Word List Recall in the current study was the presence of neuropathy or nephropathy. Several mechanisms are involved in the pathogenesis of diabetic neuropathy, including vascular dysfunction, polyol pathway, and advanced glycation end-product accumulations.[10] A common mechanism may be involved in DM-related central nervous system dysfunction and peripheral neuropathy.

The current analysis demonstrates that the specific factors associated with decline were different in two different tests, suggesting that multiple factors may cause diabetes-related cognitive decline.

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AGE, SOCIAL STRATUM, AND OBESITY IN LATIN AMERICA: SIMILARITIES IN THE INEQUALITIES FOR OLDER PEOPLE

To the Editor: In the recent years, there has been accumulating evidence about the increasing prevalence of obesity in developing countries—in children and adults.[1,2]

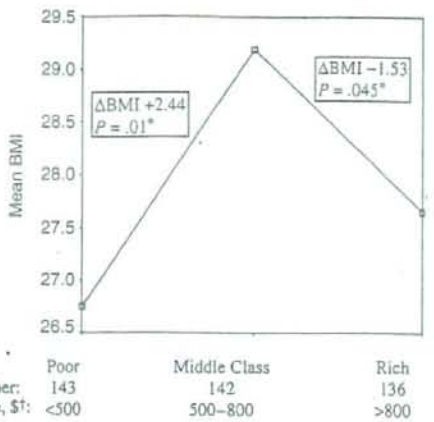

Figure 1. Mean body mass index (kg/m^2) according to the social stratum. Analysis of variance, $P = .01$. *Post hoc analysis. †International dollars.

In a recent *Lancet* article, Silveira argues that "it is intriguing that in these social layers (poor and rich), low birthweight and obesity are becoming more frequent."[3] In addition, she makes some interesting considerations about the importance of this phenomenon to pediatrics.

Whereas increasing prevalence of obesity among the poor is being reported in Brazil, as well as in many other developing regions of the world,[1] it does not seem to be the case for the upper social stratum, at least in Brazil. Indeed, some Brazilian studies have demonstrated that the prevalence of obesity in the upper class, although high, is stabilizing or declining.[4] This phenomenon might also be the case in older people.

In a recent community research, in which 421 older people living in the medium-sized city of Porto Alegre, Brazil, were evaluated, an intriguing significantly ($P = .01$) higher body mass index (29.2) was found in the middle class (monthly income $300–500) than in the poor (26.7) or rich (27.7) strata (Figure 1).

In addition, education was lower in the middle than the upper class ($P = .002$), and the former tended to eat more beef ($P = .03$) than the other two social strata.

The Bambuí project, a Brazilian longitudinal study on aging, has also found obesity to be more common in nonpoor than in poor older people.[5] In this Brazilian sample, malnutrition was found to be associated with lower family income ($P = .05$). The Bambuí study also reported that underweight in older people increased inversely with family income.

Malnutrition may lead to immunodeficient status, which in the tropical developing countries, means a higher risk of developing tropical diseases. Indeed, the same study reported higher prevalence of *Trypanosoma cruzi* in undernourished older people.[5]

Here is where pediatrics and geriatrics come together, because the two opposite extremes of age are more dependent upon the environment. The possibility that developing economies have been affecting the prevalence of obesity and malnutrition in children and older people in a different fashion is puzzling. It is possible that an increasing prevalence of obesity in the less-privileged stratum and decreasing frequency in the richer class may help to explain

the higher mean body mass index found in this sample's middle class.

In the last decade, Brazilian economic policies have reduced the once 100% retirement pensions for the middle class. This study also found that the middle class tended to keep working more after retirement ($P = .002$) and to exercise less than the other two strata ($P = .001$). It is possible that a combination of actively working after retirement, having less time to exercise, being sedentary, and being under stress may create a milieu for obesity.

Whereas redistributive economic policies in Latin America are mandatory, governments should not put the onus excessively upon the middle-class aged.

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PURPLE URINE BAG SYNDROME IN GERIATRIC PATIENTS

To the Editor: Purple urine bag syndrome (PUBS) is an uncommon but interesting condition that has been encountered in geriatric wards. Two patients with PUBS are described below, followed by a brief discussion of this condition.

