

ORIGINAL ARTICLE

Acceptance of memory impairment and satisfaction with life in patients with mild to moderate Alzheimer's disease

Mizuho Morioka,^{1,2} Makoto Tanaka,^{1,3} Kozo Matsubayashi⁴ and Toru Kita⁵

Departments of ¹Geriatric Medicine, ³Social Service and ⁵Cardiovascular Medicine and ⁴Center for Southeast Asian Studies, Kyoto University, Kyoto, and ²Graduate School of Human Culture, Nara Women's University, Nara, Japan

Background: In this study, we focused on the acceptance by patients with mild to moderate Alzheimer's disease (AD) of memory impairment and their satisfaction with life.

Methods: We interviewed 71 consecutive patients with probable AD and asked: (i) whether they had memory loss; (ii) whether they faced difficulties in life; and (iii) how their daily life was. We categorized the patients into three groups based on awareness of memory loss and whether they referred to the cause they attributed to memory loss.

Results: Cognitive functions were lower in patients who were not aware of memory loss. The level of satisfaction with life was highest in patients who were not aware of memory loss, and was lowest in patients who complained of memory loss with reference to the attribution of memory loss, indicating that patients found it difficult to accept their lives when memory impairment was a serious issue. However, in these patients, depression scores were not high, suggesting that they may somehow adapt themselves to their current status by defining the reason for memory loss. In patients who complained of memory impairment but did not refer to the attribution of memory loss, there was a variation in awareness of memory loss and satisfaction with life.

Conclusions: The present study suggests a need for the provision of individual care and support for AD patients based on their level of acceptance of memory impairment.

Keywords: acceptance of memory impairment, Alzheimer's disease, individual care, life satisfaction.

Introduction

Memory impairment is one of the core symptoms of Alzheimer's disease (AD) and many patients with AD suffer from memory impairment from early stages of the disease. Awareness of memory impairment in AD patients has been studied from the standpoint of

anosognosia and it has been shown that patients unaware of their memory deficits were more cognitively impaired.^{1,2} These studies demonstrated defective recognition in AD patients, but did not reveal how these patients faced and accepted their memory problems.

Care-givers and medical staff should understand and accept the internal world of AD patients and provide individual care, which is a key to maintaining and improving the quality of life for these patients.³ Recently, narratives from AD patients about their internal experience and life story have received increasing attention.⁴⁻⁶ However, there have been few studies investigating how AD patients perceived their memory impairment subjectively and struggled with the loss of cognitive functions.^{7,8} In this study, we tried to

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Correspondence: Dr Makoto Tanaka, MD, Department of Social Service, Kyoto University Hospital 54 Shogoin-Kawaharacho, Sakyo-ku, Kyoto 606-8507, Japan. Email: makoto@kuhp.kyoto-u.ac.jp

categorize AD patients into three groups based on their levels of awareness of memory impairment and compared cognitive functions, behavioral and psychological symptoms and satisfaction with life between these groups. The present study suggested that we have to provide care and support for AD patients, considering their levels of acceptance of memory impairment.

Methods

Patients presented for dementia evaluation to the memory clinic of the Department of Geriatric Medicine, Kyoto University Hospital from October 2001 to January 2003 were invited to participate in the study if they met National Institute of Neurological and Communicative Disorders and Stroke–Alzheimer’s Disease and Related Disorders Association criteria for probable AD and had mild to moderate AD defined by a Mini-Mental State Examination (MMSE) score of 14.⁹ Seventy-one consecutive patients who met the criteria were interviewed by a clinical psychologist who specialized in geriatrics before being evaluated using neuropsychological tests. Patients and their care-givers were informed of the aim of the neuropsychological tests and interview and gave their consent. Since our purpose was to investigate how AD patients felt and accepted memory impairment subjectively, we adopted a semistructured interview approach. Patients were asked: (i) why they came to the hospital; (ii) whether they faced difficulties in life; and (iii) how their daily life was. The interviewer did not mention such words as memory loss or acceptance to avoid leading questions.

To evaluate the level of awareness of memory loss, we categorized the patients into three groups based on whether they were aware of memory impairment and whether they referred to the cause attributed to the memory impairment. Subjects were considered to be aware of memory loss if they subjectively understood their memory problems. Reference to the cause of memory impairment was used as classification criteria, because understanding cause-and-effect relationships can promote recognition and thus we assumed that reference to the cause attributed to memory impairment could serve as an index of deep recognition of memory loss.¹⁰ Patients were classified into three groups: (i) group A (those who denied or did not mention memory impairment); (ii) group B (those who recognized memory impairment, but did not refer to the cause of the impairment); (iii) group C (those who recognized memory impairment and referred to the cause attributed to the impairment). After the interview, patients were evaluated using neuropsychological tests including MMSE and the Alzheimer’s Disease Assessment Scale–Cognitive Subscale (ADAS–cog). The 15-item Geriatric Depression Scale (GDS) was used to screen depression. Care-givers were interviewed with the Neuropsychiatric

Inventory (NPI)¹¹ for behavioral assessment and the Barthel Index for functional evaluation.¹²

Two-tailed unpaired Student’s *t*-test was applied to analyze data between the two groups and one-factorial ANOVA followed by Fischer’s PLSD test was used to compare data between more than three groups.

Results

There were no significant differences in age, sex, education, Barthel index, GDS score or NPI score among the three groups (Table 1). However, MMSE scores were significantly higher in groups B and C than in group A, and ADAS–cog scores were significantly lower in group B than in group A (Table 1).

Problems or past events attributed to memory loss in patients in group C could be categorized into two groups: physical and psychological problems (Table 2). Memory impairment was attributed to medical problems in nine cases and aging in three cases. In the other cases, their own character or past events were specifically mentioned as causes of memory impairment (Table 2).

Regarding the response to the first question, ‘why did you come to the hospital?’ we analyzed whether they came to the hospital voluntarily or following their care-givers’ suggestions. In group A, more than 80% of the patients came to the hospital following their care-givers’ suggestions, while 44% of the patients in group B and 70% of the patients in group C came to the hospital voluntarily (Table 3). Moreover, 87% of patients in group B and all the patients in group C referred to the purposes of coming to the hospital, whereas only five patients in group A talked about the purposes (Table 3). Although the five patients in group A mentioned examination of

Table 1 Patient demographics

	Group A	Group B	Group C
<i>n</i>	28	23	20
M : F	10 : 18	8 : 15	10 : 10
Age	75.0 ± 10.6	76.4 ± 6.5	74.7 ± 6.4
Education	10.6 ± 3.5	11.2 ± 3.3	11.4 ± 2.9
MMSE	19.0 ± 4.2*	22.2 ± 3.7*	22.9 ± 4.0*
ADAS–cog	18.6 ± 7.1 [†]	13.1 ± 5.0 [†]	16.7 ± 7.6
GDS	3.7 ± 2.4	4.4 ± 2.2	3.6 ± 2.7
NPI	6.0 ± 5.1	7.1 ± 5.4	5.8 ± 7.0
Barthel	94.1 ± 9.9	97.8 ± 3.9	96.8 ± 6.5

*MMSE scores were significantly lower in group A than in group B or C ($P < 0.01$). [†]ADAS scores were significantly higher in group A than in group B ($P < 0.05$). MMSE, Mini Mental State Examination; ADAS–cog, the Alzheimer’s Disease Assessment Scale–Cognitive Subscale; GDS, Geriatric Depression Scale (15 items); NPI, Neuropsychiatric Inventory; Barthel, Barthel index of activities of daily living.

