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Title	Association between decrease in frequency of going out and oral function in older adults living in major urban areas
Author(s)	Mikami, Yurie; Watanabe, Yutaka; Motokawa, Keiko et al.
Citation	Geriatrics & gerontology international, 19(8), 792-797 https://doi.org/10.1111/ggi.13715
Issue Date	2019-08
Doc URL	https://hdl.handle.net/2115/79005
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Type	journal article
File Information	Geriatrics and gerontology international_19(8)_792-797.pdf

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Running Title: Frequency of Going Out and Oral Function

Association Between Decrease in Frequency of Going Out and Oral Function in Older Adults Living in Major Urban Areas

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Abstract

Aim: To examine the association between a decrease in the frequency of going out and oral function in independent older adults living in the urban area of Tokyo.

Methods: The participants analyzed were 785 older adults from the "Takashimadaira Study" (344 men and 441 women, age 77.0 ± 4.6 years). This study investigated the following items: decrease in frequency of going out; basic characteristics (sex, age); physical factors, such as oral function (difficulty chewing, difficulty swallowing, dry mouth); body pain; the Japan Science and Technology Agency Index of Competence; physical activities; psychological factors, such as Geriatric Depression Scale-15 score; and social and environmental factors, such as the presence or absence of participation in organization activities.

Results: To investigate the factors associated with a decrease in frequency of going out, logistic regression analysis showed an association with age (OR 1.08, 95% CI 1.03-1.13), difficulty chewing (OR 2.41, 95% CI 1.52-3.83), dry mouth (OR 1.68, 95% CI 1.07-2.64), body pain (OR 1.78, 95% CI 1.14-2.78), Japan Science and Technology Agency Index of Competence scores (OR 0.91, 95% CI 0.84-0.99), physical activities (OR 0.99, 95% CI 0.98-1.00), Geriatric Depression Scale-15 scores (OR 1.13, 95% CI 1.05-1.21) and organization activities (OR 1.94, 95% CI 1.22-3.07). Covariance structural analyses showed that both "difficulty chewing" and "dry mouth" significantly affected "decrease in frequency of going out." In addition, decrease in frequency of going out was significantly affected by " Geriatric Depression Scale-15 scores" through oral function.

Conclusions The relationship between oral function and decrease in frequency of going out was clarified, after the multifaceted factors were adjusted.

Keywords: frequency of going out, older adult, oral function, oral health, urban

Introduction

The number of people using long-term care insurance in Japan reached 6.2 million in 2015, and the number of people aged ≧65 years increased by 2.5% compared with the previous year [1], making it very likely that the increase will continue. Therefore, the “Service for Preventive Long-Term Care” has been carried out in Japan since 2006 to help individuals maintain independent lives in the community.

These services include the prevention of "housebound" [2]. Housebound has been found to be a risk factor for long-term care conditions and mortality [3]. It is also believed that being housebound involves interacting physical, psychological, and social and environmental factors [4, 5]. Currently, there is no concept of housebound or a unified definition, but the frequency of going out (FGO) was used as a screening measure of housebound [4-6]. Fujita et al. [4] evaluated the validity of external criteria as a health indicator for FGO, because it was strongly correlated with the Tokyo Metropolitan Institute of Gerontology Index of Competence, Mini-Mental State Examination and Geriatric Depression Scale-15 (GDS), which are health indicators for which reliability and validity have been clarified. It has also been reported that FGO in older adults is associated with physical factors, such as cognitive function,

walking ability, and Instrumental Activities of Daily Living (IADL) disability, [4, 7, 8], psychological factors, such as self-reported health and depression [4, 5], and social and environmental factors, such as non-participation in organization activities and lack of close friends [4, 5], suggesting that multifaceted factors influence FGO.

Furthermore, maintaining and improving oral function of community-dwelling older adults is also included in the "Service for Preventive Long-Term Care". Oral functions include chewing, swallowing, articulation, sensation, salivation and various others. These are closely related to daily life practices, such as diet and conversation. Diet not only maintains nutritional status, but also stimulates senses, including vision, smell, and texture, and it is one of the important daily pleasures. Eating with relatives and friends also involves communication. Thus, oral function is important in communication, and mouths play an important role in emotional expression. In contrast, decreased oral function, such as difficulty chewing tough foods, increased coughing and decreased sliding tongue, might affect daily enjoyment and daily life in older adults. In addition, it seems likely that decreased oral function progresses to undernutrition, and that it affects physical function

and social contact[9]. Thus, we hypothesized that decreased oral function can impair social contact in older adults. Therefore, in the present study, FGO was defined as one of the indexes that might affect social contact. Thus, we aimed to clarify the relation between oral function and FGO in independent older adults living in urban areas.

