Relationship between depression and risk of malnutrition among community-dwelling young-old and old-old elderly people

Authors

Kazuya Yoshimura, Department of Physical Therapy, Human Health Sciences, Graduate School of Medicine, Kyoto University, Kyoto, Japan.

Minoru Yamada, Department of Physical Therapy, Human Health Sciences, Graduate School of Medicine, Kyoto University, Kyoto, Japan.

Yuu Kajiwara, Department of Physical Therapy, Human Health Sciences, Graduate School of Medicine, Kyoto University, Kyoto, Japan.

Shu Nishiguchi, Department of Physical Therapy, Human Health Sciences, Graduate School of Medicine, Kyoto University, Kyoto, Japan.

Tomoki Aoyama, Department of Physical Therapy, Human Health Sciences, Graduate School of Medicine, Kyoto University, Kyoto, Japan.

Corresponding aurthor:

Kazuya Yoshimura

Department of Physical Therapy, Human Health Sciences, Graduate School of Medicine, Kyoto University, Kyoto, Japan.

53 Kawahara-cho, Shogoin, Sakyo-ku, Kyoto 606-8507, Japan

E-mail: yoshimura.kazuya.76w@st.kyoto-u.ac.jp

Phone: +81-75-751-3935

Fax: +81-75-751-3909

Title

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Abstract

Objectives: The present study explores the association between nutritional status and depression among healthy community-dwelling young-old (aged 65–74) and old-old elderly (aged 75 and older).

Method: A cross-sectional design was implemented. A total of 274 community-dwelling older individuals (142 young-old; 132 old-old) were assessed using the Geriatric Depression Scale (GDS), Short-Form Mini-Nutritional Assessment (MNA-SF), and Life-Space Assessment (LSA). Logistic regression analysis was used to determine if depression was independently associated with risk of malnutrition, stratified by age (young-old vs. old-old).

Results: In the logistic regression model for young-old, being at risk of malnutrition (MNA-SF ≦ 11) was strongly associated with depression (GDS ≧ 5) (likelihood ratio = 6.26; 95% confidence interval [CI]: 1.91–20.49). In contrast, in the old-old group, the model was not statistically significant.

Conclusion: Depression and nutritional status were strongly correlated in young-old but not in old-old community-dwelling elderly. This study reveals that not only the factors correlated with but also the symptoms of depression may vary among different age stratifications of the elderly.

Keywords: Depression, Nutritional Status, Young-old

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Introduction

In an aging population, depression is a serious public health issue due to its societal burden and association with various factors. The total cost of depression in Japan in 2005 was estimated to be 2.0 trillion yen (USD 1 = JPY 78: October 2012) (Sado et al., 2011), which includes all direct, morbidity, and mortality costs. Further, studies in a variety of settings have shown that depression is strongly associated with low function and poor quality of life, increase in the use of health services, late-life suicide tendency, and excess mortality (Callahan, Hui, Nienaber, Musick, & Tierney, 1994; Cuijpers & Smit, 2002; Geerlings, Beekman, Deeg, Twisk, & Van Tilburg, 2002; Koenig, Shelp, Goli, Cohen, & Blazer, 1989; Nyunt, Lim, Yap, & Ng, 2012; Turvey et al., 2002; Van der Weele, Gussekloo, De Waal, De Craen, & Van der Mast, 2009; Wada et al., 2005). A systematic review of 34 community-based studies reported that the prevalence of depression in the elderly is as high as 35% (Beekman, Copeland, & Prince, 1999; Woo et al., 1994). In terms of the type of depression, major depression is relatively rare and minor depression more common (Beekman, Copeland, & Prince, 1999). In

addition, clinicians often fail to diagnose and treat depression in the elderly, and elderly individuals are reluctant to report depressive symptoms (Georgotas, Cooper, Kim, & Hapworth, 1983; Lyness et al., 1995; Webber et al., 2005). Therefore, depression in the elderly has often been unrecognized, and it is important to clarify the components of depression to improve the sensitivity of screening methods.