Table 2 Causes of memory loss referred to by patients in group C

Cause	Examples	<i>n</i>
Physical problems		
Medical problems	'I am concerned about brain disease.'	9
	'I would like to have medical treatment for memory loss.'	
Past physical events	'I have had memory loss since I had a fall.'	4
	'I have experienced memory loss since I was admitted to hospital for lung disease.'	
Aging	'I have memory loss because I am 80.'	3
Total		16 [†]
Psychological problems		
Character	'I have memory loss because I am always careless.'	9
	'My nervous character worsens memory loss.'	
	'I am not good at learning.'	
Past psychological events	'I lost interest in life after retirement.'	7
	'I felt as if I had nothing to do after my sons became independent.'	
Total		16 [†]

[†]These numbers include multiple answers by some patients.

Table 3 Responses to question 1 (why did you come to the hospital?)

	Group A	Group B	Group C
Suggestion of others	23 (82%)	13 (56.5%)	6 (30%)
Voluntary decision	5 (18%)	10 (43.5%)	14 (70%)
Reference to specific purposes			
Yes	5 (17.9%)	20 (87%)	20 (100%)
No	23 (82.1%)	3 (13%)	0 (0%)

physical problems not related to memory impairment as a purpose, most patients in groups B and C referred to examination of memory problems as a purpose of coming to the hospital.

We next analyzed the response to the second question 'do you find trouble in life?' Almost 90% of the patients in group A answered that there had been no troubles in their lives, while 65% of the patients in group B and 85% of the patients in group C referred to troubles in their lives (Table 4). Of those, 10 cases in group B and 12 cases in group C regarded memory loss as a cause of trouble, while the other patients complained of physical problems, bad dreams, social problems or changes in their character as a cause of trouble (Table 4).

Finally, we analyzed the response to the third question, 'how is your daily life?' We categorized their responses into four groups depending on their satisfaction with life: satisfaction, dissatisfaction, conflict and unknown (Table 5). A majority of the patients (36 cases) did not talk about anything suggestive of the level of satisfaction with their lives ('unknown', Table 5). Approximately 36% of the patients in group A and 30% in group B expressed satisfaction, while only 5% expressed satisfaction in group C ('satisfaction', Table 5). Moreover, significantly fewer patients (3.6%) expressed dis-

satisfaction in group A compared with 22% in group B and 30% in group C ('dissatisfaction', Table 5).

Discussion

A comprehensive approach, incorporating physical, mental and social aspects of the disease, is required to provide care for individual AD patients. In this study, we focused on how AD patients felt memory impairment subjectively and struggled with loss of cognitive functions.

Most patients in group A came to the hospital following suggestions by their care-givers and did not refer to problems or troubles in their lives, suggesting a decline in understanding of their status. Consistent with this, their cognitive test scores were lower than those of groups B and C. However, patients in group A expressed a higher degree of satisfaction and appeared to be satisfied in their ability to live an independent life and to play a social role. Therefore, in patients in group A, troubles associated with memory loss and changes in life were not clearly recognized due to lowering of cognitive function, resulting in a relatively stable internal world and a positive understanding of their status. However, we also have to consider the possibility that

Table 4 Responses to question 2 (do you face difficulties in life?)

	Group A [†]	Group B	Group C [†]
No	25 (89.2%)	8 (34.7%)	3 (15%)
Yes	3 (10.7%)	15 (65.2%)	17 (85%)
Causes of difficulties			
Memory loss	0 (0%)	10/15 (66.7%)	12/17 (70.6%)
Physical problems	2/3 (66.7%)	2/15 (13.3%)	2/17 (11.8%)
Bad dream	1/3 (33.3%)	1/15 (6.7%)	1/17 (5.8%)
Social problems	0 (0%)	2/15 (13.3%)	0 (0%)
Changes in their own character	0 (0%)	0 (0%)	2/17 (11.8%)

[†]The ratio of patients who answered 'Yes' was significantly low in group A and significantly high in group C. Physical problems include shoulder pain, headache and insomnia. Social problems include moving and death of a spouse.

Table 5 Responses to question 3 (how is your daily life?)

Response	Reasons	Group A	Group B	Group C
Satisfaction		10 (35.7%)	7 (30.4%)	1 (5%)
	Independent life	5 [†]	1 [†]	0
	Social role	4 [†]	2 [†]	1 [†]
	Good personal relationship	6 [†]	4 [†]	1 [†]
Dissatisfaction	Acceptance of life	0	2 [†]	0
		1 (3.6%)	5 (21.7%)	6 (30%)
	Troubles in daily life	0	2	4 [†]
	Loss of social role	1	1	1 [†]
Conflict	Troubles in personal relationships	0	2	3 [†]
		0	3 (13%)	2 (10%)
	Social activity or good personal relationship, but difficulties in daily life	0	3	2
Unknown		17 (60.7%)	8 (34.8%)	11 (55%)

[†]These numbers include multiple answers by some patients.

they were trying to keep up appearances in their struggle to maintain their pride and dignity.^{4,6}

Many patients in group B considered memory loss as a change in their lives, but there was variability regarding whether they came to the hospital voluntarily or following suggestions by their care-givers, suggesting variability in awareness of problems associated with memory loss among patients in group B. This was consistent with varying degrees of satisfaction with life in this group, indicating that their level of acceptance of memory loss was more variable than that in groups A or C. In patients with high satisfaction with life, troubles associated with memory loss were compensated for by acceptance of other people's support or by acceptance of their own lives. In contrast, in patients with low satisfaction, cognitive decline was mentioned in comparison to their ability in the past and complaints were made about troubles in their lives. Therefore, the level of satisfaction with life was dependent on whether they could find positive factors in themselves or in their lives that

could compensate for negative aspects of cognitive decline.

In group C, most patients regarded memory loss as a change in their lives and came to the hospital voluntarily, indicating high awareness of cognitive decline. Their level of satisfaction with life was low and memory loss was regarded as a crisis affecting their own lives. However, in many cases, their own character or past events were specifically mentioned as possible causes of memory impairment, suggesting that they were trying to accept situations that were difficult for them by regarding memory loss as part of their personal history, since by experiencing illness in terms of personal history individuals can attribute some meaning to this significant life event.¹³

The results may be affected by subjective judgments of the interviewers and the responses of the patients may be influenced by their level of cognitive function. Although we adopted a semistructured interview approach to understand and analyze patients' internal

worlds, the subjectivity of the interviewer and the potential influence of patients' cognitive function are a limitation of this study.

In this study, we analyzed acceptance of memory impairment and satisfaction with life in mild to moderate AD patients. The results suggested that the level of awareness of memory loss was inversely correlated with the level of satisfaction with life. However, patients in group C appeared to grope for ways to accept cognitive decline and support should be provided to help them fit memory loss to their personal history and life. For patients in group B, we found it important to give support to help them find positive factors in themselves or in their lives that could compensate for negative aspects of cognitive decline. In patients in group A, their satisfaction rate was high, but we always have to consider the possibility that they are trying to maintain appearances in order to maintain their pride and to avoid losing trust. The present study suggested that we should provide individual care and support for AD patients by considering how they face and accept memory problems.