Method

Survey object

The present study was based on a complete survey of 7614 older adults aged ≧70 years living in the Takashimadaira area, Itabashi-ku, Tokyo (for the "Takashimadaira Study"). The "Takashimadaira Study" carried out a self-administered questionnaire survey (first survey) using a postal indwelling collection method and received responses from 5430 people (71.3% recovery rate). We mailed self-administered questionnaires (advance questionnaires) and visit-based checkups (secondary surveys) to those who responded to the first survey. The second survey consisted of cognitive and physical function tests and conducted each on different schedule. The study subjects were 1,241 older adults who also participated in the physical function test out of 1,360

people who participated in the cognitive test. The participants analyzed were 785 older adults (344 men and 441 women, age 77.0 ± 4.6 years, range 70-93) who were excluded from certification of long-term care need, and those with one or more deficiencies in the survey items used in the present study (Fig. 1). This study was carried out with the review approval of the ethics committee of Tokyo Metropolitan Institute of Gerontology (Nos. 9, 31, 2016).

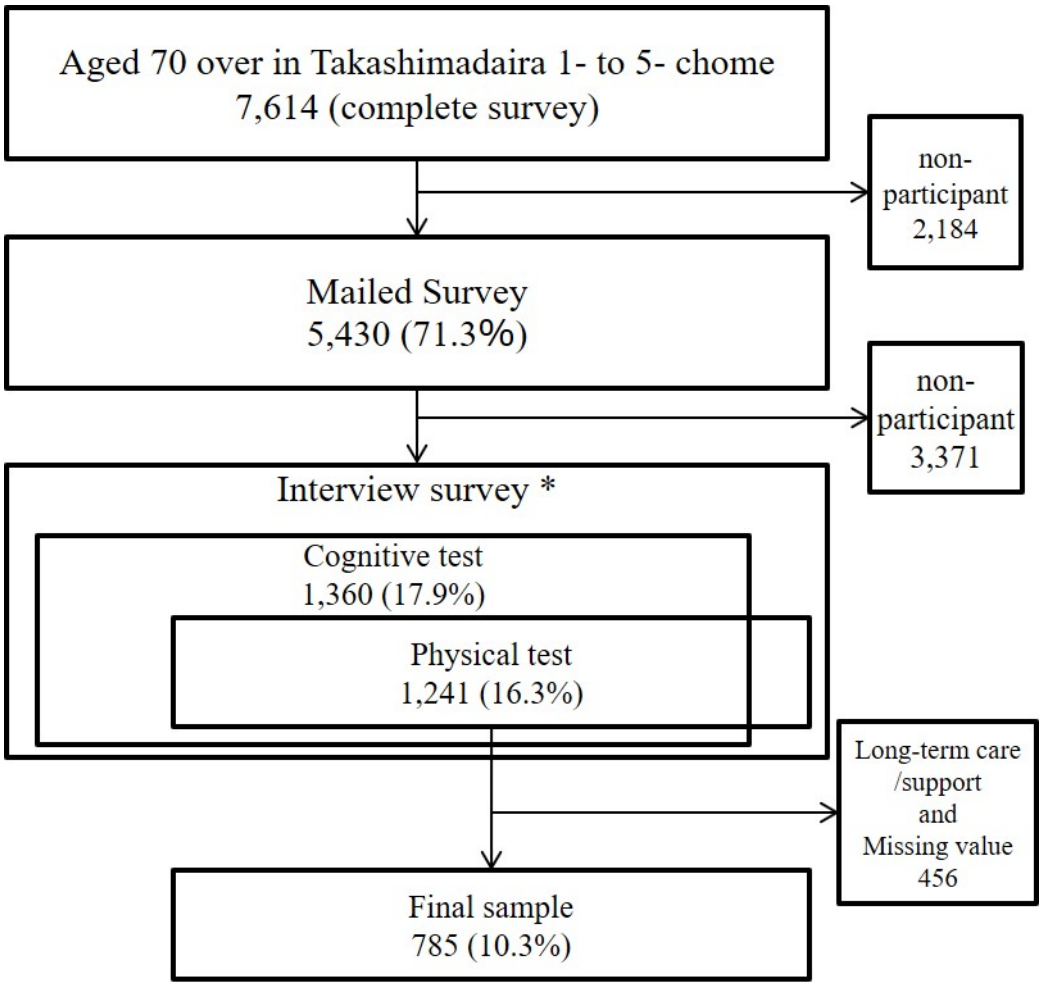


Figure 1 Selection of the individuals to be investigated and analyzed in the present study. Total N=7614. *A total of 1241 participants responded to both

cognitive and physical function tests. Additionally, 119 responded to only the cognitive test and seven responded to only the physical test.

Survey item

Decrease in FGO

Decrease in FGO was assessed by the question “Do you go out less frequently compared with last year?” in the Kihon Checklist [10]. Respondents who reported "Yes" formed the "decreased group", and those who answered "No" composed the "maintained group".

Oral function

Three questions in the Kihon Checklist[10] were answered with "Yes" or "No": "Have you experienced more difficulty chewing tough foods now than you did 6 months ago?" (hereafter, difficulty chewing); "Do you ever experience choking or coughing when drinking tea or soup?" (hereafter, difficulty swallowing); and "Are you bothered by feelings of thirst or dry mouth?" (hereafter, dry mouth).

Covariate

Considered covariates were as follows: basal characteristics of sex; age; hearing; visual acuity; body pain ("present" if either or both of the knees or waist were paining); experience of falls within 1 year, previous medical history ("orthopedics disease" if either osteoarthritis or spinal stenosis was present); physical factors, such as body mass index as an indicator of nutritional status; the Japan Science and Technology Agency Index of Competence (JST-IC) [11]as an index of living