

Table 2. Incident rate of functional disability for 4 years.

		N	Incident/Person year	Incident rate
Total				
		12,951	1,528/47,453	0.032
Number of types of organizations				
0		3,190	447/11,391	0.039
1		3,184	390/11,624	0.034
2		2,135	192/8,010	0.024
≥3		2,102	124/8,021	0.015
missing		2,340	375/8408	0.045
Type of social participation				
Local community	participation	6,851	715/25,395	0.028
	non-participation	4,948	589/18,004	0.033
	missing	1,152	224/4,054	0.055
Hobby	participation	3,557	253/13,528	0.019
	non-participation	7,799	987/28,261	0.035
	missing	1,595	288/5,665	0.051
Sports	participation	2,373	128/9,139	0.014
	non-participation	8,860	1,103/32,191	0.034
	missing	1,718	297/6,124	0.048
Religion	participation	1,394	180/5,098	0.035
	non-participation	9,913	1,069/36,469	0.029
	missing	1,644	279/5,886	0.047
Industry	participation	1,199	96/4,472	0.021
	non-participation	10,124	1,145/37,160	0.031
	missing	1,628	287/5,821	0.049
Volunteer	participation	1,180	74/4,486	0.016
	non-participation	10,111	1,161/37,055	0.031
	missing	1,660	293/5,913	0.050
Politics	participation	921	90/3,417	0.026
	non-participation	10,573	1,170/38,854	0.030
	missing	1,457	268/5,183	0.052
Citizen	participation	532	45/1,999	0.023
	non-participation	10,659	1,177/39,169	0.030
	missing	1,760	306/6,286	0.049

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However, most of the studies in this topic have been conducted in western settings. Religious involvement has a very different connotation in Japanese society, where most people (84%) do not claim to adhere to any personal religion, [34]. We speculate that religious involvement in this context is more likely to be triggered by health problems, and hence the possibility of reverse causation is heightened."

The present study has five limitations. First and foremost is that we cannot completely exclude the possibility of reverse causation, even though the study was longitudinal and none of the subjects had disability at the start of follow up. Although we carefully controlled for a number of covariates, and even conducted a sensitivity analysis excluding people who developed disability within one year of baseline, there is nonetheless a possibility of residual confounding by underlying health status (e.g. vitality, "pep", or some other subtle difference in health that our measurements were unable to capture). Thus, subtle differences

in the vitality of individuals (for example in lung capacity or cardiovascular fitness) could cause them to selectively participate in more organizations, as well as to select more vigorous activities (such as sports) over more sedentary activities (like chatting to neighbors). Causal inference in this situation is quite challenging. Given the expense involved in conducting randomized experiments, some have advocated the use of "natural" experiments, such as instrumental variables. In a recent study, Ichida et al., [29] used "distance to the nearest newly opened community center" as an instrument for social participation. The authors found that old people who happened to live closer to a newly opened community "salon" were more likely to participate, and that salon participation was associated with improved health over follow-up. A second limitation is that the term "local community organization" covered neighborhood associations, senior citizen clubs and fire-fighting teams. We were therefore unable to distinguish how participation in each of these three types of organizations related

Table 3. Adjusted hazard ratios (95% confidence intervals) for incident functional disability.

	Crude		Model 1 ^{a)}		Model 2 ^{b)}		Model 3 ^{c)}		Model 4 ^{d)}		Model 5 ^{e)}	
	HR	95%CI	HR	95%CI	HR	95%CI	HR	95%CI	HR	95%CI	HR	95%CI
Number of types of organizations												
0	1.00		1.00		1.00		1.00		1.00		1.00	
1	0.85*	0.75–0.98	0.83*	0.73–0.95	0.87	0.76–1.00	0.89	0.78–1.02	0.88	0.77–1.01	0.93	0.81–1.07
2	0.61*	0.51–0.72	0.72*	0.61–0.85	0.79*	0.66–0.93	0.82*	0.69–0.98	0.82*	0.69–0.98	0.91	0.76–1.09
≥3	0.39*	0.32–0.48	0.57*	0.46–0.70	0.63*	0.52–0.78	0.69*	0.56–0.86	0.68*	0.55–0.83	0.78*	0.63–0.96
Type of social participation (reference: non-participation of each organization)												
Local community	0.86*	0.77–0.96	0.85*	0.76–0.96	0.89*	0.79–1.00	0.90	0.80–1.02	0.89*	0.79–1.00	0.94	0.83–1.06
Hobby	0.53*	0.46–0.61	0.75*	0.64–0.87	0.78*	0.66–0.91	0.80*	0.69–0.94	0.82*	0.70–0.96	0.85*	0.73–1.00
Sports	0.41*	0.34–0.49	0.66*	0.54–0.81	0.69*	0.56–0.85	0.71*	0.58–0.87	0.69*	0.56–0.84	0.73*	0.59–0.90
Religion	1.20*	1.03–1.41	1.07	0.90–1.27	1.08	0.91–1.28	1.06	0.89–1.26	1.10	0.93–1.31	1.09	0.92–1.30
Industry	0.70*	0.57–0.86	1.07	0.84–1.35	1.08	0.85–1.37	1.11	0.87–1.41	1.09	0.86–1.39	1.13	0.88–1.44
Volunteer	0.53*	0.42–0.66	0.92	0.70–1.20	0.94	0.72–1.23	0.95	0.73–1.25	0.98	0.74–1.28	0.99	0.76–1.30
Politics	0.87	0.71–1.08	1.18	0.93–1.50	1.19	0.94–1.52	1.21	0.95–1.54	1.24	0.98–1.58	1.24	0.97–1.58
Citizen	0.75	0.56–1.01	1.33	0.96–1.84	1.32	0.95–1.83	1.37	0.99–1.90	1.36	0.98–1.89	1.36	0.98–1.90

^{a)}Model 1 is adjusted for age, sex, annual equivalized income, educational attainment, marital status, occupational status and self-reported medical conditions. In addition, participation in all 8 organizations is added only for "type of social participation".

^{b)}Model 2 is adjusted for the covariates in Model 1 plus smoking, alcohol consumption, walking time and frequency of going outdoors.

^{c)}Model 3 is adjusted for the covariates in Model 1 plus depression, emotional support, instrumental support and frequency of meeting friends.

^{d)}Model 4 is adjusted for the covariates in Model 1 plus IADL.

^{e)}Model 5 is adjusted for the covariates in Model 1 plus smoking, alcohol consumption, walking time, frequency of going outdoors, depression, emotional support, instrumental support, frequency of meeting friends and IADL.

* Statistically significant variable ($p < 0.05$).

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to incident functional disability. A third limitation is that we did not inquire about the frequency of participation in each organization. The frequency of meetings may vary greatly according to the type of organization, but the effects of variation in frequency are not reflected in this study. A fourth limitation is that we did not inquire about the level of involvement or commitment of the individual to the organization. The involvement of individuals in organizations may vary in intensity, e.g. according to whether they assume leadership roles or they choose to participate as regular members, [18]. Further studies are needed to examine these additional questions. A fifth and final limitation is that our response rate to the baseline invitation was only 46%, so that our findings may not be representative of the areas in Japan in which the surveys were conducted. However, a response rate of 40% is quite high by western standards (where the response to postal surveys can be as low as 10%). Moreover, depending on the objectives of the study, we need not insist on representativeness as an obligatory feature of a cohort study, [35].

In conclusion, social participation may lower the risk of incident functional disability in older Japanese people, and this effect may be strengthened by participation in a variety of organizations. Moreover, participating in a local community, hobby, or sports group or organization may be especially effective for decreasing the risk. These findings suggest that support for older Japanese people that encourage participation in a variety of organizations, centered on local community, hobby, and sports organizations, may be effective for preventing the need for long-term care.