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Depression, activities of daily living, and quality of life of community-dwelling elderly in three Asian countries: Indonesia, Vietnam, and Japan

Taizo Wada^{a,*}, Masayuki Ishine^a, Teiji Sakagami^b,
Toru Kita^c, Kiyohito Okumiya^d, Kosuke Mizuno^e,
Terry Arthur Rambo^e, Kozo Matsubayashi^e

^a *Department of Geriatric Medicine, Kyoto University Graduate School of Medicine, 54 Shogoin Kawahara-cho, Sakyo-ku, Kyoto 606-8507, Japan*

^b *Department of Psychiatry, Kyoto University Graduate School of Medicine, 54 Shogoin Kawahara-cho, Sakyo-ku, Kyoto 606-8507, Japan*

^c *Department of Cardiovascular Medicine, Kyoto University Graduate School of Medicine, 54 Shogoin Kawahara-cho, Sakyo-ku, Kyoto 606-8507, Japan*

^d *Research Institute for Humanity and Nature, 335 Takashima-cho, Marutamachi-dori Kawaramachi nishi-iru, Kamigyo-ku, Kyoto 602-0878, Japan*

^e *The Center for Southeast Asian Studies, Kyoto University, 46 Shimoadachi-cho, Yoshida, Sakyo-ku, Kyoto 606-8501, Japan*

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Abstract

The purpose of this study was to examine the prevalence of screening-based depression and the association of depression with activities of daily living (ADL) and quality of life (QOL) of community-dwelling elderly in the developing and developed countries. A total of 2695 community-dwelling elderly subjects aged 60 years or older living in five rural Asian towns (Indonesia: 411, Vietnam: 379, Japan: 1905) participated in this cross-sectional study. Depressive symptoms were assessed using a 15-item geriatric depression scale (GDS-15). ADL, higher daily activities, and medical and social history were assessed by interviews or self-report questionnaires. For the assessment of subjective QOL, a 100 mm visual analogue scale was used. Using a cut-point of 5/6 for the GDS-15, 782 participants (29.0%) appeared to have depression (Indonesia: 33.8%, Vietnam: 17.2%, Japan: 30.3%). Subjects with depression had significantly lower scores for both

* Corresponding author. Tel.: +81 75 751 4260; fax: +81 75 751 3574.

E-mail address: taizow@kuhp.kyoto-u.ac.jp (T. Wada).

ADL and QOL than those without depression in all the three countries. In all the three countries, 17.2–33.8% of community-dwelling elderly subjects had screening-based depression, which was commonly associated with both lower quantitative ADL and lower QOL.

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Keywords: Community-dwelling elderly; Prevalence of depression; Activities of daily living; Quality of life; Geriatric depression scale short form

1. Introduction

Depressive illness is not only a major threat to the mental health and well-being of elderly patients but also a matter of concern to any primary physician and caregiver treating such patients. Depressive illness is projected to be the second-leading cause of disability worldwide by 2020 (Murray and Lopez, 1997). Thirty-four studies have reported prevalences of depression in the community-dwelling elderly, but with widely varying findings (0.4–35%) (Beekman et al., 1999). Furthermore, most of these studies were performed in developed countries. Methodological differences among studies preclude firm conclusions concerning cross-cultural and geographical variations in the prevalence of depression. In the community, the prevalence of major depression ranges from 1 to 2% among the elderly (Unutzer et al., 1997; Penninx et al., 1998), but other disabling depressive illnesses include dysthymia (a chronic low-grade depression) and minor depression (an episodic, less severe illness), which are common in the elderly.

Pursuit of successful aging is now emphasized, and comprehensive geriatric assessment is considered very important for the achievement of this (Rowe and Kahn, 1987). The health status of the elderly should be assessed comprehensively with regard to their not only physical condition but also emotional condition, social activity, and quality of life (QOL). In the community-based setting, depression in the elderly is difficult to define clearly, and the significance of screening for depression in comprehensive determination of the health status of the elderly has remained unclear. To our knowledge, few studies have examined the relationship of depression to both QOL and activities of daily living (ADL), especially in less developed countries. Xavier et al. (2002) reported that subjects with minor depression had significantly lower life satisfaction and worse indices of life quality in Brazil. However, the size of their random sample was only 77. The purpose of the present study was to examine the prevalence of depression as defined by the 15-item geriatric depression scale (GDS-15) score in two developing countries in southeast Asia and in a developed country, Japan, and to clarify the relationship of depression with quantitative ADL and QOL scores in community-dwelling elderly persons.

2. Methods

2.1. Sample size

A total of 2695 Asian subjects aged 60 years or older living in three Asian countries (two towns in Indonesia, two towns in Vietnam, and one town in Japan) were studied between

June 2002 and November 2003. All five towns were rural. Standardized questionnaires were used throughout. In Indonesia and Vietnam, the questionnaires were translated into the native languages, and then translated back to check for consistency in meaning and content, and standardized interviews were also carried out. Those elderly subjects who agreed to reply and could answer the GDS-15, self-rating questionnaire for ADL impairment, and quantitative subjective QOL examination were included. They were also assessed for living condition, lifestyle, and social and medical history (hypertension, current use of anti-hypertensives, and history of stroke, heart disease, and osteoarthritis).

2.1.1. Indonesia

A total of 411 subjects (female 59.9%, mean (\pm S.D) age: 72.3 (\pm 7.3), range 62–105 years, 44.8% of eligible subjects) from two towns in Java Island were studied in February 2003. One is S town, near Bandun city, and the other is K town, about 50 km east of the capital Jakarta. They had populations of 6965 and 11,505, respectively, and their proportions of individuals aged 65 years or older were 5.5% and 4.7%. All the elderly persons living in these towns were informed that they could undergo a health check-up including questionnaire, blood test, and blood pressure measurement as well as consultation with a physician. Finally, 204 and 207 subjects (53.7% and 38.5% of eligible subjects, respectively) participated in this survey and local physicians implemented the questionnaire.

2.1.2. Vietnam

Two rural towns were selected for this study. N town is about 150 km northwest of the capital Hanoi. In this town, four communities were selected for inclusion in this study. All the elderly aged 60 years or older living in these communities were informed that they could have a health check-up including questionnaire, blood test, and blood pressure measurement, as well as consultation with a physician, and 191 subjects participated (coverage rate, range, 60–90%). V town is about 80 km northwest of Hanoi. One area of this town was selected for this study, and 262 individuals (26.9% of the elderly living in the area) were randomly selected based on a local government list. However, 62 subjects rejected the inclusion and 12 were excluded because they were under 59 years of age. A total of 379 subjects (female 55.1%, mean age: 70.7 \pm 8.0, range 60–98 years, 28.3% of those in the study area) from these two towns were studied in November 2003.

2.1.3. Japan

S town is situated in the midportion of Japan, and has a population of 16,700. The proportion of those aged 65 years or older was 20.0%. All the elderly living in this town were given a self-rating questionnaire. A total of 1450 subjects did not complete the survey for the following reasons: away from the area, in a hospital, in a nursing home, subject could not answer because of severe disability or cognitive impairment, or subject refusal. Finally, 1905 subjects (female 58.0%, mean age; 74.0 \pm 6.6, range 65–100 years, 57.0% of eligible subjects) participated in this survey in June 2002.