function; Mini-Mental State Examination[12] as an index of cognitive function; gait speed (m/s) and physical activities (METs・h/week) [13]; psychological factors, such as self-reported health and GDS [14] as an index of depression; social and environmental factors, such as status of household, presence or absence of partner, total years of education, subjective economic status, presence or absence of participation in organization activities (presence: selected "once a week or one to three times a month " in any one of total 8 organization activities: “community and towns association”, “hobbies groups”, “sports-related groups”, “volunteer and Non-Profit Organization”, “elderly associations”, “alumni associations”, “trade associations”, and “others”; absence: selected "several times in a year or do not participate" in all items); and relation with others (frequency of direct or

indirect engagement with neighborhood and separation from family was assessed on a 5-point scale, and the frequency of all items was summed, with less than once a week being "absence" and at least once a week being "presence"). These answers were gathered through self-written questionnaires and interviews carried out in a medical examination meeting by nurses and psychologists trained in advance.

Statistical Analysis

Two-group comparisons of the characteristics of participants with and without a decrease in FGO were presented as number and proportions (%) for categorical variables, and mean and standard deviations for continuous variables (Table 1). Comparisons between the two groups were carried out by the χ^2- test for categorical variables, and Mann-Whitney U-test for continuous counts. To examine the factors associated with a decrease in FGO, we carried out a logistic regression analysis with the presence or absence of a decrease in FGO as the outcome variable, with explanatory variables of sex, age and respective relevant items (Table 2, model 1). In addition, all variables that were significant after adjusting for sex and age were forced into logistic

regression models as explanatory variables (Table 2, model 2). Furthermore, covariance structural analyses were carried out to investigate how oral function influences decrease in FGO. In the preparation of the path figure, the fit index of the model was analyzed and models with high goodness of fit were examined. Statistical analysis was carried out using SPSS Statistics 23 and SPSS Amos 23 (IBM Corporation, Armonk, NY, USA), and the significance level was set up $P < 0.05$.

Results

The results showed that 154 (19.4%) of the participants met conditions for the decreased group, 155 (19.7%) had difficulty chewing, 185 (23.6%) had difficulty swallowing and 194 (24.7%) had dry mouth.