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Relative Deprivation, Poverty, and Subjective Health: JAGES Cross-Sectional Study

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Abstract

To evaluate the association between relative deprivation (lacking daily necessities) and subjective health in older Japanese adults, we performed a cross-sectional analysis using data from the Japan Gerontological Evaluation Study (JAGES). The data were obtained from functionally independent residents aged ≥ 65 years from 24 municipalities in Japan ($n=24,742$). Thirteen items in three dimensions were used to evaluate relative deprivation of material conditions. Approximately 28% of older Japanese people indicated that they lacked some daily necessities (non-monetary poverty). A two-level Poisson regression analysis revealed that relative deprivation was associated with poor self-rated health ($PR=1.3-1.5$) and depressive symptoms ($PR=1.5-1.8$) in both men and women, and these relationships were stronger than those observed in people living in relative poverty (monetary poverty). The interaction effect between relative deprivation and relative poverty was not associated with poor health. As a dimension of the social determinants of health, poverty should be evaluated from a multidimensional approach, capturing not only monetary conditions but also material-based, non-monetary conditions.

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Introduction

The association between poverty and health has been established. A number of studies have revealed that relative income poverty is significantly related to poor health [1–3]. However, this approach has limitations when attempting to capture the diverse and complex aspects of poverty. In reality, older people tend to have comparatively high-quality living conditions due to savings and property ownership, even if their income is low [4]. To overcome this limitation, poverty research has proposed the concept of relative deprivation in material conditions to reflect the multidimensional non-monetary aspects of poverty [5–15]. Townsend [5] developed 60 relative deprivation indices within 12 dimensions composed of items such as “Household does not have a refrigerator” and “Has not had a week’s holiday away from home in the last 12 months,” and found that poverty in the United Kingdom was more extensive than generally believed or officially reported. The Europe 2020 strategy has adopted the concept of relative deprivation as a material dimension of social exclusion and

has set the elimination of severe material deprivation as a goal for the next decade [16].

In investigating relationships between poverty and health, some studies have applied a social indicator approach, such as the Carstairs deprivation score or Townsend deprivation index, to include unemployment rate or proportion of non-car ownership. These previous studies found that relatively deprived areas were associated with standardized mortality rates [17–20], cancer mortality rates [21], suicide rates [22], coronary heart disease [23], dental caries [24], number of sound teeth remaining [25], and depression symptoms [26]. However, there have been few studies analyzing the relationship between an individual’s relative deprivation and his or her health. Some studies have shown an association between deprivation in living conditions and poor health [14], low levels of satisfaction with life [27], and poor social support [28]. Furthermore, no studies investigating the different associations between relative deprivation, relative poverty, and health have been conducted, although it has been suggested that people who live in relative deprivation have different character-

Table 1. Distribution of control variable.

Variable	Category	Total	Men	Women
Individual (n = 24,742)				
Sex	men	45.9	-	-
	women	54.1	-	-
Age	65–69	25.4	26.9	24.0
	70–74	29.1	29.5	28.7
	75–79	23.3	23.2	23.4
	80–84	14.1	13.5	14.7
	85 -	8.1	6.8	9.2
Education	>9	47.6	51.8	44.1
	= <9	49.9	46.5	52.9
	unknown	2.4	1.7	3.0
Marital status	married	69.0	84.0	56.0
	divorced	22.6	8.6	34.5
	separated	3.2	2.6	3.8
	never married	2.1	1.9	2.3
	unknown	3.1	2.9	3.4
Disease and/or impairment	no	22.4	24.1	20.8
	yes	68.5	67.6	69.3
	unknown	9.1	8.3	9.9
Self recognition of forgetfulness	no	79.3	79.5	79.1
	yes	16.8	16.5	17.1
	unknown	3.9	4.1	3.8
Social supports	present	85.6	84.4	86.7
	absent	8.1	9.9	6.5
	unknown	6.3	5.7	6.8
Municipality (n = 24)				
Proportion of older people	mean (SD)	24.4 (5.2)	-	-
Population density [1000 p/km ²]	mean (SD)	1.70 (1.36)	-	-
Proportion of person receiving public assistance[%]	mean (SD)	8.5 (10.7)	-	-

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istics than those living in relative poverty [9,13,15]. In order to clarify the relationships between poverty and health, it is important to identify the aspects of poverty that are the strongest predictors of health.

In addition, there have been few studies focusing on relative deprivation among older adults [8,15]. Previous studies comparing younger and older people found that both the prevalence and depth of deprivation were more severe in younger people or single parents of working age [4,13,29]. However, from a life course perspective, the impact of relative deprivation on health should be evidenced in older people because the influence of poverty on health may accumulate over time. Finally, with the exception of a study that analyzed 131,335 people in 11 countries [10], most of the previous related research has been conducted on a relatively small scale. Analysis of relative deprivation should be performed with a large sample in order to derive robust findings, as few cases fall into each of the deprivation indices.

The present study posed three research questions: (1) is relative deprivation associated with poor health, even after monetary poverty is controlled for; (2) is the interaction effect between

relative deprivation and relative poverty significantly associated with poor health, and (3) do older people with social support have good health, even if they are relatively deprived? In social psychology and sociology, the concept of relative deprivation has also been used to measure psychosomatic stress related to complaints or dissatisfaction based on comparisons with their reference groups [30–38]. However, our focus on relative deprivation is based on Townsend's definition used in the poverty and social policy research described above.

Methods

Study samples

We used data from the Japan Gerontological Evaluation Study (JAGES), which was cross-sectional in design. JAGES was a postal survey of 112,123 people aged ≥ 65 who were randomly selected from the older residents of 31 municipalities in Japan. Data were collected from August 2010 to January 2012, with a response rate of 66.3%. For our study, we included 24,742 respondents from 24 municipalities who answered a relative deprivation questionnaire. The average age of the respondents was 74.6 years [standard

Table 2. Distribution of relative deprivation index.

Dimension	Item	Category	n	%	Crude odds ratio (95% CI)		
					self-rated health (1 = fair/poor)	depressive symptom (1 = present)	
Lack of daily necessities due to economic reasons	no television	no	23,594	97.6	1.00	1.00	
		yes (+)	592	2.4	1.47 (1.22–1.77)	2.25 (1.87–2.72)	
	no refrigerator	no	23,781	98.3	1.00	1.00	
		yes (+)	405	1.7	1.32 (1.05–1.66)	1.67 (1.32–2.11)	
	no air conditioner	no	22,823	94.4	1.00	1.00	
		yes (+)	1,363	5.6	1.62 (1.44–1.83)	2.23 (1.97–2.52)	
	no microwave oven	no	23,315	96.4	1.00	1.00	
		yes (+)	871	3.6	1.62 (1.40–1.88)	1.88 (1.61–2.19)	
	no water heater	no	23,213	96.0	1.00	1.00	
		yes (+)	973	4.0	1.63 (1.41–1.87)	2.14 (1.85–2.48)	
	Lack in living environment	private WC	yes	22,606	93.5	1.00	1.00
			no (+)	1,580	6.5	1.40 (1.24–1.57)	1.78 (1.58–2.01)
private kitchen		yes	22,260	92.0	1.00	1.00	
		no (+)	1,926	8.0	1.43 (1.29–1.59)	1.79 (1.60–2.00)	
private bathroom		yes	22,153	91.6	1.00	1.00	
		no (+)	2,033	8.4	1.40 (1.27–1.56)	1.83 (1.64–2.04)	
dining room separated from bedroom	yes	20,585	85.1	1.00	1.00		
	no (+)	3,601	14.9	1.48 (1.37–1.61)	1.81 (1.67–1.97)		
Lack of social life due to economic reasons	no telephone	no	23,229	96.0	1.00	1.00	
		yes (+)	957	4.0	1.52 (1.32–1.76)	2.25 (1.94–2.60)	
	no ceremonial dress	no	23,644	97.8	1.00	1.00	
		yes (+)	542	2.2	1.53 (1.27–1.85)	1.92 (1.58–2.34)	
	absence from relative's ceremonial occasions	no	21,952	93.4	1.00	1.00	
		yes (+)	1,549	6.6	2.47 (2.22–2.76)	3.27 (2.91–3.67)	
cut-off of essential services in the past year	no	23,509	98.4	1.00	1.00		
	yes (+)	388	1.6	2.09 (1.70–2.59)	4.10 (3.27–5.14)		
Number of relative deprivation index	none	16,812	72.0	1.00	1.00		
	1	3,349	14.3	1.61 (1.48–1.75)	1.93 (1.77–2.10)		
	2	916	3.9	2.01 (1.74–2.32)	2.68 (2.31–3.12)		
	3	480	2.1	2.04 (1.67–2.48)	2.89 (2.36–3.52)		
	4	1,109	4.8	1.61 (1.40–1.85)	2.04 (1.77–2.36)		
	5	271	1.2	2.30 (1.77–2.98)	3.49 (2.66–4.58)		
	>=6	401	1.7	1.75 (1.40–2.19)	2.92 (2.33–3.67)		
	>=2	3,177	13.6	1.86 (1.70–2.02)	2.57 (2.35–2.81)		