2.2. Depression screening

The GDS-15 (Yesavage et al., 1982; Sheikh and Yesavage, 1986; Yesavage, 1988) was used for depression screening, and required approximately 4 min to complete and score. Using a cut-point of 6 or more, the GDS-15 has a sensitivity of 88–92% and specificity of 62–81%, compared with results of structured clinical interviews for the determination of depression in Western countries (Gerety et al., 1994; Herrmann et al., 1996; Lyness et al., 1997). In Japan, Schreiner et al. (2003) reported that the cut-point for the GDS-15 for Japanese subjects was the same as that reported for Western subjects. In Indonesia and Vietnam, however, no validation study of the GDS-15 has been reported yet. Thus, the definition of depression was unified with a cut-point for the GDS-15 of 6 or more in these three countries, and a cut-point of 10 or more was used for reference. In Japan, medical histories were self-reported and history of hypertension was defined as self-reported high blood pressure and counter-checked with another item of the questionnaire on the use of anti-hypertensives. In Indonesia and Vietnam, all subjects had blood pressure measured in the sitting position, and hypertension was defined as 140 mmHg or higher systolic blood pressure. In cases in which elderly individuals were not able to directly answer the questions (e.g., unable to read or write clearly), a proxy helped them complete the questionnaire. However, in such cases, questions related to QOL and the GDS-15 were left unanswered if the individuals were unable to indicate the answers themselves.

2.3. Disability

For basic-ADL assessment, each subject rated his/her independence in seven items (walking, ascending and descending stairs, feeding, dressing, going to the toilet, bathing, and grooming). Each basic-ADL item was evaluated using four levels: 3, completely independent; 2, needing some help; 1, needing much help; 0, completely dependent. The seven basic-ADL scores were summed to a total score (0–21). For higher-level daily activities, each subject rated his/her independence on the Tokyo Metropolitan Institute of Gerontology index of competence (TMIG-IC) (Koyano et al., 1991, 1993; Ishizaki et al., 2000). This is a 13-item index including three sublevels of competence: (1) instrumental self-maintenance (five items: ability to use public transport, buy daily necessities, prepare a meal, pay bills, and handle banking matters, rated on a yes/no basis); (2) intellectual activities (four items: ability to fill out forms, read newspapers, read books or magazines, and interest in television programs or news articles on health-related matters, rated on a yes/no basis); and (3) social role (four items: ability to visit own friends, give advice to relatives and friends who confide in one, visit someone at the hospital, and initiate conversation with younger people, rated on a yes/no basis).

2.4. Quality of life

QOL was assessed using a 100 mm visual analogue scale (VAS) (Morrison, 1983; Matsubayashi et al., 1997) (worst QOL on the left end of the scale, best on the right) for the following five items: subjective sense of health, relationship with family, relationship with friends, financial status, and subjective happiness. We have already confirmed the

inter-rater reliability ($R = 0.74$) and test-retest reliability ($R = 0.82$) of the VAS (Matsubayashi et al., 1994).

2.5. Statistics

Statistical analysis was performed using StatView ver. 5 for Macintosh (SAS Institute Inc., Cary, NC). Student's *t*-test was used for continuous variables. *P*-values less than 0.05 were considered significant.

3. Results

The characteristics of the 2695 subjects of three different populations are shown in Table 1. In Indonesia, subjects living alone numbered more than those in the other two countries, and prevalence of hypertension was highest among the subjects there. The majority of subjects from Indonesia were Muslims and did not drink alcohol. Mean GDS-15 score was lowest in Vietnam. The lowest TMIG-IC scores were found in Indonesia, but since the study areas there were relatively remote, one of the TMIG-IC questions, "Can you handle your own banking?", was probably biased. Figs. 1 and 2 show proportions of depressed subjects among the three populations using as cut-points 5/6 and 9/10 on the GDS-15. Using the cut-point 5/6, subjects with depression comprised 33.8% of those in Indonesia, 17.2% of those in Vietnam, and 30.3% of those in Japan, while with a cut-point of 9/10 the corresponding percentages were 11.7%, 4.7%, and 10.7%. Although the proportion of subjects with basic ADL independence was lowest in Vietnam, the prevalence of depression was also lowest there. The prevalence of depression was higher in women than in men in all three countries. On linear regression analysis, GDS-15 score exhibited weak but significant inverse correlations with basic ADL score, self-maintenance score, intellectual activity score, social role score, TMIG-IC score, and each item of QOL score (data not shown).

The elderly subjects with depression had significantly lower scores for each item of the ADL and QOL than those without depression, as assessed by GDS-15 using a cutoff of 5/6 even after adjustment for the effect of age (Table 2), except self-maintenance in Vietnam.

4. Discussion

The prevalences of depression as determined using a cut-point of 5/6 for the GDS-15 were 33.8% in Indonesia, 17.2% in Vietnam, and 30.3% in Japan. The reported prevalences of screening-based depression using the GDS-15 in other countries have varied (14% in US study, with the cut-point of 5/6 (Whooley et al., 2000); 40.2% in Estonia, with the cut-point of 5/6 (Saks et al., 2002); and 8.8% in Taiwan, with the cut-point of 4/5 (Tsai et al., 2003)). In Korea, Cho et al. (1999) suggested a score of 8 or more as the optimal cut-point for the GDS-15 for screening DSM-III-R major depression among clinical subjects, and also concluded that relatively high cut-points require further evaluation in the viewpoint of culturally determined style of response for the depression questionnaire in Korea. The

Table 1
Baseline characteristics of 3255 elderly subjects in three Asian countries

	K and S towns, Indonesia (N = 411)	N and V towns, Vietnam (N = 379)	S town, Japan (N = 1905)
Eligible subjects (%)	44.8	28.3	57.0
Age, mean \pm S.D.	72.3 \pm 7.3	70.7 \pm 8.0	74.0 \pm 6.6
Female (%)	59.9	55.1	58.0
Lifestyle			
Partner alive (%)	53.5	70.5	66.6
Living alone (%)	31.3	6.3	10.0
Alcohol consumption (%)	0.7	43.9	35.9
Non-smoker (%)	55.0	77.6	78.8
Working everyday (%)	53.9	85.0	65.5
Average monthly income ^a , mean (USD)	Not available	29.0	1244.0
GDP/capita (International \$)	3121	2459	25901
Total health expenditure/capita	84	129	2009
Life expectancy at birth, male/female	64.4/67.4	66.9/71.8	77.9/84.7
Medical			
Hypertension ^b (%)	76.1	58.8	41.2
Current use of antihypertensives (%)	Not available	15.9	44.5
Past medical history of heart disease (%)	4.4	16.4	20.3
History of stroke (%)	1.2	5.6	5.0
History of osteoarthritis (%)	22.5	52.1	42.7
History of fall (%)	Not available	16.5	18.9
ADL			
Basic ADL score (range, 0–21)	20.0 \pm 12.6	20.6 \pm 2.0	19.9 \pm 3.2
Tokyo Metropolitan Institute of Gerontology index (range 0–13)	6.7 \pm 3.2	10.1 \pm 3.6	10.7 \pm 3.3
GDS-15, mean \pm S.D.	4.9 \pm 3.3	3.4 \pm 2.7	4.1 \pm 3.6

Four hundred eleven elderly from K and S towns, Indonesia, and 379 elderly from N and V towns, Vietnam, were measured for blood pressure in sitting position, with hypertension defined as 140 mmHg or higher casual systolic blood pressure. S.D.: standard deviation; USD: US dollar; GDS-15: 15-item Geriatric Depression Scale.