Comparing the maintained group (n=631) and the decreased group in the present study (Table 1), the decreased group of older adults with FGO had a higher percentage of difficulty chewing, difficulty swallowing and dry mouth. There was also a higher proportion of participants with reduced hearing and vision, body pain, previous medical history of diabetes mellitus, lung disease, orthopedic diseases, lower JST-IC scores, gait speed, and physical activities.

In addition, more participants reported unsatisfactory health sensation, and the GDS scores were high. The decreased group was advanced age, had short total years of education, felt a limit in subjective economic status and had no organization activities participation.

To investigate factors related to a decrease in FGO, a logistic regression analysis was carried out with all variables that were significant after adjusting for sex and age as explanatory variables. In the results, there was a statistically significant relationship between a decrease in FGO and age (OR 1.08, 95% CI 1.03-1.13), difficulty chewing (OR 2.41, 95% CI 1.52-3.83), dry mouth (OR 1.68, 95% CI 1.07-2.64), body pain (OR 1.78, 95% CI 1.14-2.78), JST-IC scores (OR 0.91, 95% CI 0.84-0.99), physical activities (OR 0.99, 95% CI 0.98-1.00), GDS scores (OR 1.13, 95% CI 1.05-1.21) and organization activities (OR 1.94, 95% CI 1.22-3.07; Table 2).

Then, we carried out a covariance structural analysis and created models assuming reduced oral function influences a decrease in FGO (Fig. 2). As a result of the analysis, the path coefficient from difficulty chewing to a decrease in FGO was 0.163 ($P < 0.001$), and from dry mouth to a decrease in FGO was 0.080 ($P = 0.015$). For the pathway from dry mouth to difficulty

chewing, the path coefficient (0.142) was significant ($P < 0.001$). Furthermore, a decrease in FGO was also significant through oral function from the GDS score. The goodness of fit of the model was 0.994, adjusted goodness of fit was 0.985, confirmatory fit index was 0.995, root mean square error of approximation was 0.015 and the goodness of fit of the created path figure model was very good.

