘すべき重要なことがある。かつて健康教育による生活習慣改善には効果があり、冠動脈疾患死や罹病率の減少に効果的で、費用対効果も高く、広く行われるべきと考えられていた。しかし、6ヶ月を超える長期効果を調べてみると、期待されていたような効

果がないことが明らかになってきたのである。

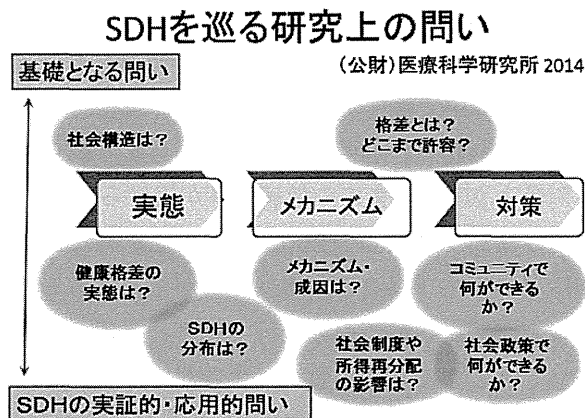
糖尿病、高血圧症、高脂血症、肥満などの冠動脈疾患の危険因子を持つ成人を対象に、これらのうち2つ以上の危険因子を改善させるためのカウンセリングまたは教育を実施し、6カ月を超える効果を検証したランダム化比較試験のシステマティック・レビューがコクランライブラリーにある<sup>33)</sup>。55件の試験（参加者163,471例、追跡期間の中央値は12カ月間）のうち、臨床イベントのエンドポイントを報告している14件（参加者139,256例）で、総死亡率の統合オッズ比（OR）は1.00（95%CI 0.96~1.05）、冠動脈疾患による死亡率の統合ORは0.99（95%CI 0.92~1.07）と、統計学的に有意なものではなかった。ただし高血圧症患者（16試験）および糖尿病患者（5試験）を対象とするものに限れば、総死亡率ORは0.78（95%CI 0.68~0.89）と致死性的および非致死性的な心血管イベント0.71（95%CI 0.61~0.83）と介入効果が認められた。今後、介入方法を改善したり、より大規模なデータが加わったりして、将来において結論が変わる可能性は残されているものの、現時点のエビデンスに基づけば、行動の変容を目的とする健康教育は、一般集団に対する長期効果については有用性に限界があると結論されている。

これらのことから、健康教育による生活習慣の改善の追求だけでなく、例えば公共空間の禁煙化やタバコ税の引き上げなど社会環境の改善も合わせて追求されることになったのは妥当と言える。

### 3. 関連する研究の課題・対象の枠組みと概要

健康格差の縮小を意図した研究となると、必要となる1) 研究課題、2) 対象・領域は広範に及ぶ。その枠組み（見取り図）を概観しておきたい。

図1



#### 1) 研究課題（図1）

まず健康格差の縮小を図るには、その背景にある健康の社会的決定要因を巡る以下のような研究上の問い（リサーチ・クエスチョン）に答える研究が必要となる。図1<sup>34)</sup>の左手から右に向けて、(1) 実態、(2) メカニズム、(3) 対策である。また上側に示した基礎的な問いもあれば、下側にある実証的な、あるいは応用的な問いもある。

(1) 実態を明らかにする研究には、社会構造はいかなるものかという基礎的な問いもあれば、健康格差の実態やその要因となっている健康の社会的決定要因の分布を明らかにする記述的な研究<sup>20),23),35)~37)</sup>もある。日本における個人<sup>21)</sup>および地域間<sup>38)</sup>の健康格差は小さいと報告されてきた。一方で、日本男性における職業階層別の死亡率のトレンドを分析した結果、他国では管理職や専門職において健康水準が良いが、日本ではむしろ彼らで悪化してきていることが報告されている<sup>39)</sup>。つまり上位層が低いことによって他の国よりも健康格差が小さい可能性もある。また調査では低所得層ほど無回答となる傾向があり、調査データでは統計学的に有意な健康格差が見られなかったが行政が持つ介護保険料データを用いて分析すると、最高（第5段階）層と比べ最低層では死亡ハザー