^a A total of 991 and 40 elderly individuals from S town of Japan and N town of Vietnam, respectively, volunteered the information.

^b A total of 1905 elderly individuals from S town, Japan, reported awareness of their own hypertension.

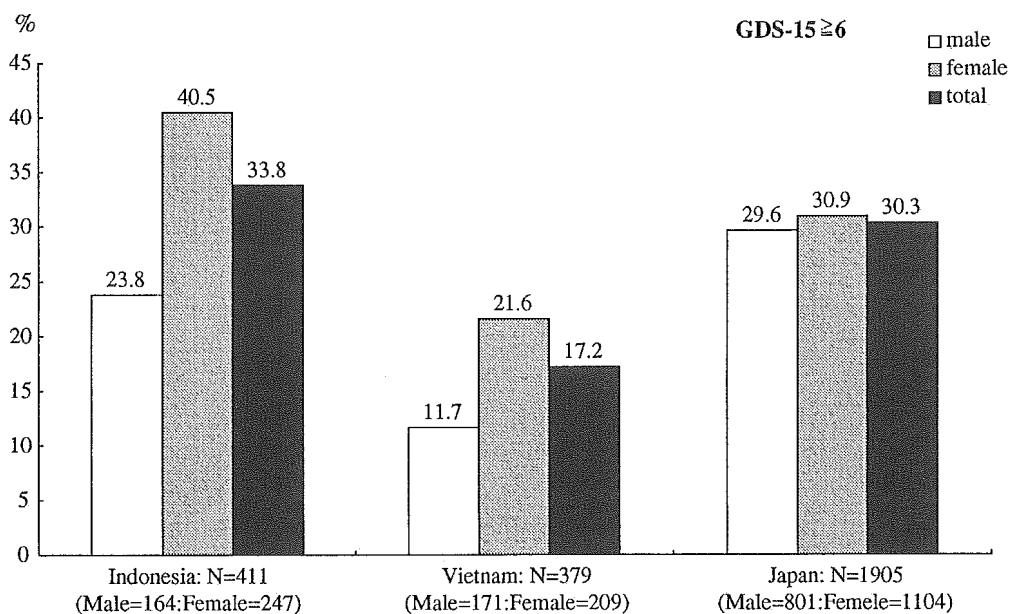


Fig. 1. Prevalence of depression defined as a 15-item GDS score of 6 or more.

GDS-15 (usual cut-point, 5/6) is limited by low specificity in detecting depression (Mulrow et al., 1995; Whooley et al., 1997). A higher cut-point might thus be useful for screening in these Asian countries. In the present study, the lowest prevalence of depression among the elderly was found in Vietnam using both 5/6 and 9/10 as cut-points. Since translation from the English version of GDS-15 to a native language may preclude firm conclusions regarding interpretations of results, further evaluation by a native psychiatrist in each of these countries is needed to confirm our results. Differences in socio-economic factors, social support, ecological environment, and even cultural conditions probably affected the

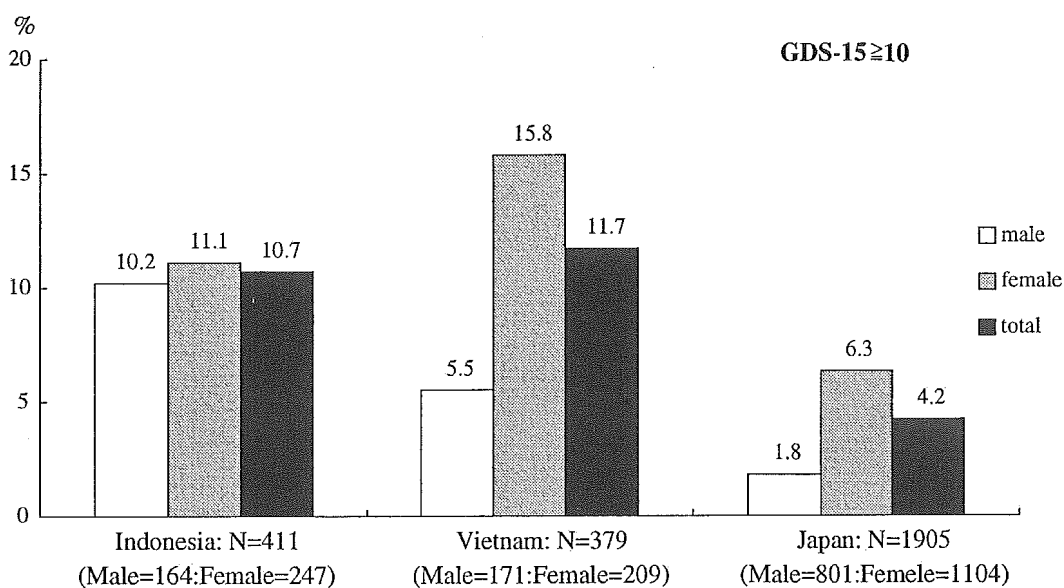


Fig. 2. Prevalence of depression defined as a 15-item GDS score of 10 or more.

Table 2
Comparison of activities of daily living and quality of life scores between elderly subjects with and without depression