(+) is related to relative deprivation.
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deviation (SD) = 6.4] and 54.1% were women. Our study protocol and questionnaire procedures were approved by the Ethics Committee in Research of Human Subjects at Nihon Fukushi University. Written informed consent was assumed with voluntary return of the questionnaire.

Dependent variables

We used self-rated health and depressive symptoms as indicators of subjective health. Self-rated health and depressive symptoms

have been found to be highly valid predictors of mortality, regardless of other medical, behavioral, or psychosocial factors [39,40]. Self-rated health was measured using the question “How do you feel about your current health status: excellent, good, fair, or poor?” Responses were recoded into dichotomous response variables (excellent/good or fair/poor). Depressive symptoms were assessed using the short version of the Geriatric Depression Scale (GDS-15), which was developed for self-administration in the community using a simple yes/no format [41,42]. The validity and

Table 3. Combination of relative deprivation and poverty.

	n (%)	Self-rated health		Depressive symptom	
		fair/poor %	Crude OR (95%CI)	present %	Crude OR (95%CI)
No deprivation or poverty	10,241 (53.7)	16.9	1.00	21.0	1.00
Poverty only	3,987 (20.9)	23.3	1.50 (1.37–1.64)	29.0	1.54 (1.41–1.68)
Deprivation only (=1)	1,334 (7.0)	23.1	1.48 (1.29–1.70)	32.1	1.78 (1.56–2.03)
Deprivation only (>=2)	893 (4.7)	25.4	1.68 (1.43–1.97)	36.4	2.16 (1.85–2.52)
Poverty and deprivation (=1)	1,305 (6.8)	31.4	2.26 (1.98–2.57)	43.2	2.86 (2.51–3.26)
Poverty and deprivation (>=2)	1,300 (6.8)	33.8	2.51 (2.21–2.86)	48.4	3.53 (3.10–4.02)

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reliability of this scale have also been confirmed for Japanese older people, and it is often used in Japanese surveys [43,44]. According to Sheikh et al. [42], scores of ≥ 5 on the GDS-15 indicated the presence of depressive symptoms of mild to severe depression. Our data showed approximately 30% of respondents had depressive symptoms. It is consistent with preceding Japanese studies [43,44].

Independent variables: relative deprivation and relative poverty

The indicators of relative deprivation used in preceding studies differ, because the standard living condition or decent life varies by culture and times. In reference to preceding research including Japanese studies [5–8,10–12,14], we evaluated thirteen indices that equated “lack of daily necessities,” “lack of living environment,” and “lack of social life due to economic reasons” with a low standard of living. Although lack of access to medical and health care services is another important element of standard of living, this was excluded from our deprivation indices because we assumed it to be directly reflected in poor health. On the other hand, we included experience of cutoff of essential services as a typical condition of lacking decent life, which is also used as a measure of social exclusion in a Japanese study [45].

Indicators of “lack of daily necessities” included having no television, refrigerator, air conditioner, microwave oven, or water heater. “Lack of living environment” indicators included having no private toilet, kitchen, or bathroom in the house and having a dining room that was not separate from the bedroom. “Lack of social life due to economic reasons” indicators included having no telephone or formal dress, being absent from family celebrations and events during the previous year due to economic reasons, and having essential services such as water, electricity or gas, cut off in the previous year (except in cases of forgetting to make a payment).

Relative poverty was defined as an income of less than half of the median annual equivalent income in the National Survey of Family Income and Expenditure in Japan [46]; the threshold was 1.49 million Japanese yen. This is the definition of relative poverty accepted by the Organisation for Economic Co-operation and Development and is conceptually based on the relative approach of the Luxembourg Income Study [47]. We used annual pre-tax household income. For each response, we calculated the equivalent household income by dividing income by the square root of the number of household members. Responses were categorized

into three groups: poverty (28.2%), non-poverty (51.7%), and unknown (20.1%).

Covariates

We used several control variables at the individual level: sex, age, educational attainment (to represent ascribed and achieved statuses), medical treatment (to represent recent physical condition), self-recognition of forgetfulness (to represent prodrome of dementia), and social support (to represent a buffer between poverty and health). Medical treatment was determined by asking “Are you currently receiving any medical treatment?” Self-recognition of forgetfulness was measured by asking “Do people around you notice your forgetfulness, for example, by telling you that you often ask the same thing?” Social support was measured using two questions representing emotional and institutional support: “Do you have someone who listens to your concerns and complaints?” and “Do you have someone who looks after you when you are sick and have to stay in bed for a few days?” Responses of “no” or “nobody” to both questions indicated an absence of social support.

In our data set, individuals were nested within each municipality. Previous studies reported significant associations between individual health and regional characteristics such as social capital and income inequality [48,49]. We used the proportion of older people residing in the area (%), population density in inhabitable areas (1,000 person/km²), and the proportion of persons receiving public assistance (%) for characteristics at the municipal level. These variables were based on 2010 census and government data for Japan. The distribution of these variables is shown in Table 1.

Statistical analysis

First, we confirmed the distribution of the relative deprivation index and calculated crude odds ratios for subjective health. Second, we applied two-level Poisson regression analysis of random-intercept and fixed-slope models to assess the relationship between relative deprivation and self-rated health and depressive symptoms, adjusting for individual factors and municipal-level covariates (level 1: 24,742 individuals, level 2: 24 municipalities). We adopted multilevel modeling in order to control for intraclass (municipal level) cluster correlation. We also examined the interaction effect of relative deprivation and relative poverty. Individual and municipality fixed parameters were converted to prevalence ratios (PR) with a 95% confidence interval (95%CI).

Table 4. Association of subjective health and relative deprivation by two-level Poisson regression analysis^{a)}.