Many variables, including gender, marital status, cognitive status, activities of daily living and independent activities of daily living limitations, and social engagement, are associated with increased depression (Anstey, Von Sanden, Sargent-Cox, & Luszcz, 2007; Glass, Mendes De Leon, Bassuk, & Berkman, 2006). Meanwhile, weight loss and loss of appetite are the main factors that mediate the relationship between depression and nutritional status (Rubenstein, Harker, Salvà, Guigoz, & Vellas, 2001). Recently, multiple studies have indicated an association between depression and nutritional status in various settings such as outpatient clinics and institutions and in the community (Cabrera, Mesas, Garcia, & Andrade, 2007; Kaburagi et al., 2011; Smoliner et al., 2009; Wilson, Vaswani, Liu, Morley, & Miller, 1998). In these settings, depression is an independent predictor of nutritional health and a major cause of weight loss (Chen, Chang, Chyun, & McCorkle, 2005; Morley & Kraenzle, 1994; Thompson

& Morris, 1991). Conversely, better diet quality is beneficial for preventing and improving depressive symptoms (Akbaraly et al., 2009; Lin & Su, 2007). The relationship between depression and nutritional status is interactive and further investigation is still needed. In this regard, the aging society needs to be considered. The word ‘elderly’ is very broad, encompassing all individuals aged older than 60 or 65 years. Age may alter the relationship among the various variables associated with depression. For example, the young-old (age 65–74 years) and old-old (age 75 years and above) have different predispositions regarding various aspects of both depression and nutritional status (Kaburagi et al., 2011; Kondo, Kazama, Suzuki, & Yamagata, 2008). Older elderly are more likely to experience frailty, physical illness, bereavement, and loneliness, which are risk factors contributing to depression (Bruce, 2002; Blazer, 2002). Investigating age-group differences may help in clarifying the correlation between depression and nutritional status and in developing precise, age-stratified interventions.

The purpose of the present study was to analyse the association between depression and nutritional status in different age groups of non-functionally-impaired, community-dwelling elderly.

Methods

[Participants]

Study participants were recruited through advertisements in the local press and at local healthcare events from April 2011 to June 2012. A total of 274 community-dwelling older individuals volunteered in the study. The inclusion criteria were an age of 65 years or older, living in the community, and being able to walk independently with or without a cane. The exclusion criteria ensured that none of the participants had any indications of the following health problems: (a) symptomatic cardiovascular disease, (b) neurological and orthopaedic disorders, (c) peripheral neuropathy of the lower extremities, and (d) severe arthritis.

This study was approved by the Ethical Review Board of Kyoto University Graduate School of Medicine, Kyoto, Japan.

[Variables]

The following variables were collected using a questionnaire.

Depression was screened for by the 15-item Geriatric Depression Scale (GDS) (Yesavage, 1988), a validated and reliable self-report scale that detects

depression in elderly people. Scores range from 0 to 15. We used a cut-off of 4/5, which is a recommended indicator of depression in Japanese populations (Murata, Kondo, Hirai, Ichida, & Ojima, 2008; Yamazaki, Nakano, Saito, & Yasumura, 2012).

Nutritional status was assessed with the Short-Form Mini-Nutritional Assessment (MNA-SF) (Rubenstein et al., 2001). MNA-SF includes 6 items dealing with loss of appetite, weight loss, mobility, stress or illness, dementia or depression, and body mass index (BMI). Scores range from 0 to 14. A score of 12 or above indicates satisfactory nutritional status, a score of 8 to 11 implies risk of malnutrition, and a score less than 7 suggest malnourishment.

Life-space mobility was assessed by the Life-Space Assessment (LSA) (Baker, Bodner, & Allman, 2003), a questionnaire that measures the spatial extent of individuals in a given month. The LSA takes into account the frequency of travel to different life-space levels (bedroom, driveway, within neighbourhood, outside neighbourhood but within town, and out of town), and whether personal or technical assistance was required to get to those levels. The composite scores range from 0 to 120.