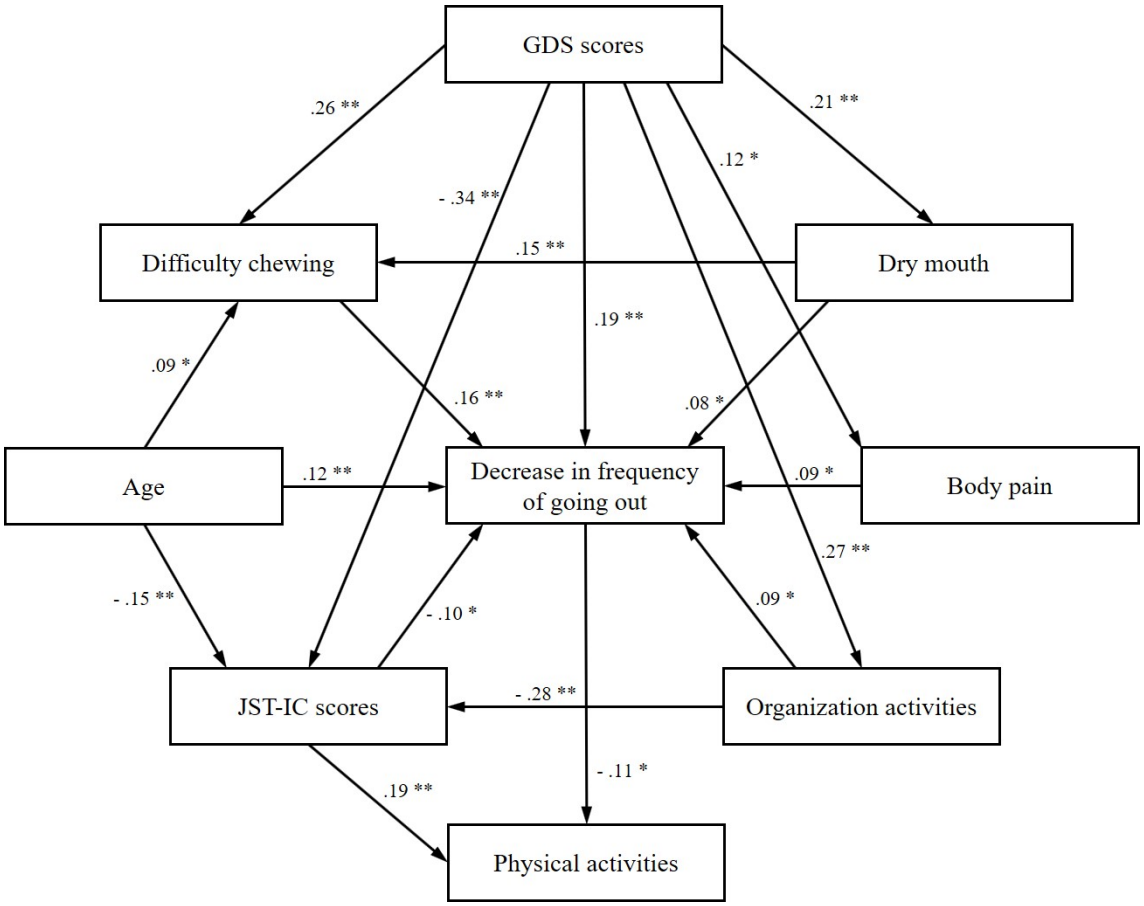


Figure 2 Covariance structural analysis was carried out, and models assuming that reduced oral function decreases the frequency of going out were created. Values are path coefficients, and the direction of the arrow represents a causal relationship. Variables used in the analysis were “age,” ”

difficulty chewing," "dry mouth," "body pain," "Japan Science and Technology Agency Index of Competence (JST-IC) score," "physical activities," "Geriatric Depression Scale-15 (GDS) scores," "organization activities," and "decrease in FGO" for which significant differences were found in model 2 of logistic regression analysis. These variables were used to create a path figure while checking the fit index. AGFI, adjusted goodness of fit; CFI, confirmatory fit index; GFI, goodness of fit; RMSEA, root mean square error of approximation. *P < 0.05; **P < 0.001.

Discussion

A decrease in FGO might result from decreased physical function, a tendency of depression or decreased interaction with others, and might narrow the scope of social activities. As a result, "housebound" behavior ensues, which ultimately leads to long-term care condition and death[3]. Thus, maintaining and improving FGO is important in preventing becoming housebound, and reducing the risk of the long-term care and death.

The present results are in line with the results found by Fujita et al.[4] in older adults with a decrease in FGO. In contrast, some previous studies [4, 7] reported that there is a relationship between self-reported health and cognitive function, but in the present study, no significant relationship was found. This might be because of a difference in assessment of FGO. Previous studies have often evaluated FGO at baseline, whereas we considered the

subjective evaluation of a decrease in FGO as compared with the previous year. Our measure seems trustworthy because of significantly lower physical activities in the decreased group, and the negative association between a decrease in FGO and physical activities in the logistic regression analysis. The participants of the present study visited a medical examination meeting away from their home and had to use stairs independently. These circumstances might have selected people with high motivation for health, physical function and cognitive function. In fact, our participants had JST-IC scores higher than the standard value of 9.5, [11] and maintained their IADL. We considered that there was no association between self-reported health and decrease in FGO, as the relationship between reduced IADL and worse self-reported health has been previously reported [15] and there were more participants who maintained their IADL. Also, as just 6.1% of participants in the present study had Mini-Mental State Examination scores of $\leqq$ 23 points, it was likely that cognitive function and a decrease in FGO would not correlate.

The present results corroborate the results of a study [16] of community-dwelling mildly-dependent older adults that also used a decrease in FGO and

oral function questions of the Kihon Checklist in finding a strong association between a decrease in FGO and difficulty chewing. In the present study, even if we populated the presence or absence of participants in organization activities further into the logistic regression analysis, the significant relationship remained. Therefore, it is considered that remarkable knowledge showing the importance and specificity of oral function is found, even after adjustment of multifaceted factors.

Studies of older people have reported associations between oral function and physical or psychological factors, such as nutritional status [17, 18], physical function [19, 20], mental function [21], cognitive function [22] and living function [23]. In contrast, social and environmental factors, such as the association between the number and frequency of social participation and the number of remaining teeth [24], FGO and oral health awareness [25], maximal tongue pressure and leisure activities and networks with neighbors, [9] have also been reported, but few reports have focused on oral function and FGO. In the present study, covariance structural analyses were carried out to investigate how oral function influences decrease in FGO. As a result, it was suggested that difficulty chewing and dry mouth directly affected the decrease in FGO.