	Self-rated health (fair/poor)				Depressive symptom (present)			
	Men		Women		Men		Women	
	PR	(95%CI)	PR	(95%CI)	PR	(95%CI)	PR	(95%CI)
FIXED EFFECTS								
Individual level								
Age (ref.: 65–69)								
70–74	1.06	(0.94–1.19)	1.09	(0.97–1.23)	0.92	(0.83–1.02)	1.00	(0.90–1.11)
75–79	1.24***	(1.11–1.40)	1.29***	(1.15–1.46)	1.03	(0.93–1.15)	0.98	(0.88–1.10)
80–84	1.31***	(1.15–1.49)	1.49***	(1.31–1.70)	0.95	(0.84–1.08)	1.02	(0.90–1.15)
85 -	1.23*	(1.05–1.45)	1.54***	(1.33–1.79)	0.95	(0.81–1.13)	1.15*	(1.00–1.33)
Education (ref.: >9 years)								
= <9 years	1.07	(0.98–1.16)	1.19***	(1.09–1.29)	1.16***	(1.07–1.25)	1.09*	(1.01–1.18)
Marital status (ref.: married)								
divorced	0.99	(0.86–1.13)	0.83***	(0.76–0.90)	1.23**	(1.09–1.39)	1.03	(0.95–1.12)
separated	1.22	(0.99–1.51)	0.91	(0.75–1.10)	1.37**	(1.14–1.65)	1.10	(0.92–1.31)
never married	1.17	(0.90–1.53)	0.92	(0.72–1.19)	1.29*	(1.03–1.62)	0.98	(0.77–1.26)
Disease and/or impairment (ref.: no)								
yes	4.76***	(4.05–5.60)	3.90***	(3.34–4.56)	1.33***	(1.21–1.46)	1.28***	(1.16–1.41)
Self recognition of forgetfulness (ref.: no)								
yes	1.47***	(1.34–1.61)	1.65***	(1.52–1.79)	1.71***	(1.57–1.86)	1.83***	(1.69–1.98)
Social supports (ref.: present)								
absent	1.37***	(1.21–1.54)	1.58***	(1.39–1.79)	1.57***	(1.41–1.75)	1.84***	(1.64–2.07)
Relative poverty (ref.: non-poverty)								
poverty (< ¥ 1.49 million)	1.25***	(1.11–1.40)	1.13*	(1.01–1.26)	1.34***	(1.20–1.50)	1.24***	(1.11–1.37)
Relative deprivation score (ref.: none)								
1	1.19*	(1.03–1.37)	1.31***	(1.15–1.50)	1.45***	(1.27–1.65)	1.36***	(1.19–1.55)
>= 2	1.34***	(1.16–1.54)	1.27**	(1.10–1.46)	1.62***	(1.42–1.85)	1.43***	(1.25–1.64)
Interaction Effect								
poverty x deprivation (1)	1.08	(0.87–1.34)	0.95	(0.78–1.17)	1.03	(0.84–1.26)	1.00	(0.82–1.22)
poverty x deprivation (>= 2)	1.01	(0.82–1.25)	1.06	(0.86–1.31)	0.94	(0.77–1.14)	1.01	(0.82–1.23)
Municipal level								
Proportion of older people [1%]	1.00	(0.99–1.01)	0.99	(0.98–1.00)	1.01*	(1.00–1.02)	1.02**	(1.01–1.03)
Population density [1000 p/km ²]	0.96**	(0.94–0.99)	0.94***	(0.92–0.97)	1.03*	(1.00–1.06)	1.01	(0.99–1.04)
Prop. of receiving public assistance [5%]	1.03*	(1.00–1.06)	1.04**	(1.01–1.07)	0.96**	(0.93–0.99)	0.95**	(0.93–0.98)

Table 4. Cont.

	Self-rated health (fair/poor)		Depressive symptom (present)	
	Men	Women	Men	Women
	PR	(95%CI)	PR	(95%CI)
Municipality level variance (standard error)	.039 (.050)	.046 (.042)	.045 (.031)	.035 (.031)

RANDOM EFFECTS^{b)}

Municipality level variance (standard error)

*** $p < .001$ ** $p < .01$ * $p < .05$ PR: Prevalence ratio.^{a)}Each estimated coefficient of "unknown" category was omitted in above table.^{b)}Random effect in null model.

SRH(men) = .147(SE = .034), SRH(women) = .197(SE = .037), GDS(men) = .093(SE = .027), GDS(women) = .101(SE = .026).

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Finally, we calculated the proportion of poor health among deprived people with social support. We used the computer software, STATA 12.1 for all analyses.

Results

Table 2 showed that 1.6% to 8.4% of respondents lived in deprived conditions, as defined by the study parameters. A higher percentage of respondents did not have a dining room separate from the bedroom (14.9%). Univariate analysis showed that ORs for respondents living in deprived conditions, according to each relative deprivation index, were approximately 1.3–2.5 times higher for fair/poor self-rated health and 1.7–4.1 times higher for depressive symptoms than respondents who did not live in relative deprivation. In particular, the crude ORs for having essential services cut off and absence from family celebrations and events were relatively high. Relative deprivation scores also showed that respondents who were deprived of one item (14.3%) and two or more items (13.6%) were more likely to report fair/poor self-rated health [OR = 1.61 (95%CI: 1.48–1.75) and OR = 1.86 (95%CI: 1.70–2.02), respectively] and depressive symptoms [OR = 1.93 (95%CI: 1.77–2.10) and OR = 2.57 (95%CI: 2.35–2.81), respectively].

Table 3 shows the associations between subjective health and a combination of relative deprivation and relative poverty. The proportion of respondents with poor health was high with respect to "poverty and deprivation," "deprivation only," "poverty only," and "no deprivation or poverty." Odds ratios for respondents living in poverty and deprivation (two or more deprivation items) were 2.51 (95%CI: 2.21–2.86) and 3.53 (95%CI: 3.10–4.02) times higher for fair/poor self-rated health and depressive symptoms, respectively, than ORs for respondents with no deprivation or poverty.

Table 4 shows the results of a two-level Poisson regression analysis. Random effects showed that municipal-level variance in each model was smaller than that in the null model. This means that part of the municipal-level variance was explained by the individual- and municipal-level variables in the model. Fixed effects showed similar associations for both genders. Respondents with low educational attainment, no social support, under medical treatment, and prodrome of dementia tended to have poor subjective health, although relationships between age and municipal level variables were not consistent.

Relative deprivation was significantly associated with poor health, regardless of the status of relative poverty and other individual- and municipal-level characteristics. In male respondents with two or more deprivation items, rates of fair/poor self-rated health were 1.34 times (95%CI: 1.16–1.54) higher and rates of depressive symptoms were 1.62 times (95%CI: 1.42–1.85) higher than those observed in non-deprived individuals. Similarly, relative deprivation was associated with fair/poor self-rated health [PR = 1.27 (95%CI: 1.10–1.46)] and depressive symptoms [PR = 1.43 (95%CI: 1.25–1.64)] in women. Relative poverty was also related to self-rated health [men: PR = 1.25 (95%CI: 1.11–1.40); women: PR = 1.13 (95%CI: 1.01–1.26)] and depressive symptoms [men: PR = 1.34 (95%CI: 1.20–1.50); women: PR = 1.24 (95%CI: 1.11–1.37)]. The PRs for relative deprivation were comparatively higher than those for relative poverty. The interaction effect between relative poverty and relative deprivation for subjective health was not statistically significant.

Figure 1 shows different associations between subjective health and relative deprivation according to social support. The proportion of respondents with poor health was remarkably lower in those with social support relative to those without. However,

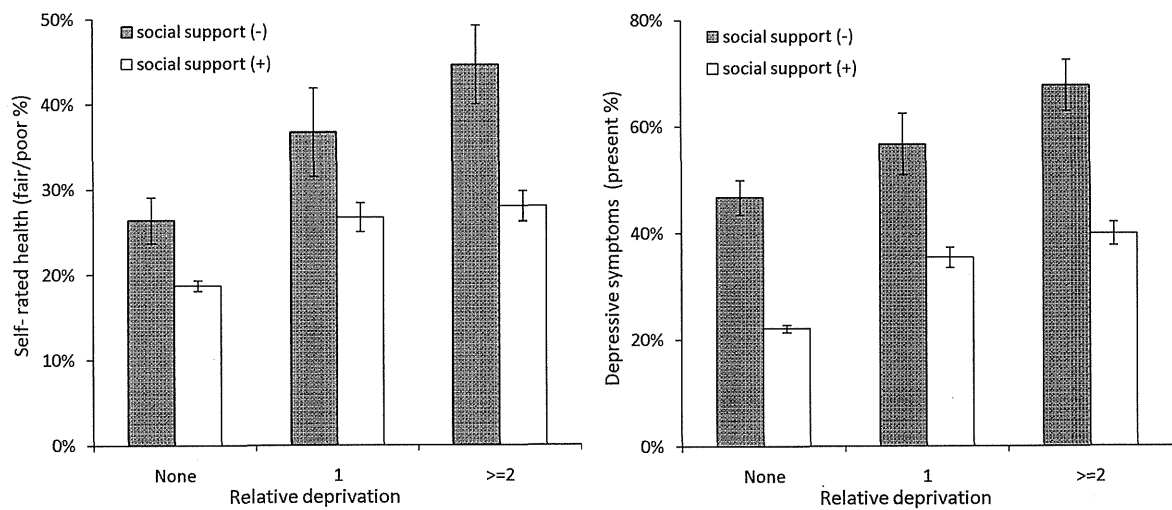


Figure 1. Proportion (95% Confidence Interval) of poor health in relation to relative deprivation and social support. Both figures show a low proportion of poor health in the presence of social support. Meanwhile, the proportion of those with poor health increases as the relative deprivation index score increases even with social support, indicating that social support does not fully cancel out the negative impacts of relative deprivation on health.