[Statistical Analysis]

Statistical analysis was carried out with the software package SPSS 20.0 (SPSS Inc., Chicago, IL). Relationships between MNA-SF items and depression were evaluated with chi-square tests. Multivariate analysis was performed to examine the association between depression and risk of malnutrition. Step-up logistic regression analysis was used to determine if depression (GDS ≥ 5) was independently associated with risk of malnutrition (MNA-SF ≤ 11). In Model I, all of the participants were analysed. Model II contained only young-old participants, and Model III contained only old-old participants. Demographic factors (age, gender, and BMI) and LSA were adjusted in each model. An acceptable level of statistical significance was considered to be a p value of < .05.

Results

Participant characteristics are shown in Table 1. The mean age was 74.33 (SD 4.72) years, and 185 participants (67.5%) were female. Classifying participants by age, 142 were young-old (51.8%) and 132 participants were old-old (48.2%). Fifty-nine participants (21.5%) were depressed. Seventy-seven (28.1%) were at risk of malnutrition (including 1 participant determined to be malnourished), and the others were well nourished. Old-old participants had a higher risk of

malnutrition than young-old ones, but no significant differences were found for depression. The nutritional characteristics of the participants are shown in Table 2. Among the young-old, there was a trend that depressed participants were more likely to have a loss of appetite within the past 3 months than the non-depressed participants, but this difference was not statistically significant ($p = .075$). There was no trend toward significance in the old-old group ($p = .502$).

In the logistic regression model for young-old (Model II), being at risk of malnutrition (MNA-SF ≤ 11) was strongly associated with depression (GDS ≥ 5) (likelihood ratio = 6.74; 95% confidence interval [CI]: 2.11–21.51) independent from the control variables, while this association was not found in Models I and III (Table 3).

Discussion

The present study found a correlation between GDS and MNA-SF for young-old individuals, but not for old-old individuals or for the two groups combined. Multiple studies conclude that depression and malnutrition are related, but that the influence of age on the variables differs. Previous studies reported that depression is an independent predictor of malnutrition or nutritional risk even

after adjusting for social and educational factors in young-old elderly adults but not old-old elderly adults (Cabrera et al., 2007; Callen and Wells, 2005).These differences could arise because depressive symptoms in the elderly have different clinical features along the age spectrum from young-old to old-old (Mehta et al., 2008). For example, old-old elderly may suffer from a higher prevalence of disability or medical illnesses (Chou & Chi, 2005). Having a chronic disease is a variable that independently influences depression (Schoevers et al., 2000). The relationship between depression and malnutrition needs to be further examined, with physical, mental, and social status taken into consideration.

Various studies have reported a positive relationship between depression and nutritional status, and they often associate depression with loss of appetite or weight loss (Akbaraly et al., 2009; Davison & Kaplan, 2012). However, the rates of depressed participants in the present study with loss of appetite or weight loss were 13.6% and 30.5% in the young-old and old-old, respectively, and were relatively low. Only the relationship between depression and loss of appetite in young-old elderly showed a trend toward significance, and other relationships (between depression and weight loss in young-old and between depression and loss of appetite or weight loss in old-old) did not. Callen and Wells (2005)

reported that in old-old elderly, depression is not a predictor of weight loss or low BMI when adjusting for social, physical, and economic factors, a finding which is in agreement with our results. The relationship between depression and loss of appetite may have been the principal reason behind the result obtained in the present multivariate analysis, that is, the positive relationship between depression and malnutrition.

Our study has several limitations. The cross-sectional design prevents us from making causal inferences. We also did not assess socioeconomic and educational status and social support; the possibility of these being confounding factors cannot be denied. Despite these limitations, this study reveals that the factors correlated with depression could vary among different age groups of elderly and suggests that depression and nutritional status are correlated more strongly in young-old than old-old elderly. Future studies should focus on clarifying the causal relationship, consider the age of subjects and assess nutritional status, social status, etc., for better understanding of depression.