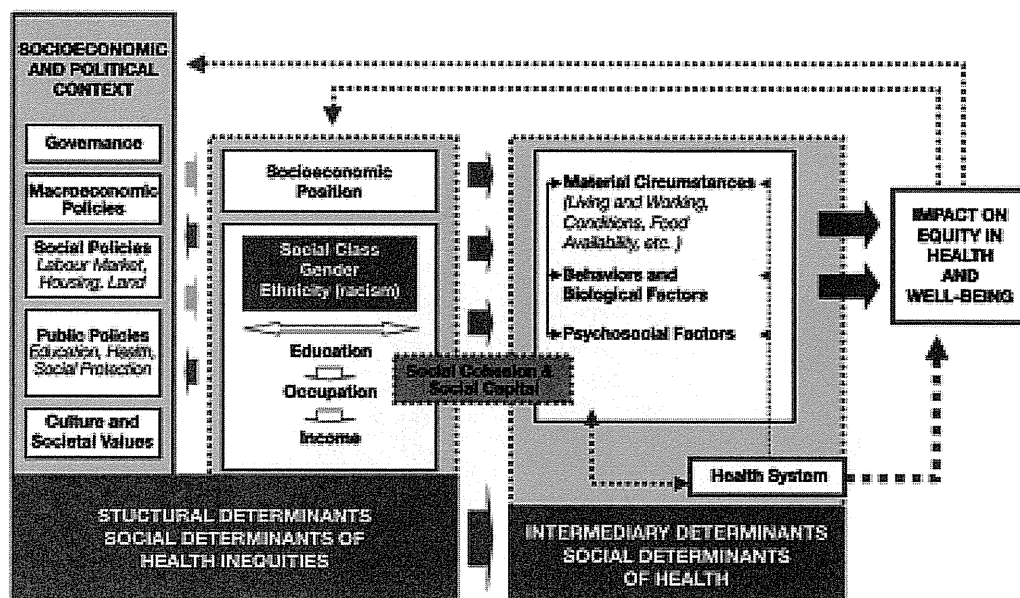
ド比が男性で3.50、女性2.48で有意となったという報告もある<sup>40</sup>。今後危惧されるのは、日本においては子ども貧困率が10.9% (1985)→12.1% (1995)→13.7% (2003)→15.7% (2009)と上昇してきていること<sup>41</sup>、および非正規雇用率も15.3% (1984)→20.8% (1993)→30.4% (2003)→36.7% (2013)と上昇し、特に25-34歳では12.0% (1993)→27.4% (2013)と急増していることである<sup>42</sup>。後述するように、出生時から小児期、成人期、高齢期に至るライフコースの影響が蓄積されることから、子ども時代に貧困を経験したり、望まないのに非正規雇用となった人が今後も正社員になれないとすると、健康格差が将来拡大する可能性は高い。それらをモニタリングできるデータと仕組みの整備が望まれる。

(2) メカニズムの解明は、効果的な対策を練る上で重要である。図2 (WHO2010)<sup>43</sup>に示したような複雑に絡み合う健康の社会的決定要因間の相互の関係、それらから健康に至るプロセス、および健康からの逆の因果関係も想定して解明が進められている<sup>12),18),24),44</sup>。平成21~25年度文部科学省の科学研究費で新学術領域研究「現代社会の階層化の機構理解と格差の制御—社会科学と健康科学の融合」(領域代表者川上憲人)が組織され、複数の大規模多目的共用パネル調査が行われ、それをういた分析など精力的に研究発表がされている<sup>45</sup>。

(3) 対策に関わる研究では、政策目標を設定するために、どの程度の格差まで問題に(あるいは許容)するのか、どのような対策がありえるの

図2

## WHO framework of social determinants of health



[http://www.who.int/sdhconference/resources/ConceptualframeworkforactiononSDH\\_eng.pdf](http://www.who.int/sdhconference/resources/ConceptualframeworkforactiononSDH_eng.pdf)