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relative to non-deprived respondents with any level of social support, the proportions of respondents with poor/fair subjective health were remarkably higher in the relative deprivation groups (1 and ≤ 2 , respectively).

Discussion

It was previously thought that all Japanese people were middle class. However, recent surveys have shown that intergenerational inequality exists in Japan [50], and the number of older people on public assistance is increasing [51]. The World Health Organization stated that poverty and relative deprivation have a major impact on health and premature death [52]. On the other hand, most poverty research has been based solely on the concept of relative poverty (monetary poverty) since data on material and environmental poverty was severely limited in Japan.

The present study addressed the concepts of both relative poverty and relative deprivation through a large survey of older Japanese and analyzed the association between health and relative poverty and deprivation. Our results showed that relative deprivation and relative poverty were related to poor health, even after other variables were controlled for. Our results were consistent with preceding findings; Abe [14] found that relative deprivation is closely associated with poor self-rated health and the presence of depressive symptoms using national Japanese representative cross-sectional data of participants aged ≥ 20 years. In particular, our results suggest that the concept of relative deprivation could address a different aspect of poverty that is related to health but is not addressed by the concept of relative poverty. People who have overlapping multidimensional disadvantages are more likely to be socially excluded [9] and to experience premature death [53]. Our results also showed that the negative effects of relative poverty and deprivation on health are additive; people with both relative deprivation and poverty were more disadvantaged with respect to health, but the relationship was not multiplicative.

Our study adds new evidence regarding which elements of poverty have strong impacts on the health of older adults. An

important finding is that relative deprivation has a stronger association with subjective health than relative poverty for both sexes. Some studies have revealed that people living in relatively deprived conditions experienced long-term, severe poverty throughout their life course [10,11]. For example, Whelan et al. [10] reported that approximately 40% of persistent income poverty overlapped with lifestyle deprivation in a broadly uniform manner. Consequently, the concept of relative deprivation could capture severe and absolute poverty better than relative poverty, which is based on the distribution of income in society. This could mean that relatively deprived older people might tend to be more disadvantaged, even in good health.

Finally, similar to a preceding study using cross-sectional data from 5,624 women aged 2059 [28], our data confirmed that relative deprivation was associated with the absence of social support [15]. Moreover, our results showed that having social support of any form could mitigate some of the negative impacts of relative deprivation on health. However, it is important to note that even with social support, relatively deprived people have more disadvantages with respect to health than non-deprived people. Therefore, the effects of material and environmental deprivation on poor health cannot be explained only by the absence of social support. As shown in preceding study [30–38], relative deprivation might increase social stresses and anxieties while lowering self-efficacy by depriving a living standard most people in the society enjoy. Furthermore, unlike monetary poverty, poor standard of living such as relative deprivation might closely be related to unhealthy lifestyles including poor eating habit and nutrition and lack of access to healthcare and welfare services.

Compared to relative poverty, which is based on a simple indicator and is often used in international comparative studies, relative deprivation is composed of complex indicators and has limitations for use in comparative studies. In fact, most preceding studies have applied a consensual approach based on public opinion in creating and selecting daily necessities and basic needs indices [4,6,7,10,12–14]. As a result, each relative deprivation indicator was different among preceding studies, although they often reflected the characteristics of that nation and culture.

However, relative deprivation could more accurately represent the phenomenon of poverty due to multidimensional living conditions than it does relative poverty. Although measurements of relative deprivation have been made in order to establish the poverty line, our results suggest that relative deprivation is also important for public health policy as it represents a dimension of the social determinants of health.

Study limitations

The present study has some limitations. First, our relative deprivation indicators did not cover the full range of daily resources among older people in Japan. Although we included indicators used in preceding studies, the indicators should be more sophisticated. Second, while the overall response rate for our data was relatively high, the response rates among the lower income categories were comparatively lower [54]. Therefore, our findings may be underestimated because people living in serious poverty and deprivation may have been less likely to participate in our survey. Third, there is a possibility of selection bias at the municipal level since our data are not representative of the whole country. On the other hand, our subjects were randomly selected in each municipality, and it is important to note that we did perform a large-scale survey concerning non-monetary poverty among older people in more than one municipality. Further research should include longitudinal surveys to reveal whether a causal relationship between relative deprivation and health exists.

Conclusion

Relative deprivation (non-monetary poverty) is an important element in poverty. To the best of our knowledge, this is the first study to investigate the association between health conditions and relative deprivation and poverty among older Asian adults. The

results showed that relative deprivation has stronger associations with self-rated health and depressive symptoms than with relative poverty. There was an independent and additive association between relative deprivation and poverty with respect to subjective health, and the presence of social support may not fully mitigate the negative association between relative deprivation and health. Our results suggest that relative deprivation is one social determinant of health that the concept of relative poverty cannot address.

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Author Contributions

Conceived and designed the experiments: MS NK KK. Performed the experiments: KK the JAGES group. Analyzed the data: MS. Contributed to the writing of the manuscript: MS KK NK AA TO KS.

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高齢者における相対的剥奪の割合と諸特性 ～ JAGESプロジェクト横断調査より～

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I はじめに

1 研究の背景

近年、貧困者ないし生活困窮者対策は日本でも大きく取り上げられており、社会保障制度改革に際しても重要な論点の1つになっている。かつて日本は一億総中流社会ともいわれたが、年間所得のジニ係数は1980年代から上昇し、2000年代以降そのままほぼ横ばいで推移している。24～34歳の有配偶女性306名を8年間追跡した研究〔浜田2006〕では、所得階層および貧困の固定化が示されているほか、日本の格差の固定化は国際的にみて中等度であるとも報告されている〔Krueger et al. 2012〕。とりわけ、高齢期は他の年齢階層と比べて、所得格差が大きい〔大竹2005〕だけでなく、被保護世帯が多く〔国立社会保障・人口問題研究所2013〕、相対的貧困率も高いこと〔内閣府男女共同参画会議2011a〕、なかでも75歳以上・単身世帯・女性の間での貧困率が顕著に高いことが既に報告されている〔江口ら1974;山田ら2011〕。

他方で、これまでの国内における多くの研究は、利用可能なデータの制約から、貧困の事象のなかでも当該社会における相対的な所得や消費の乏しさに基づく相対的貧困（relative poverty）を扱っている。しかし、貨幣的な指標のみに着目するアプローチでは、複雑化・多様化した現代社会の貧困現象を十分に捉えることは困難であり〔平岡2001〕、とくに高齢期は、所得が低くても現役時代からの貯蓄や財産によって高い生活水準を保

つことができる場合がある〔阿部2006〕。そうした批判に対応するものとして、所得や消費といったデータからは捉えることのできない多次元的な生活様式の貧しさに基づく相対的剥奪（relative deprivation）という概念がある。欧州連合（EU）では、この相対的剥奪概念が社会政策の実践にも取り入れられ、「欧州2020戦略」において貧困の削減目標の一つとして採択されている〔European Commission 2011〕。