Patient 1 was a 70-year-old bedridden man who suffered from progressive paraplegia as a result of tuberculous meningitis and arachnoiditis. He required long-term urinary catheterization for urinary retention and had repeated urinary tract infections. Patient's condition was further complicated with a urethrocutaneous fistula that healed poorly, because he refused suprapubic catheterization to facilitate healing. He was chronically constipated and required habitual use of laxatives. After staying in a chronic care ward for 4 years, his urine bag, together with the drainage catheter, was noted to have purple discoloration for the first time (Figure 1). Patient was afebrile, and all vital signs were stable. His indwelling urinary catheter and drainage bag were changed, but the purple color appeared again shortly afterward. He developed fever 3 days later, and a sepsis examination was performed. Bedside urine Multistix revealed urine pH of 8.5, protein of 100 mg/dL, and was negative for leukocyte, red cells, nitrite, and glucose. Urine microscopy revealed moderate numbers (10,000–100,000 cells/mL) of leukocytes and grew *Providencia* species (>100, 000 colony forming units (CFU)/mL), whereas blood culture per-

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ORIGINAL ARTICLE

Usefulness of measuring serum markers in addition to comprehensive geriatric assessment for cognitive impairment and depressive mood in the elderly

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Background: To determine the utility of various serum markers for assessment of cognitive and mental functions in the elderly, we performed a Comprehensive Geriatric Assessment (CGA) in the out-patient clinic in Kyoto University Hospital.

Methods: We measured serum levels of dehydroepiandrosterone (DHEA), DHEA-S, malondialdehyde low-density lipoproteins (MDA-LDL), and high-sensitivity C-reactive protein (hs-CRP) in 145 patients to find the association of these markers with activities of daily living (ADL), cognitive impairment and depressive symptoms.

Results: We found that the levels of hs-CRP were significantly higher in patients with lower scores in Mini-Mental State Examination (MMSE) and Kohs block design test, and higher scores in the button test, indicating that hs-CRP may be associated with the cognitive function in elderly patients. We also found that the levels of DHEA-S were lower in patients with higher scores (9 or over) on the Geriatric Depression Scale-15 (GDS), indicating that DHEA-S may be associated with depressive mode in elderly patients. Total cholesterol, high-density cholesterol (HDL-C), or albumin were not statistically different in each group studied.

Conclusions: Thus, our data indicate that measuring hs-CRP and DHEA-S would be helpful to assess the cognitive function and depressive symptoms in elderly patients.

Keywords: Comprehensive Geriatric Assessment (CGA), cognitive function, C-reactive protein (CRP), depression, dehydroepiandrosterone (DHEA).

Introduction

The Comprehensive Geriatric Assessment (CGA) emerged during the 1980s as an important strategy to improve care for elderly patients with complex medical, psychosocial and functional problems.[1,2] Earlier studies showed that CGA in inpatient units dramatically improved survival and functional status.[3,4] Therefore, if

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we utilize CGA more intensively for the care of elderly patients in our hospitals, CGA will have a more beneficial effect on outcomes.[5] Although CGA for inpatients is very important to improve the outcomes of elderly patients, the focus of recent investigations has been shifted to outpatient CGA due to high cost of inpatient care in the United States.[6] One study showed that outpatient CGA helps maintain functioning and the ability to perform daily activities.[7] However, its benefits are not consistently demonstrated or recognized.

Although survival is one of the most commonly reported outcomes in clinical studies, Stuck *et al.* reported in a meta-analysis that outpatient CGA did not improve survival compared to usual care despite the fact that significant survival benefits were observed in inpatients and home-based CGA.[8] Two of the four trials of outpatient CGA in the meta-analysis were, however, criticized because the subjects were relatively healthy and not at high risk. Additional studies of outpatient CGA were therefore conducted with greater attention to targeting frail subjects, resulting in improved outcomes in elderly patients including mental health[9–11] and functional status.[6,7] Although outpatient CGA has, so far, no demonstrable benefit for the survival of older, frail patients compared to usual care, outpatient CGA should be a good way to assess elderly patients, to diagnose patients with mild cognitive impairment or depressive symptoms, and to eventually prevent functional decline. However, additional measurement might be required to improve the survival.