Characteristic	K and S town, Indonesia (2003), mean \pm standard deviation		P-value		N and V town, Vietnam (2003), mean \pm standard deviation		P-value		S town, Japan (2002), mean \pm standard deviation		P-value
	With depression* (n = 139) GDS-15 \geq 6	Without depression† (n = 272) GDS-15 \leq 5	With depression* (n = 65) GDS-15 \geq 6	Without depression† (n = 314) GDS-15 \leq 5	With Depression* (n = 578) GDS-15 \geq 6	Without Depression† (n = 1327) GDS-15 \leq 5					
Age	72.2 \pm 8.1	72.7 \pm 7.0	71.1 \pm 8.5	70.7 \pm 7.9	73.7 \pm 6.8	74.1 \pm 6.5	NS	0.7	0.2		
ADL score											
Basic ADL (range 0–21)	19.2 \pm 3.2	20.6 \pm 1.1	19.5 \pm 2.6	20.1 \pm 1.6	18.9 \pm 4.3	20.6 \pm 1.8	<0.001	0.007	<0.001		<0.001
Self-maintenance (range 0–5)	2.2 \pm 1.5	3.0 \pm 1.3	0.6 \pm 0.5	0.5 \pm 0.5	3.7 \pm 1.8	4.6 \pm 1.0	<0.001	NS	<0.001		<0.001
Intellectual activity (range 0–4)	0.5 \pm 0.9	1.2 \pm 1.5	2.2 \pm 1.7	2.8 \pm 1.6	2.9 \pm 1.3	3.6 \pm 0.8	<0.001	0.02	<0.001		<0.001
Social role (range 0–4)	2.6 \pm 1.3	3.3 \pm 1.1	3.2 \pm 1.2	3.7 \pm 0.7	2.4 \pm 1.5	3.4 \pm 1.0	<0.001	<0.001	<0.001		<0.001
TMIG index (range 0–13)	5.3 \pm 3.0	7.5 \pm 3.1	8.9 \pm 4.1	10.3 \pm 3.4	9.0 \pm 4.0	11.6 \pm 2.3	<0.001	0.003	<0.001		<0.001
QOL score (range 0–100)											
Sense of subjective health	38.6 \pm 29.7	60.5 \pm 23.8	38.1 \pm 18.1	49.2 \pm 17.7	51.5 \pm 19.0	69.4 \pm 17.0	<0.001	<0.001	<0.001		<0.001
Relationship with family	70.4 \pm 29.1	85.5 \pm 15.8	63.0 \pm 24.4	78.7 \pm 15.6	69.3 \pm 22.3	84.4 \pm 14.9	<0.001	<0.001	<0.001		<0.001
Relationship with friends	71.9 \pm 23.5	82.3 \pm 18.1	73.3 \pm 19.0	79.1 \pm 16.1	67.3 \pm 20.8	81.9 \pm 15.7	<0.001	0.01	<0.001		<0.001
Financial satisfaction	29.0 \pm 22.6	49.8 \pm 23.1	43.7 \pm 15.0	52.7 \pm 14.3	49.7 \pm 25.0	65.7 \pm 22.3	<0.001	<0.001	<0.001		<0.001
Subjective happiness	47.5 \pm 29.0	75.2 \pm 21.6	47.2 \pm 19.6	61.9 \pm 16.4	57.0 \pm 20.4	77.3 \pm 15.5	<0.001	<0.001	<0.001		<0.001

Note: Unpaired *t*-test and chi-square test were used for statistical analysis. Japan—Female: (♂) 59.0%, (♀) 57.5%; P = 0.5. Indonesia—Female: (♂) 71.9%, (♀) 54.0%; P < 0.001. Vietnam—Female: (♂) 69.2%, (♀) 51.9%; P = 0.01. TMIG: Tokyo Metropolitan Institute of Gerontology; ADL: activities of daily living; QOL: quality of life.

prevalence of depression in these countries. Even in the case of screening-based detection, however, depression in the elderly was found to be strongly associated with both lower ADL and lower QOL in three different countries.

In conclusion, about 17.2–33.8% of community-dwelling elderly subjects were found to have screening-based depression in three different Asian countries, and depression was found to be strongly associated with both lower ADL and lower QOL. Primary physicians should pay more attention to depression in community-dwelling elderly populations while considering their strategies for treatment, even in developing countries.

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ORIGINAL ARTICLE

Comprehensive geriatric assessment for community-dwelling elderly in Asia compared with those in Japan: I. Singapore

Kozo Matsubayashi,¹ Han Kwee Ho,² Kiyohito Okumiya,³ Taizo Wada,⁴ Masayuki Ishine,⁴ Chizu Wada,⁵ Zhu Ge Xin,⁶ Toru Kita,⁶ Yuko Kato,⁷ Naoko Nishihiro⁷ and Lim Boon Hock⁷

¹The Center for South-east Asian Studies, Kyoto University, ³The Research Institute of Humanity and Nature, ⁴Department of Field Medicine, Kyoto University, ⁵Kyoto Preventive Medical Center Foundation, ⁶Department of Cardiology, and ⁷Graduate School of Asian and African Area Studies, Kyoto University, Kyoto, Japan; and ²Choa Chu Kang Polyclinic, Singapore

Background: The objective of the present study is to compare the findings of comprehensive geriatric assessments of community-dwelling elderly people in Singapore with those in Japan.

Methods: A cross-sectional, interview- and examination-based study was conducted of community-dwelling elderly people living in an urban district, Choa Chu Kang, in Singapore and in a rural town, Urausu, in Hokkaido in Japan. Volunteers were recruited by advertising. One hundred and seventeen and 163 community-dwelling elderly aged 70 years and over in Singapore and Japan, respectively, were examined using a common comprehensive geriatric assessment tool. Interviews pertaining to activities of daily living (ADL), medical and social history, quality of life (QOL) and the 15-item Geriatric Depression Scale as well as anthropometric, neurobehavioral and blood chemical examinations were included in the assessment. Using unpaired *t*-tests and χ^2 tests, findings from the two groups were compared.

Results: Intellectual ADL scores were higher in Japan than in Singapore, while there was no significant difference in basic ADL, instrumental ADL or social ADL between the two groups. The prevalence of depression was lower and QOLs were higher in Singaporean elderly subjects than in Japanese. Scores on cognitive functions were higher in Japanese subjects than in Singaporean ones. Mean blood pressure measurements and the prevalence of both hypertension and impaired glucose tolerance were higher in Singapore than in Japan.

Conclusion: Comparative findings between comprehensive geriatric assessment of community-dwelling elderly in Singapore and in Japan were reported. Between these highly economically developed countries, there was no significant difference in such ADLs as basic, information-related, instrumental and social, but there were differences in the intellectual ADL scores. Japanese elderly people were more highly educated than their Singaporean counterparts, however, higher QOLs and a lower prevalence of depression in the

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Correspondence: Dr Kozo Matsubayashi, MD, The Center for South-east Asian Studies, Kyoto University, 46 Snimoadachi-cho, sakyō-ku, Yoshida 606-8501 Kyoto, Japan. Email: kmatsu@cseas.kyoto-u.ac.jp

community-dwelling elderly population were revealed in Singapore than in Japan. Understanding of the need to control chronic risk factors such as hypertension or diabetes mellitus was less popularly spread among community-dwelling elderly in Singapore than in Japan.

Keywords: ADL, community-dwelling elderly, comprehensive geriatric assessment, QOL, Singapore.

Introduction

The elderly population in Japan has been rapidly growing at the fastest rate in the world. In response to the increasing population of the elderly, the best approach to the provision of efficient and effective health care to older persons has been a subject of intense debate. Since 1990, we have carried out assessments of the comprehensive geriatric functions of community-dwelling elderly and providing efficient education to promote health in the elderly population living in several towns in Japan.¹⁻¹¹ As a result, diseases and frailty in community-dwelling old subjects are revealed to be influenced by ecological differences such as the natural environment, historical background, lifestyle, habits, religion and health promotion policies in the area.

In the twenty-first century, rapid growth in the elderly population in each country in Asia is projected to follow Japan's. In Asian countries, the projected percentage of elderly people aged 65 years and over will increase to between 14% and 35% in 2050 from between 4% and 18% in 2000 (Fig. 1).¹² With longer life spans and decreasing birth rates, demographic aging is now an established trend not only in Western countries but also in Asian countries. The issue of efficient health care for the elderly is therefore becoming a more urgent issue even in Asian countries. To achieve appropriate policies to detect ecology-related risk factors for frailty in the elderly and to prevent disabilities in elderly populations, and also to provide useful care services to the frail elderly, we need to further investigate each comprehensive area of study with regard to health and diseases.