相対的剥奪とは「所属する社会で慣習になっている、あるいは少なくとも広く奨励または是認されている種類の食事をとったり、社会的諸活動に参加したり、あるいは生活の必要諸条件や快適さを得るために必要な生活資源を欠いている状態〔Townsend 1979, p31〕」と定義されている。Townsend（1979）は、食生活や家庭用品、住環境など12分野60項目から相対的剥奪を把握し、従来よりも広範に貧困者が存在していることを明らかにしている。この点で、国内では一部、住居・健康・経済の観点から生活階層を析出した研究〔松崎1986〕もあるが、生活様式の貧しさに基づいて貧困層を分析した研究の蓄積は非常に限られている。

なお、相対的剥奪という概念には、社会心理学や社会学において準拠集団の相違による相対的な不満を説明するものとして使用されてきた系譜もある。主観的・客観的なアプローチによる検討が国内外で継続的に発表されている〔Stouffer et al 1949;Runciman 1966;Scase 1974;Crosby 1982;Kosaka 1986;Turley 2002;Walker

et al. 2002;Tougas et al. 2004;Kondo et al. 2009)が、上記の貧困や社会政策との関連で言及される相対的剥奪とは主たる関心が異なるものである。また、貧困研究における相対的剥奪のなかでも、当該地域の失業率や自動車の保有率などを用いた社会指標アプローチもあるが、本研究では個人レベルの相対的剥奪に着目する。

2 先行研究の主要な知見と課題

第1に、相対的剥奪者の割合に関しては、分析対象者の1～2割前後であることが報告されている〔Mack et al. 1985;Gordon 2000;岩田ら2004;阿部2006;Saunders 2008〕。たとえば、1983年にイギリスで行われたBreadline Britain調査では26の剥奪指標のうち3つ以上該当者が12%になること〔Mack et al. 1985〕、国内では全国20歳以上の男女1,520名を分析した研究〔阿部2006〕において、社会的必需項目に1つでも欠けている群が21%、2つ以上欠けている群が14%であることが報告されている。このほか、ホームレス経験者116名を分析した研究では、ホームレス状態を解消して生活保護を受給した後も7割が複数の剥奪項目を経験していること〔山田2013〕なども報告されている。しかし、ドイツ・デンマーク・オランダなど11カ国13万人を分析した研究〔Whelan et al. 2003〕など一部を除き、多くの先行研究における分析対象のサンプルサイズは大きくないという課題がある。個々の剥奪指標への該当者が極めて少数であることを考慮すると、一定のサンプルサイズに基づいた分析が必要である。また、蓄積された資産の影響から若年者よりも高齢者の間では相対的剥奪者が少ない〔Golant et al. 1995;阿部2006〕ともいわれているが、高齢者に焦点をあてた分析が極めて少ないという課題もある。他の年齢階層よりも所得格差が大きく、相対的貧困率も高い高齢期において、剥奪状態にある人々がどの程度存在するのかは、日本の社会保障研究においても検討すべき課題の一つと考えられる。

第2に、相対的剥奪と所得との関連については、相対的剥奪状態にある人々の所得水準が当該社会の貧困線になりうるという発想から、Townsend

(1979)は、剥奪スコアが急激に上昇する所得の閾値を発見している。この点に関しては、一部、国内でも類似の結果が得られており、若年を含むデータにおいて世帯所得が400～500万円以下であると剥奪状態へのリスクが高まるという知見が報告されている〔阿部2006〕。また、閾値には言及していないが、東京都23区内の高齢者を分析した研究では、配偶者がいる高齢者世帯において夫婦の年収が225万円未満の群において、他の所得階層よりも相対的剥奪の割合が高くなるという結果も報告されている〔平岡2002〕。しかしながら、少なくとも日本における相対的剥奪と所得との関連を扱った研究自体が非常に限られている。相対的剥奪という概念を踏まえた場合に、日本社会において、どの程度の所得水準からが貧困層と考えられるのかは政策的にも重要な示唆を与えるものであり、多様なデータから検証されるべき課題といえる。

第3に、相対的剥奪に該当する人々の諸特性に関しては、高齢者に限定すると年齢は有意な関連がない〔平岡2002〕ほか、低学歴〔平岡2002〕や離別経験や配偶者の不在〔平岡2002;Whelan et al. 2003;阿部2006〕が関連していることが報告されている。また、相対的剥奪は、ソーシャル・サポートの乏しさ〔Sacker et al. 2001〕とも関連し、健康の社会的決定要因の一つである〔Wilkinson 2003〕といわれている。とくに、地域単位での剥奪に着目した研究では、剥奪水準の高い地域では抑うつ傾向の高齢者が多く〔Walters et al. 2004〕、がん死亡率〔中谷2011〕や早期死亡率〔Eames et al. 1993;Langford et al. 1996;O'Reilly 2002〕が高いといった知見も報告されている。以上のように、相対的貧困と同様に、相対的剥奪にはライフコースを通じた社会経済的地位や健康状態などが関連していることがいくつかの研究で報告されているが、相対的剥奪者と相対的貧困者の相違については必ずしも十分に検討されていない。所得の分布に基づく相対的貧困が貧困層の一部しか捉えていないとすれば、従来の相対的貧困と合わせて、物的・環境的な生活様式の貧しさに基づく相対的剥奪という概念で把握される高齢者

にどのような特性があるのかについても改めて検討する必要がある。

そこで、本研究では、2万人を超える高齢者の横断調査の結果に基づいて、国内において一般的な生活様式を剥奪されている状態と考えられる高齢者がどの程度存在するのか、どの程度の所得水準以下になると相対的剥奪へのリスクが高まるのか、また相対的剥奪に陥っている高齢者は基本属性と社会経済的地位、健康度、社会関係などの面から見てどのような人々なのかを検討した。

II 方法

1 データ

調査は、2010年8月から2012年1月にかけて、全国12都道府県31市町村における要介護認定を受けていない65歳以上の高齢者169,215人を対象にして行われた。調査票の配布と回収は郵送法を原則とし、性別ないし年齢が不明を除く112,123人から回答が得られた（有効回収率=66.3%）。31市町村のうち、比較的小規模な16市町村については全数を対象にし（回収数:50,013人）、他の大規模な市町村については1/2から1/20の無作為抽出により対象者を抽出した（回収数:62,110人）。調査票はコア項目と複数のオプション項目から構成されており、ここでは相対的剥奪に関するオプション項目が含まれた特定の調査票に回答した24市町村24,742人について分析した。分析対象者の平均年齢は74.6歳（SD=6.4）、女性が54.1%であった。

なお、本調査は、研究代表者の所属機関における研究倫理審査委員会（人を対象とする研究に関する倫理審査委員会;申請番号10-05）の承認を得て行われた。市町村からのデータ提供に際しては、各市町村と総合研究協定を結び、定められた個人情報取扱特記事項を遵守した。個人情報保護のために氏名を削除し、分析者が個人を特定できないよう配慮した。

2 使用した変数

(1) 相対的剥奪

相対的剥奪の前提となる一般的な生活様式自体

が時代や文化によって変容することもあり、先行研究における相対的剥奪指標は一部重複しているが、必ずしも共通しているわけではない（表1）。本研究では、既存の指標を参考にしうえて、文化的な背景の相違と調査対象者が高齢者であることを考慮し、日用品、住環境、社会生活、医療受診（保障）という観点から14項目を設定した。その際に、社会的排除の指標〔阿部2007〕の1つでもある経済的理由によるライフラインの停止経験を社会生活における資源欠如の一側面として独自に加えた。なお、食生活に関する項目は、貧困線の検討において古くから使用されてきたが、個人の嗜好が強く反映されることと自記式郵送調査であることを考慮して、本研究の相対的剥奪指標からは除外した。また、貯蓄等の金融資産に関しては、理論的には重要な指標だが、調査実施上の制約から本分析では含まれていない。