In addition, from a report on the relationship between dry mouth and chewing/swallowing function, [26, 27] it was also found that dry mouth affected the decrease in FGO through difficulty chewing. Decreased chewing ability reduced intake of fiber, such as vegetables and fruits, and it is common to avoid hard foods and to eat soft, chewable foods [17]. Therefore, decreased chewing ability leads to reduced intake of vitamins and minerals, and lower energy intake, which leads to worse nutritional status and risk of undernutrition [17]. Undernutrition leads to reduced muscle mass, which can lead to reduced physical function and decrease in FGO. In addition, dry mouth has been reported to cause problems, such as poor mouth movement, difficulty speaking and poor sliding tongue, as well as halitosis [28]. Problems with articulation and halitosis might impact speech confidence, and make them reluctant to talk to others, and reduce FGO. In conclusion, we considered the results of the present study to be valid, indicating that reduced oral function might reduce FGO.

In the present study, three oral functions were evaluated subjectively, but a decrease in FGO was associated with difficulty chewing and dry mouth, and difficulty swallowing was not. This might have occurred because swallowing

has an objective index of "coughing." In contrast, as difficulty chewing and dry mouth depended on subjective evaluation, psychological influences might have occurred. In the prepared path figure, both of these oral functions were directly affected by the GDS scores, which supported the effect of psychological factors. GDS scores also influenced all relevant factors except “age” and “physical activities”, which also influenced a decrease in FGO through their items. From this fact, we can infer that psychological factors had a direct effect on the decrease in FGO, and that they also had the strong effects on multiple factors, such as oral function, living function and social participation.

In addition to oral function improvement-related services that have been carried out in by the Service for Preventive Long-Term Care until now, popularization and enlightenment activities on oral frail [29] and medical measures for oral hypofunction [30] have been carried out since 2018 in Japan. Further to the dental health activities for oral health maintenance, such as the prevention of periodontal diseases and dental caries, it is expected that older adults will recognize the importance of maintaining and improving oral functions, and further promote the maintenance and promotion of oral health.

As subjective decreased oral function was associated with a decrease in FGO, we should consider FGO as one of the outcomes of improving oral function maintenance. In addition, it was clear that the decrease in FGO has been found to be associated with physical factors, such as body pain, living function and physical activities; psychological factors, such as depression; and social and environmental factors, such as lack of organization activities participation. Therefore, it is necessary to establish a new dental care system that includes a multifaceted approach, taking into account not only the maintenance and promotion of oral health, but also physical, psychological, social and environmental background factors.

In conclusion, the relation between decreased oral function and decrease in FGO was clarified, after multifaceted factors were adjusted. Thus, the decreased oral function might decrease in FGO, and it is important to maintain and improve oral health. In addition, the construction of the dental care system including the multifaceted approach is required, because physical, psychological, social and environmental factors were related in decreased oral function.

The present study might not be generalizable, as it is limited to urban areas.

Furthermore, unlike suburbs, urban areas are less susceptible to factors related to FGO, such as means of transportation and distance to destination, which might have provided simple results. Together with the paucity of reports on FGO in urban-dwelling older adults, we believe that the present study has great significance. Although complete surveys were planned in this study, the final sample covered about 10% of all inhabitants. Improving the participation and completion rate of the visit-type medical examination in future cohort investigations is crucial. Furthermore, because of the cross-sectional study design, a causal relationship of results cannot be determined. Follow-up surveys will be carried out in the future to clarify a causal relationship.

Disclosure statement

The authors declare no conflicts of interest.