Now we have applied a common method of comprehensive geriatric assessment to the community-dwelling elderly population living in several countries in Asia and we would like to report the diverse findings compared with those in Japan in a consecutive series of articles in this journal.¹³⁻¹⁶

Singapore is the country with the second largest aging population in Asia after Japan. In this paper, we report the internationally comparative comprehensive geriatric assessment between a community-dwelling elderly population living in Singapore and one in Japan, as the first report of the series drawing up the cross-ecological and cross-cultural findings in Asia.

Methods

Subjects

The study population consisted of 117 community-dwelling elderly subjects aged 70 years or more (male : female, 34 : 83; mean age, 78.2 years old) living in Chao Chu Kang district, which is located 10 km north-west of the centre in Singapore City, Singapore, and 163 subjects (male : female, 66 : 94; mean age, 80.7 years old) living in Urausu town in Hokkaido in Japan. These subjects were elderly volunteers who responded to our advertisement of medical examinations and constituted 30% and 41% of the eligible populations in Choa Chu Kang and Urausu, respectively. The geriatric survey of community-dwelling elderly living in Singapore and Japan was carried out during August in 2001. These survey were approved by the ethical committee of the department of medicine in Kyoto University, and we obtained informed consent from each participant.

Comprehensive geriatric assessment

The items of the comprehensive geriatric assessment included activities of daily living (ADL), assessment of depression and quantitative assessment of quality of life (QOL) as well as medical and anthropometric indicators.

ADLs

For the basic ADL assessment, each subject rated their independence between 3 and 0 (3, completely independent; 2, needs some help; 1, needs much help; 0, completely dependent) in regard to seven activities (walking, ascending and descending stairs, feeding, dressing, making his/her toilet, bathing, grooming). The items were added to give scores ranging from 0 to 21, with low scores indicating disability.^{1,6,10,17} Information-related function was measured by summing the scores for five functions (visual acuity, hearing acuity, conversation, memory in one day and use of the telephone) using a rating scale from 0 (cannot perform the function at all) to 3 (completely independent) to produce a score between 0 and 15. For higher-level functional capacity, each subject rated his/her independence in the Tokyo

Metropolitan Institute of Gerontology (TMIG) index of competence.^{18,19} This assessment consists of a 13-item index including three sublevels of competence, all rated on a yes/no basis: (i) instrumental ADLs (five items: the ability to use public transport, buy daily necessities, prepare a meal, pay bills, handle banking matters); (ii) intellectual ADLs (four items: the ability to fill in forms, read newspapers, read books or magazines and interest in television programs or news articles on health-related matters); and (iii) social ADLs (four items: the ability to visit friends, give advice to relatives and friends who confide, visit someone at the hospital and initiate conversation with younger people).

Depression and QOLs

We screened for depressive symptoms using the Japanese version of the 15-item Geriatric Depression Scale (GDS-15).^{20,21} We defined depression as a GDS-15 score of 6 or more, with a score of 6–9 indicating ‘mild depression’, and a score of 10 or more indicating ‘severe depression’. QOLs were assessed using a 100 mm visual analog scale (worst QOL on the left end of the scale, best on the right) in the following five items; subjective sense of health, relationship with family, relationship with friends, financial status and subjective happiness.^{22,23}

Cognitive and neurobehavioral functional assessment

We assessed cognitive and neurobehavioral function using five items of tests including Mini-Mental State

Examination,²⁴ Koh’s block design test,²⁵ the Up & Go test, functional reach and a button test. Up & Go test is a reliable and valid scale assessing balance, gait speed and postural impairment. The subject was observed and timed while he or she rose from a chair, walked 3 m, turned, walked back, and sat down again.²⁶ Functional reach is also assessed using a validated balance instrument to measure maximal safe standing forward reach (cm).²⁷ Manual dexterity was assessed using a panel with combinations of 10 hooks and 10 big and 5 small buttons. There were three discrete measurements of time recorded for each participant (10 ‘hook ons, 10 big ‘button-on-off’s and 5 small ‘button-on-off’s). The average time for one hook-on, one big and small button on and off was summed to obtain a total manual dexterity time in seconds, defined as the button score. A high button score indicates poor manual dexterity.^{8,25}

Social, anthropometrical and medical assessments

Living condition, lifestyle (current habit of exercise, drinking alcohol, smoking and so on), and medical histories (histories of stroke, heart diseases and osteoarthritis, as well as taking antihypertensive drugs) were also assessed. Two blood pressure measurements in a sitting position by autosphygmomanometer (HEM 757, Omron, Japan) were averaged to determine the blood pressure level of the subjects. Blood chemical examination were carried out in casual settings (non-fasting), including total protein, albumin, total cholesterol, HDL-cholesterol, blood urea and nitrogen (BUN), creatinine and glucose.

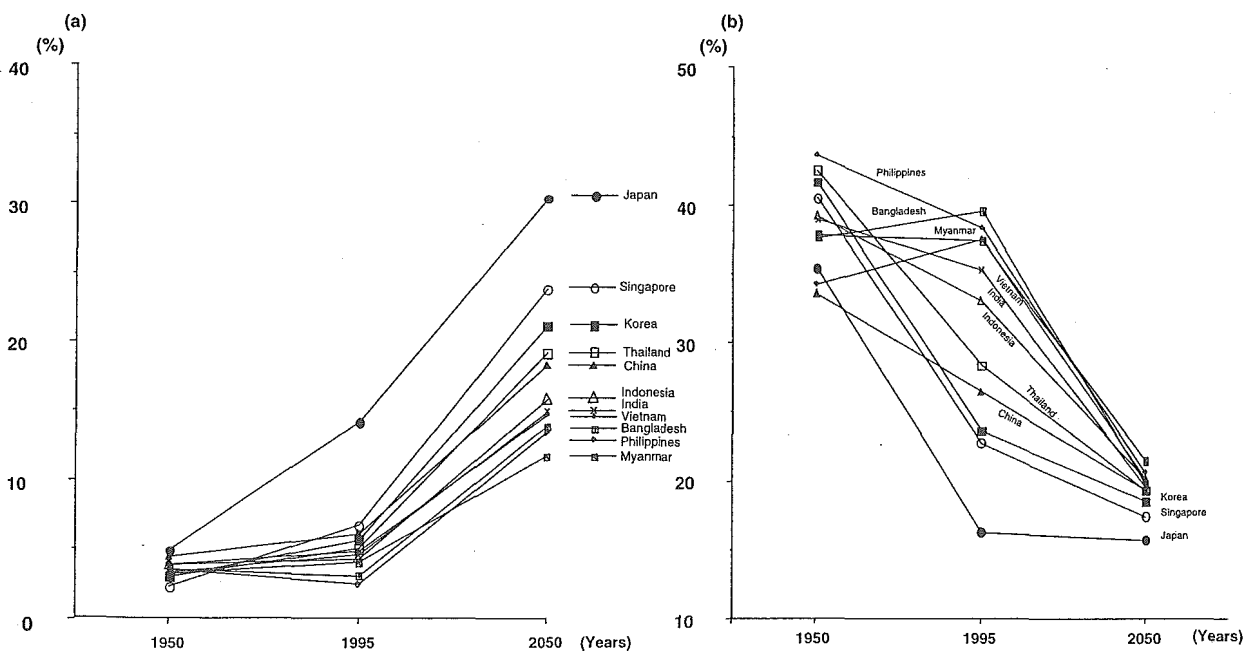


Figure 1 Demographic projections of populations in Asian countries aged (a) 65 years or more years; and (b) 0–14 years.