日用品については、「テレビ」「冷蔵庫」「冷暖房機」「電子レンジ」「湯沸かし器」のうち、経済的理由や家庭の事情で欲しくても持っていないものがあるかをたずねた。住環境については、「家族専用のトイレ」「家族専用の炊事場」「家族専用の浴室」「寝室と分かれた食事をとる部屋」のうち、回答者の住居にないものを把握した。社会生活に関しては、経済的理由や家庭の事情によって「電話がない」「喪服がない」という項目のほかに、「過去数年間に、祝儀や交通費の負担のために、親戚の冠婚葬祭への出席ができなかったこと」があるか、「過去1年間に、支払いが滞ったために、水道、電気・ガス、電話・携帯電話などのサービスを停止されたこと（うっかり忘れていた場合を除く）」があるかをたずねた。医療受診については、「費用がかかる」ことを理由として「過去1年間に、病気や障害があるにもかかわらず治療を受けなかった、または中断したこと」があるかを把握した。偶然の可能性などを考慮して複数該当したケースのみを剥奪とした研究もある〔Mack 1985;Gordon 2000;平岡2002;岩田2004〕が、相対的剥奪の項目群は、社会生活上の必需リストであるため1項目でも該当すれば剥奪とした研究〔阿部2006〕もある。本研究では、1項目でも該

表1 相対的剥奪指標の主な構成^{a)}

		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	本研究
日用品	冷蔵庫がない	✓	✓	✓						✓
	冷暖房機・エアコンがない	✓		✓	✓	✓		✓	✓	✓
	テレビがない	✓	✓	✓		✓	✓		✓	✓
	湯沸し器がない				✓			✓		✓
	電子レンジがない					✓		✓		✓
	洗濯機がない		✓	✓					✓	
	皿洗い機がない	✓				✓				
	カーペットがない	✓	✓	✓						
	暖かい衣服・コートがない	✓	✓	✓					✓	
	天候に合わせた靴がない	✓	✓	✓						
	ビデオデッキがない						✓	✓		
使い古した家具がある		✓				✓				
住環境	家族専用のトイレがない	✓	✓					✓		✓
	家族専用の浴室/風呂場がない	✓	✓		✓			✓		✓
	家族専用の炊事場がない	✓						✓		✓
	寝室と食卓が分かれていない				✓			✓		✓
	家族分のベッドがない	✓	✓	✓					✓	
	安全な住居でない				✓				✓	
	水漏れなどの構造的な欠陥がある	✓							✓	
	湿気に悩まされる住居である		✓	✓						
庭がない	✓	✓							✓	
社会関係	電話機（携帯電話）がない			✓		✓	✓	✓	✓	✓
	礼服がない			✓				✓		✓
	親戚の冠婚葬祭に欠席した			✓				✓		✓
	ライフラインサービスを止められた									✓
	新しい衣類を買えない	✓	✓	✓		✓		✓	✓	
	趣味や娯楽活動がない		✓	✓	✓		✓			
	年一度、家族等にプレゼントできない		✓	✓					✓	
	クリスマスなどのお祝いをしていない	✓	✓	✓						
	休暇を家の外で過ごしていない	✓	✓	✓		✓			✓	
	親しい友人・家族がいない			✓	✓	✓	✓		✓	
	医師が処方した薬が買えない			✓					✓	
	緊急時に支援してくれる人がいない	✓			✓					
他者との交流が少ない			✓	✓	✓	✓		✓		
保障	医者にかかれない						✓	✓	✓	✓
	歯医者にかかれない							✓	✓	
	生命保険等に加入していない						✓	✓		
	住宅関係の保険に加入していない			✓					✓	
食生活	肉や魚を適度に摂っていない	✓	✓	✓		✓			✓	
	一日2回暖かい食事を摂っていない		✓	✓						
	新鮮な野菜や果物を食べていない	✓		✓						
資産	貯金ができない			✓			✓	✓	✓	

a) 先行研究の指標については研究間で類似項目がないものを除外した。

(A) : Townsend (1979), (B) : Mack (1985), (C) : Gordon (2000), (D) : 平岡 (2002), (E) : Whelan (2003), (F) : 岩田 (2004), (G) : 阿部 (2006), (H) : Saunders (2008)

当した人を相対的剥奪に分類し、一部、より深刻な状態として2項目以上該当者についても検討した。なお、これらの項目に無回答であるケースについて代入法等の処理は行わず分析から除外して

いる。

(2) 相対的貧困

相対的貧困については、OECD (Organization

for Economic Co-operation and Development) の操作的定義〔Förster 1994〕に基づいて、等価所得の中央値の半分未満を基準とした。平成21年全国消費実態調査〔総務省統計局2009〕によれば、全人口における中位等価所得は297万円であったため、その半分である149万円未満を相対的貧困と定義した。本調査では、世帯全体の合計所得額(税込み)を「50万円未満」「50～100万円未満」から「1,000～1,200万円未満」「1,200万円以上」までの15カテゴリーで把握しており、各カテゴリーの中央値(50万円未満は25, 1200万円以上は1,300)を世帯人員の平方根で除して等価所得を算出したところ、分析対象者の35.3%が貧困に分類された。所得ないし世帯人数が不明なケースについては、代入法等の処理を行わずに分析から除外した。

(3) 相対的剥奪・貧困者の諸特性

相対的剥奪・貧困者の諸特性として、基本属性と社会経済的地位、健康度、社会関係との関連を分析した。基本属性と社会経済的地位を表す変数として、性別と年齢、修学年数、婚姻状態、世帯構成、および住宅の所有状況を使用した。世帯構成については、単身、夫婦のみ、子等と同居、その他、不明に分類し、「夫婦のみ」を参照カテゴリーにしたダミー変数として使用した。住宅の所有状況については、持ち家、持ち家以外、不明に分類し、「持ち家」を参照カテゴリーにして使用した。また、健康度との関連は貧困状態にあることで健康を害し、健康でないために貧困に陥るという循環的な関係があることが予想され、ここでは、治療疾患の有無と抑うつ傾向の有無に着目した。治療疾患の有無に関しては「現在、治療を受けているか」という問いでその有無をたずねたものである。抑うつ傾向は、15項目版の高齢者抑うつ尺度:Geriatric Depression Scale〔Yesavage et al. 1983;Sheikh et al. 1986〕を使用し、5点以上を抑うつ傾向ありとした。社会関係を表す変数として、高齢者のソーシャル・サポートに着目し、手段的サポートと情緒的サポートの受領を想定して、「あなたの心配事や愚痴を聞いてくれる人」の有無と

「あなたが病気で数日間寝込んだときに看病や世話をしてくれる人」の有無を用いた。これらの変数の分布は、男女で概ね同様であったが、男性では修学年数が9年以上の人、婚姻中の人、夫婦のみ世帯の人、情緒的サポートのない人がやや多くなっていた(表2)。

3 分析方法

はじめに、使用した相対的剥奪指標の分布と等価所得との関連を集計した。その際に、貧困者および非貧困者のなかでの相対的剥奪指標への該当者割合、および、非貧困者内での値に対する貧困者内での値の比を算出した。つぎに、等価所得段階による相対的剥奪指標の平均該当数および相対的剥奪者の割合の相違に基づいて、相対的剥奪へのリスクが高まる等価所得の閾値を検討した。さいごに、相対的剥奪に該当する高齢者の特性を検討するために、剥奪にも貧困にも該当しない高齢者を参照カテゴリーとし、剥奪のみ該当、貧困のみ該当、剥奪と貧困の両方該当を従属変数にした多項ロジスティック回帰分析を行った。なお、本分析で使用する個票データは複数の市町村から抽出されており、市町村単位での級内相関が存在している可能性がある。級内相関が存在すると誤差が過小推定されて第一種の過誤が生じやすくなることが知られており、市町村ごとのデータの集積性を調整するためにマルチレベル・モデルを採用した。また、多変量解析に際しては、男女を分けたモデルも検討した。分析にはSTATA 12.1を使用した。