Table 1. Comparison between two groups based on basal characteristics and presence or absence of decrease in frequency of going out

			Maintained (n=631)		Decreased (n=154)		Total (n=785)		p-value
Basal characteristics	Sex	Male	277	(43.9)	67	(43.5)	344	(43.8)	1.000
		Female	354	(56.1)	87	(56.5)	441	(56.2)	
	Age	(year)	76.6 ± 4.5		78.4 ± 4.8		77.0 ± 4.6		< ***.001***
Physical factors	Oral Function								
	Difficulty chewing	Yes	90	(14.3)	65	(42.2)	155	(19.7)	< ***.001***
	Difficulty swallowing	Yes	134	(21.2)	51	(33.1)	185	(23.6)	***.003***
	Dry mouth	Yes	133	(21.1)	61	(39.6)	194	(24.7)	< ***.001***
	Hearing	Big voice / inability to hear	43	(6.8)	26	(16.9)	69	(8.8)	< ***.001***
	Visual acuity	face / not visible	14	(2.2)	14	(9.1)	28	(3.6)	< ***.001***
	Body pain	Yes	297	(47.1)	103	(66.9)	400	(51.0)	< ***.001***
	Experience of falls	Yes	134	(21.2)	33	(21.4)	167	(21.3)	1.000
	Previous medical history								
	Hypertension	Yes	325	(51.5)	86	(55.8)	411	(52.4)	.368
	Stroke	Yes	51	(8.1)	13	(8.4)	64	(8.2)	.870
	Heart disease	Yes	123	(19.5)	40	(26.0)	163	(20.8)	.077
	Diabetes mellitus	Yes	93	(14.7)	33	(21.4)	126	(16.1)	***.0499***
	Dyslipidemia	Yes	234	(37.1)	70	(45.5)	304	(38.7)	.065
	Lung disease	Yes	119	(18.9)	43	(27.9)	162	(20.6)	***.015***
	Orthopedics disease	Yes	174	(27.6)	59	(38.3)	233	(29.7)	***.011***
	Malignant neoplasm	Yes	112	(17.7)	29	(18.8)	141	(18.0)	.727
	BMI	(kg/m^2)	23.2 ± 3.2		22.8 ± 3.2		23.1 ± 3.2		.114

	JST-IC scores	(score)	11.1 ± 2.9		9.1 ± 2.7		10.7 ± 3.0	< ***.001***
	MMSE scores	(score)	27.4 ± 2.4		27.2 ± 2.3		27.4 ±.4.4	.154
	Gait speed	(m/s)	1.3 ± 0.2		1.2 ± 0.2		1.3 ± 0.2	< ***.001***
	Physical activities	(METs・hours/week)	41.7 ± 38.9		27.0 ± 27.9		38.8 ± 37.5	< ***.001***
Psychological factors	Self-reported health	a little / health	566	(89.7)	103	(66.9)	669	(85.2)	< ***.001***
		a little / no health	65	(10.3)	51	(33.1)	116	(14.8)	
	GDS scores	(score)	2.9 ± 2.9		5.6 ± 3.6		3.5 ± 3.3	< ***.001***
social and environmental factors	Status of household	Cohabiting	408	(64.7)	91	(59.1)	499	(63.6)	.225
		Living alone	223	(35.3)	63	(40.9)	286	(36.4)	
	Partner	Yes	363	(57.5)	83	(53.9)	446	(56.8)	.167
		No	268	(42.5)	71	(46.1)	339	(43.2)	
	Total years of education	(year)	12.8 ± 2.5		12.1 ± 2.5		12.7 ± 2.5	***.001***
	Subjective economic status	Leeway	90	(14.3)	13	(8.4)	103	(13.1)	
		Common	344	(54.5)	70	(45.5)	414	(52.7)	***.001***
		Difficult	197	(31.2)	71	(46.1)	268	(34.1)	
	Organization activities	No	198	(31.4)	85	(55.2)	283	(23.6)	< ***.001***
	Relation with others	No	168	(26.6)	53	(34.4)	221	(28.2)	.058

BMI: Body Mass Index, JST-IC: Japan Science and Technology Agency Index of Competence, MMSE: Minu-Mental State Examination, GDS: Geriatric Depression Scale. Categorical variables are given as number (%), and analyzed by Chi-square test. Continuous variables are expressed as mean and standard deviation, while variables are expressed with Whitney U test. Significance probability is $p < .05$.