Statistical analysis

Statistical analysis was performed using StatView ver.5 for Macintosh (SAS institute, Inc., Cary, NC). The Student's *t*-test was used for continuous variables and χ^2 test was used for categorical variables. *P*-values less than 0.05 were used to indicate statistical significance.

Results

Table 1 shows the comparison of baseline characteristics between the elderly subjects living in Singapore and those in Japan. The elderly subjects in Singapore were significantly younger (78.2 years old) than those in Japan (80.1 years old). The percentage of widowers was higher in Singapore (62.4%) than in Japan (47.5%). There was no significant difference in lifestyle, such as rates of subjects living alone, drinking alcohol, smoking and working or doing exercise every day. Most of the Japanese elderly had a family physician (88.5%), while 47% elderly subjects in Singapore had a family physician. The rate of elderly subjects taking antihypertensive medication was higher in Japan (46.7%) than in Singapore (20.5%). The rate of subjects recognizing their apparent history of heart diseases or stroke was higher in Japan than in Singapore. Past history of falls was common in elderly subjects both in Singapore and in Japan (76.9% and 70.5%, respectively).

Table 2 shows the comparison of scores in ADLs, GDS-15 score and quantitative QOLs between community-dwelling elderly living in Singapore and in Japan.

There was no significant difference in scores in basic ADL, information-related function and instrumental ADL. The mean score in intellectual ADL was significantly higher in Japanese elderly subjects than in Singaporean ones, resulting in higher scores for TMIG in Japan than in Singapore. The mean score in GDS-15 and a prevalence of depression, including both mild (GDS ≥ 6) and severe (GDS ≥ 10), were significantly lower in Singaporean elderly subjects than in Japanese ones. Singaporean elderly had significantly higher scores for QOL items of subjective sense of health, family relationship and subjective happiness than Japanese elderly.

Table 3 shows the comparison of anthropometrical indicators and neurobehavioral functions between two elderly groups. Body mass index and blood pressure, both in systolic and diastolic, were higher in Singaporean elderly than in Japanese one. The rates of subjects with systolic pressure > 140 mmHg or diastolic pressure > 90 mmHg based on the measurements of casual blood pressure was higher in Singaporean subjects than in Japanese ones. The scores in cognitive functions assessed by Mini-Mental State Examination and Koh's block design test were higher in Japanese subjects than in Singaporean ones. The mean score for the Up & Go test assessing walking speed and postural function was higher in Singaporean subjects than in Japanese ones after the adjustment of the effect for age. There were no significant differences in scores in functional reach and in button tests between two groups.

Table 1 Baseline characteristics of community-dwelling elderly living in Singapore and in Japan

	Choa Chu Kang, Singapore (<i>n</i> = 117)	Urausu, Japan (<i>n</i> = 163)	<i>P</i>
Mean age \pm SD	78.2 \pm 4.7	80.7 \pm 5.1	< 0.001
Male/female	34/83	66/94	NS
Marital status (%)			0.0454
Widowed	62.4	47.5	
Unmarried	0	0.01	
Divorced	0	0.02	
Lifestyle factors (%)			
Living alone	9.4	13.3	NS
Drinking alcohol	14.5	21.7	NS
Smoking	12.1	12.7	NS
Work or do exercise every day	69.2	68.9	NS
Medical (%)			
Has family physician	47.4	88.5	< 0.0001
Takes anti-hypertensive medication	20.5	46.7	< 0.0001
History of stroke	8.6	16.1	NS
History of heart disease	13.8	31.7	0.0474
History of osteoarthopathy	36.2	50.3	0.0261
History of fall	76.9	70.5	NS

NS, not significant.

Table 2 Comparison of activities of daily living (ADL) and quality of life (QOL) scores between the community-dwelling elderly living in Singapore and in Japan

	Choa Chu Kang, Singapore	Urausu, Japan	P
ADLs			
Scores of basic ADL (0–21)	20.5 ± 1.1	20.2 ± 2.4	NS
Independence of basic ADL (%)	68.4	71.7	NS
Information-related function (0–15)	13.9 ± 1.4	13.5 ± 1.9	NS
Independence of information-related function (%)	44.4	42.2	NS
Scores of instrumental ADL (0–5)	4.1 ± 1.3	4.1 ± 1.5	NS
Independence of instrumental ADL (%)	54.7	64.1	NS
Scores of intellectual ADL (0–4)	1.7 ± 1.3	3.1 ± 1.2	< 0.0001
Independence of intellectual ADL (%)	11.1	50.3	< 0.0001
Scores of social role (0–4)	3.0 ± 1.2	2.9 ± 1.3	NS
Independence of social ADL (%)	47.9	43.7	NS
Scores of TMIG (0–13)	8.8 ± 2.9	10.0 ± 3.5	0.0026
Independence of TMIG (%)	9	26.3	0.0007
Depression			
Scores of geriatric depression scale (0–15)	3.6 ± 3.2	5.0 ± 3.2	0.0002
≥ 6 (%)	22.2	39.1	0.0043
≥ 10 (%)	7.6	13	NS
QOL scores (0–100)			
Subjective health	65.5 ± 23.9	60.1 ± 19.7	0.0433
Family relationship	81.4 ± 18.3	74.4 ± 22.3	0.0061
Friend relationship	77.7 ± 18.0	79.0 ± 41.8	NS
Financial satisfaction	68.2 ± 23.7	64.4 ± 24.1	NS
Subjective happiness	75.1 ± 20.3	67.4 ± 24.0	0.0433

Values for continuous variables are given as means ± SD.

TMIG, Tokyo Metropolitan Institute of Gerontology index of competence; NS, not significant.

Table 3 Comparison of anthropometrical indicators and neurobehavioral functions between community-dwelling elderly in Singapore and Japan

	Choa Chu Kang, Singapore	Urausu in Japan	P
Anthropometric			
Height (cm)	152.3 ± 8.0	147.9 ± 9.1	< 0.0001
Weight (kg)	56.1 ± 9.9	51.1 ± 9.7	< 0.0001
Body mass index	24.2 ± 3.7	23.3 ± 3.4	0.0421
Blood pressure			
Systolic blood pressure (mmHg)	161 ± 22	144 ± 21	< 0.0001
Diastolic blood pressure (mmHg)	89 ± 12	81 ± 11	< 0.0001
Pulse rate (/min)	78 ± 15	72 ± 12	0.0008
Prevalence of hypertension [†] (%)	81.2	59.6	0.0002
Neurobehavioral function tests			
MMSE (points)	21.7 ± 4.4	23.9 ± 4.4	< 0.0001
Koh's block design test (points)	14.9 ± 10.1	18.8 ± 10.8	0.0027
'Up & Go' test (s)	15.4 ± 4.9	17.6 ± 7.6	0.0073
Functional reach (cm)	25.8 ± 7.2	26.0 ± 8.3	NS
Button test (s)	17.0 ± 7.7	17.0 ± 9.2	NS

Values for continuous variables are given as means ± SD.

[†]Hypertension is defined as systolic blood pressure > 140 or diastolic blood pressure > 90 mmHg.

NS, not significant.