III 結 果

1 相対的剥奪指標項目の分布

高齢者のうち、経済的理由によってテレビや冷蔵庫、冷暖房機などの日用品がないという人が2～6%、家族専用のトイレや炊事場、浴室がないという人が7～8%、経済的理由によって親戚の冠婚葬祭に出席できなかった人が7%、過去1年間に滞納によってライフラインを停止されたことがある人が2%、経済的理由から医療機関への受診

表2 使用した独立変数の分布

変数	カテゴリー	%	男女別%	
			男性	女性
性別	男性	45.9	-	-
	女性	54.1	-	-
年齢	65～69歳	25.4	26.9	24.0
	70～74歳	29.1	29.5	28.7
	75～79歳	23.3	23.2	23.4
	80～84歳	14.1	13.5	14.7
	85歳以上	8.1	6.8	9.2
修学年数	9年以上	47.6	51.8	44.1
	9年未満	49.9	46.5	52.9
	不明	2.4	1.7	3.0
婚姻状態	婚姻中	68.9	84.0	56.0
	死別	22.6	8.6	34.5
	離別	3.2	2.6	3.8
	未婚	2.1	1.9	2.3
	不明	3.1	2.9	3.4
世帯構成	夫婦のみ	45.4	56.6	35.8
	単身	15.0	10.5	18.9
	子等と同居	24.7	19.3	29.1
	その他	8.4	7.1	9.4
	不明	6.6	6.5	6.8
住宅所有	持ち家	88.5	89.0	88.0
	持ち家以外	8.9	8.7	9.1
	不明	2.6	2.3	2.9
治療疾患	なし	22.4	24.1	20.8
	あり	68.5	67.6	69.3
抑うつ傾向	不明	9.1	8.3	9.9
	なし	58.7	60.8	56.8
	あり	23.7	25.0	22.7
情緒的サポート	不明	17.6	14.2	20.5
	あり	89.7	87.1	91.9
	なし	5.5	8.0	3.4
手段的サポート	不明	4.8	4.9	4.7
	あり	91.2	91.8	90.8
	なし	4.5	4.4	4.5
	不明	4.3	3.8	4.7

n=24,742

値は%

を抑制した人が3%程度という結果であった(表3)。いずれの項目も非貧困者よりも貧困者の間では該当者が2.0～5.0倍程度多くなっていた。回答者全体の平均等価所得は218.7万円だったが、剥奪指標該当者の平均等価所得は130～170万円程度と顕著に低くなっていた。また、14項目の剥奪指標全体で見ると、1つも該当しない人が72.4%、1つでも該当した人が27.6%であり、非貧困者と比べて貧困者の間で該当者の割合が高く、平均等価所得も顕著に低くなっていた。なお、2つ以上該当した人が13.0%おり、1つ以上該当者よりも貧困者の間で該当者割合がより高く、平均

等価所得もより低くなっていた。

2 等価所得と相対的剥奪得点との関連

つぎに、図1は、所得段階による相対的剥奪指標の平均該当数および相対的剥奪者(1つ以上該当者および2つ以上該当者)の割合を集計したものである。これによると、正確な閾値は特定できないが、等価所得が150～200万円未満の群から、剥奪指標の平均該当数と剥奪者割合のいずれもがやや高くなり、150万円未満の群では顕著に高くなっていた。すなわち、高齢者の間では等価所得が200万円未満ないし150万円未満になると、他

表3 使用した相対的剥奪指標（14項目）の分布

	該当%	貧困状態別での割合 ^{c)}			等価所得 ^{c)} (平均±SD)
		貧困者 (A)	非貧困者 (B)	(A) / (B)	
日用品 ^{a)}					
テレビがない	2.4	3.1	1.4	2.21	166.9±149.5
冷蔵庫がない	1.7	2.0	0.9	2.22	165.4±149.3
冷暖房機がない	5.6	9.3	2.8	3.32	135.9±114.0
電子レンジがない	3.6	5.6	1.8	3.11	142.6±119.9
湯沸かし器がない	4.0	6.3	2.3	2.74	146.8±112.3
住環境 ^{a)}					
家族専用のトイレがない	6.5	7.3	3.7	1.97	169.2±140.0
家族専用の炊事場がない	8.0	9.3	4.4	2.11	165.0±135.5
家族専用の浴室がない	8.4	9.8	4.7	2.09	165.4±136.9
寝室と食卓が分かれていない	14.9	19.2	8.4	2.29	161.2±131.7
社会生活 ^{a)}					
電話がない	4.0	6.0	2.2	2.73	149.1±119.1
喪服がない	2.2	3.4	1.2	2.83	150.6±121.7
親戚の冠婚葬祭に欠席した	6.6	10.1	3.7	2.73	147.0±117.5
ライフラインサービスを止められた	1.6	3.0	0.6	5.00	126.3±117.6
医療受診（保障） ^{a)}					
経済的理由から受診を抑制した	2.6	3.9	1.7	2.29	147.6±104.7
相対的剥奪得点 ^{b)}					
0 (1つも該当しない)	72.4	60.2	82.3	0.73	239.9±158.8
1つ該当	14.6	19.8	11.1	1.78	173.6±126.4
2つ該当	4.2	7.2	2.2	3.27	141.1±98.7
3つ該当	2.1	3.3	1.1	3.00	144.0±114.9
4つ該当	3.7	5.0	2.1	2.38	160.8±134.9
5つ該当	1.2	2.0	0.4	5.00	128.9±123.9
6つ該当	0.6	0.9	0.2	4.50	138.3±142.2
7つ該当	0.7	1.0	0.4	2.50	175.6±162.6
8つ以上該当	0.5	0.7	0.2	3.50	141.5±116.0
(再掲) 1つ以上該当	27.6	39.9	17.7	2.25	162.2±124.9
2つ以上該当	13.0	20.1	6.6	3.05	147.9±121.4

a) 各項目に無回答のケースを除外した割合を示している。

b) 剥奪指標に1つでも回答していないケースを除外した割合を示している。

c) 等価所得が不明なケースは分析から除外している。

の所得階層とは異なって、日用品の欠如や社会生活上の不利を抱えている人が顕著に多くなることを示唆する結果であった。とりわけ、等価所得が100万円未満の高齢者世帯では平均該当数が1に近く、4割以上が相対的剥奪に該当し、相対的貧困と相対的剥奪が重複しやすいことが示唆された。なお、図は省略したが、男女を分けても同様の結果であった。

3 相対的剥奪・相対的貧困への該当者の特性

表4は、剥奪にも貧困にも該当しない高齢者を参照カテゴリーにしたマルチレベル・ロジスティック回帰分析の結果である。各カテゴリーの構成は、剥奪と貧困ともに非該当が54.4%、剥奪

のみ該当が11.7%、貧困のみ該当が20.4%、剥奪と貧困に該当が13.5%であった。分析の結果、低所得ではないが相対的剥奪に該当した高齢者（剥奪のみ）と生活様式や物的・環境的には貧しくはないが所得水準が相対的貧困に該当した高齢者（貧困のみ）には共通点とともに異なる特性があることが示された。なお、本分析モデルにおける変動効果は、Nullモデルと比べて小さくなっておらず、ここで投入した変数では説明しきれない市町村単位での分散成分があることが示された。

まず、性別は貧困のみと剥奪のみのいずれにも有意な関連を示していたが、女性の方が1.38倍、貧困のみに該当しやすく、剥奪のみに女性ではなく男性の方が1.27倍（0.79の逆数）該当しやす