Cognitive impairment in elderly patients is sometimes hard to diagnose in the outpatient clinic. Therefore, screening elderly patients by Mini-Mental State Examination (MMSE) is useful to diagnose the initial phase of dementia or mild cognitive impairment, although it takes time to screen all the patients with MMSE. Screening depression is also helpful for the care of elderly patients and a 15-item Geriatric Depression Scale (GDS-15) is commonly used for that purpose. This test also takes time in the outpatient clinic. Finding a marker for early diagnosis of cognitive impairment or depressive mood therefore would be important to select high-risk patients.

Chronic brain inflammation characterizes Alzheimer's disease (AD), the most of common neurodegenerative disease associated with progressive cognitive decline. Certain cytokines, such as interleukin (IL)-1, IL-6, and tumor necrosis factor (TNF)-α, are shown to influence a number of different mechanisms that can induce or accelerate the development of neurodegeneration, indicating a correlation of inflammation with cognition.[12,13] Because high-sensitivity C-reactive protein (hs-CRP) can reflect the presence of inflammation and can be induced by these cytokines, we chose hs-CRP as a candidate marker for screening patients with cognitive impairment.

Androstenedione and dehydroepiandrosterone (DHEA) are produced in the biosynthetic pathway of androgen and estrogen. The sulfate ester of DHEA is DHEA-S. The decline of DHEA has been pursued as a major factor in the development of age-associated disorders.[14] Among the studies investigating the effect of DHEA-S on mood in the elderly, some studies show that DHEA-S improves mood[15,16] while others do not.[17,18] Therefore, the effect of these steroids on neurodegenerative diseases remains inconclusive. Malondialdehyde-low density lipoproteins (MDA-LDL) are associated with oxidatively-modified products of LDL and can be associated with atherosclerotic disease.[19] Therefore, if MDA-LDL is associated with cognitive impairment or depressive mood, controlling risk factors for atherosclerotic disease might be important.

From these findings we assessed the activities of daily living (ADL), cognitive functions and depressive symptoms in elderly patients who visited our outpatient clinic for the first time and examined the correlation with various serum markers listed above. We also used 'Get up and go', 'Button scores' and 'Functional reach' to assess neurobehavioral functions in these patients. By these measurements, we should be able to select high-risk patients for cognitive and functional decline and eventually would be able to use outpatient CGA to improve survival of elderly patients.

Methods

Subjects

All elderly (basically 65 years or older) patients who came to Kyoto University Hospital for the first time or had not been seen for the past 6 months in this hospital were asked to attend for health problem screening. We started outpatient CGA in May 2001. One hundred and forty-five consecutive patients aged 62 and older (mean age ± SD: 75.6 ± 0.56) who visited the outpatient clinic from May 2001 through March 2004 were enrolled for this study after written informed consent was taken from each patient or his/her family member. The study protocol was approved by the Ethical Committee of Kyoto University School of Medicine.

Measurements

Comprehensive Geriatric Assessment (CGA) was done on the day of patient visit by experienced speech therapists after history taking and physical examination were done. The CGA included height, body weight, blood pressure, basic activities of daily living (BADL), which was measured with the Barthel Index. For higher-level functional capacity, each subject's independence was rated by the Tokyo Metropolitan Institute of Gerontology (TMIG) Index of competence.[20] This

assessment consists of a 13-item index including three sublevels of competence: (i) instrumental self-maintenance; (ii) intellectual activities; and (iii) social role. MMSE was used to assess cognitive functions. Neurobehavioral functions were assessed by the Kohs block design (KBD) test,[21] 'Get up and go' and 'Button scores'. A cutoff point of 12 for KBD test was used as described.[21] Functional reach was also determined as described.[22] Briefly, each subject was positioned next to the wall with one arm raised 90° with fingers extended, and a yardstick was mounted on the wall at shoulder height. The distance in centimeters that a subject was able to reach forward from an initial upright posture to the maximal anterior leaning posture without moving or lifting the feet was measured by visual observation of the third finger tip against the mounted yardstick. The distances of two trials were averaged as the functional reach score, with a greater distance indicating better balance ability.