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Table 1. Participant characteristics according to age

	All participants (n = 274)		Young-old (age 65–75; n = 142)		Old-old (age ≧ 75; n = 132)		
	mean	SD	mean	SD	mean	SD	p value
Age (years)	74.33	4.72	70.61	2.33	78.34	3.07	< .001
Female, %	67.5		66.2		68.9		.699
BMI	22.44	3.26	22.65	3.21	22.23	3.31	.287
LSA (range, 0–120)	87.83	21.08	89.91	20.62	85.59	21.41	.107
MNA-SF score (range, 0–14)	12.32	1.56	12.44	1.50	12.20	1.61	.253
At risk of malnutrition, % (MNA-SF score ≦ 11)†	28.1		21.8		34.8		.022
GDS score (range, 0–15)	2.71	2.74	2.55	2.70	2.89	2.78	.228
Depression, % (GDS score ≧ 5)	21.5		19.7		23.5		.466

BMI: body mass index; LSA: Life-Space Assessment; MNA-SF: Short-Form Mini-Nutrition Assessment; GDS: Geriatric Depression Scale

† Includes one participant classified as malnourished in the young-old group

p values determined by Mann-Whitney U test or chi-square test

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Table 2. Nutritional characteristics, measured by MNA-SF, of young-old and old-old participants with and without depression

	With depression (GDS ≧ 5)				Without depression (GDS < 5)				
	n (%)				n (%)				p value
MNA-SF items (ranking)†	0	1	2	3	0	1	2	3	
Young-old (n = 142)									
Loss of appetite	1 (3.6)	3 (10.7)	24 (85.7)	-	0 (0)	5 (4.4)	109 (95.6)	-	.075
Weight loss	0 (0)	3 (10.7)	6 (21.4)	19 (67.9)	0 (0)	6 (5.3)	13 (11.4)	95(83.3)	.108
Mobility	0 (0)	-	28 (100)	-	0 (0)	-	114 (100)	-	-
Stress or acute illness	6 (21.4)	-	22 (78.6)	-	7 (6.1)	-	107 (93.9)	-	.022*
Neuropsychological status	2 (7.1)	1 (3.6)	25 (89.3)	-	0 (0)	0 (0)	114 (100)	-	.007**
Body mass index	4 (14.3)	6 (21.4)	7 (25.0)	11 (39.3)	11 (9.6)	16 (14.0)	45 (39.5)	42 (36.8)	1.000
Old-old (n = 132)									

Loss of appetite	0 (0)	4 (12.9)	27 (87.1)	-	0 (0)	9 (8.9)	92 (91.1)	-	.527
Weight loss	0 (0)	3 (9.7)	6 (19.4)	22 (71.0)	3 (3.0)	6 (5.9)	12 (11.9)	80 (79.2)	.398
Mobility	0 (0)	-	31 (100)	-	0 (0)	-	101 (100)	-	-
Stress or acute illness	6 (19.4)	-	25 (80.6)	-	8 (7.9)	-	93 (92.1)		.076
Neuropsychological status	1 (3.2)	1 (3.2)	29 (93.5)	-	0 (0)	2 (2.0)	99 (98.0)	-	.246
Body mass index	3 (9.7)	8 (25.8)	6 (19.4)	14 (40.6)	17 (16.8)	21 (20.8)	22 (21.8)	41 (40.6)	.681

MNA-SF: Short-Form Mini-Nutrition Assessment; GDS: Geriatric Depression Scale

† Higher scores indicate better function

Chi-square test: Loss of appetite and neuropsychological status, 0–1 vs. 2; weight loss and body mass index, 0–2 vs. 3; stress or acute illness, 0 vs. 2

* $p < .05$, ** $p < .01$

Table 3. Step-up logistic regression model of variables associated with depression (GDS ≧ 5)

	All participants (Model I) (n = 274)		Young-old (Model II) (age 65–75; n = 142)		Old-old (Model III) (age ≥ 75; n = 132)	
	Likelihood ratio (95% CI)	p value	Likelihood ratio (95% CI)	p value	Likelihood ratio (95% CI)	p value
Risk of malnutrition (MNA-SF ≦ 11)	-	NS	6.738** (2.111–21.510)	.001	-	NS
Age (years)	-	NS	-	NS	-	NS
Gender (male 0; female 1)	-	NS	-	NS	-	NS
BMI	-	NS	1.201* (1.033–1.395)	.017	-	NS
LSA	.985* (.971– .999)	.031	-	NS	-	NS

GDS: Geriatric Depression Scale; MNA-SF: Short-Form Mini-Nutrition Assessment; BMI Body Mass Index; LSA: Life-Space Assessment

NS: not selected

* p < .05, ** p < .01

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