Table 2 Relation between Decrease in the Frequency of Going Out and Each Item by Logistic Regression Analysis

		Model1		Model2	
		OR (95%CI)		OR (95%CI)	
Sex	(0: Male, 1: Female)			1.12 (0.71 - 1.77)	
Age	(year)			1.08 (1.03 - 1.13)	*
Oral Function					
Difficulty chewing	(0: No, 1: Yes)	4.20 (2.83 - 6.24)	**	2.41 (1.52 - 3.83)	**
Difficulty swallowing	(0: No, 1: Yes)	1.87 (1.26 - 2.76)	*	1.07 (0.66 - 1.71)	
Dry mouth	(0: No, 1: Yes)	2.52 (1.72 - 3.69)	**	1.68 (1.07 - 2.64)	*
Hearing	(0: Normal, 1: Big voice / inability to hear)	2.43 (1.42 - 4.13)	*	1.52 (0.80 - 2.87)	
Visual acuity	(0: Normal, 1: face / not visible)	4.34 (2.00 - 9.41)	**	1.80 (0.68 - 4.75)	
Body pain	(0: No, 1: Yes)	2.29 (1.58 -3.34)	**	1.78 (1.14 - 2.78)	*
Experience of falls	(0: No, 1: Yes)	0.95 (0.62 - 1.47)			
Previous medical history					
Hypertension	(0: No, 1: Yes)	1.08 (0.75 - 1.55)			
Stroke	(0: No, 1: Yes)	0.95 (0.50 - 1.81)			
Heart disease	(0: No, 1: Yes)	1.32 (0.87 - 2.01)			
Diabetes Mellitus	(0: No, 1: Yes)	1.70 (1.08 - 2.70)	*	1.56 (0.91 - 2.67)	
Dyslipidemia	(0: No, 1: Yes)	1.40 (0.98 - 2.01)			
Lung disease	(0: No, 1: Yes)	1.52 (1.00 - 2.29)	*	1.18 (0.73 - 1.92)	
Orthopedics disease	(0: No, 1: Yes)	1.65 (1.13 - 2.40)	*	1.24 (0.79 - 1.94)	
Malignant neoplasm	(0: No, 1: Yes)	1.03 (0.65 - 1.63)			
BMI	(kg/m^2)	0.96 (0.91 - 1.02)			

JST-IC scores	(score)	0.80 (0.75 - 0.86)	**	0.91 (0.84 - 0.99)	*
MMSE scores	(score)	0.99 (0.92 - 1.07)			
Gait speed	(m/s)	0.28 (0.13 - 0.60)	*	1.54 (0.58 - 4.09)	
Physical activities	(METs・hours/week)	0.98 (0.98 - 0.99)	**	0.99 (0.98 - 1.00)	*
Self-reported health	(0: a little or health, 1: a little or no health)	4.26 (2.78 - 6.54)	**	1.34 (0.78 - 2.30)	
GDS scores	(score)	1.26 (1.20 - 1.33)	**	1.13 (1.05 - 1.21)	*
Status of household	(0: Cohabiting, 1: Living alone)	1.19 (0.81 - 1.74)			
Partner	(0: Yes, 1: No)	1.05 (0.71 - 1.55)			
Total years of education	(year)	0.89 (0.82 - 0.95)	*	0.99 (0.91 - 1.08)	
Subjective economic status	Leeway	1.00 (Reference)		1.00 (Reference)	
	Common	1.47 (0.77 - 2.81)		1.04 (0.51 - 2.14)	
	Strait	2.78 (1.45 - 5.36)	*	0.89 (0.41 - 1.92)	
Organization activities	(0: Yes, 1: No)	2.89 (1.99 - 4.18)	**	1.94 (1.22 - 3.07)	*
Relation with others	(0: Yes, 1: No)	1.50 (1.01 - 2.22)	*	0.89 (0.55 - 1.45)	

Logistic regression model; outcome variable: Decrease in the frequency of going out (0: No, 1: Yes). OR : Odds Rate, CI : Confidence Interval, BMI : Body Mass Index, JST-IC: Japan Science and Technology Agency Index of Competence, MMSE : Mini-Mental State Examination, GDS: Geriatric Depression Scale. Model1: Adjusted by sex, age. Model2: Adjusted by Model1+ Difficulty chewing, Difficulty swallowing, Dry mouth, Hearing, Visual acuity, Body pain, presence or absence of Diabetes Mellitus / Lung disease / Orthopedics disease, JST-IC scores, Gait speed, Physical activities, Self-reported health, GDS scores, Total years of education, Subjective economic status, presence or absence of Organization activities, presence or absence of Relation with others. *: $p < .05$, **: $p < .001$.

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