We screened depressive symptoms using the Japanese version of GDS-15.[23] Higher scores of GDS-15 indicate a greater degree of depressive mood. In this study we used a cutoff point of 9. Therefore, we defined depression as a GDS-15 score of 9 or more.

'Get up and go'

This test of balance is commonly used to examine functional mobility in elderly subjects.[24] The test requires the subject to stand up, walk 3 m (10 ft), turn, walk back and sit down. The time to complete the test is strongly correlated with functional mobility. Elderly people who can complete the test in less than 20 s are independent in transfer tasks, which are normal activities in daily living.

'Button scores'

'Button scores' evaluate manual dexterity using a panel with combinations of 10 hooks, 10 big buttons and five small buttons. There were three discrete measurements of time recorded for each participant (10 hook-ons, 10 big button-on-and-offs, and five small button-on-and-offs). Total manual dexterity time in seconds, defined as the Button Score, was calculated by adding the average times for one hook-on and one big or small button-on-and-off.[25,26] A cutoff point of 17 was used for the analysis.

Serum marker measurement

Serum levels of DHEA, DHEA-S, MDA-LDL and hs-CRP were measured by SRL (Tokyo, Japan). DHEA and DHEA-S were measured by radioimmunoassay. MDA-LDL was measured by enzyme-linked immunosorbent assay (ELISA). Hs-CRP was measured with CardioPhase kit (Dade Behring, Tokyo, Japan).

Statistical analysis

Differences in continuous variables among the disease groups were determined by one-way analysis of variance (ANOVA). A P-value of less than 0.05 was considered significant. Multiple regression analysis was used to assess the involvement of age and sex.

Results

Table 1 summarizes the patient characteristics in the study population. The mean age in this study group was 75.6 years and the percentage of males was 40%. There was no statistical difference in age between males and females. The ADL of the patients was relatively well preserved. The mean Barthel index (0–100) was 98.3 and was not statistically different between males and females. Instrumental ADL was assessed by the Tokyo Metropolitan Institute of Gerontology Index (TMIG Index) (0–13). The mean value was 10.3 and was not statistically significant between males and females either. We assessed depression by GDS-15 and found that the mean score was 5.23. The GDS scores were slightly higher in females than in males, but the difference was not statistically significant. The mean score was almost comparable to that of community-dwelling elderly people in Japan.[27]

We then determined the cognitive function by MMSE and found that the mean scores were 25.2 (Table 2). We also determined the KBD test to assess spatial recognition and found that the mean score was 22.3. 'Get up and go' and 'Button scores' were assessed and the mean time to be required was 14.9 and 12.1 s, respectively. The mean length of functional reach in these patients

Table 1 Mean age, Barthel index, Tokyo Metropolitan Institute of Gerontology (TMIG) index and Geriatric Depression Scale (GDS) scores in males and females

	n	Age	Barthal index	TMIG index	GDS
Total	145	75.6 ±0.56	98.3 ±0.61	10.3 ±0.25	5.23 ±0.31
Male	58	74.8 ±0.90	99.5 ±0.38	10.5 ±0.37	4.51 ±0.45
Female	87	75.9 ±0.72	98.3 ±0.98	10.1 ±0.33	5.70 ±0.41

Data are expressed as mean ± SEM.

Table 2 Mean MMSE, KBS, button scores, Get up and go, and functional reach in males and females in this population

	MMSE	KBS	Button score	'Get up and go'	Functional reach
n	142	133	134	131	125
Total	25.2 ± 0.46	22.3 ± 1.13	12.1 ± 0.45	14.9 ± 0.46	23.4 ± 0.66
Male	25.7 ± 0.77	24.0 ± 1.88	12.8 ± 0.62	14.1 ± 0.74	26.2 ± 0.84*
Female	25.0 ± 0.56	21.0 ± 1.39	11.6 ± 0.62	15.5 ± 0.57	21.3 ± 0.66*

Data are expressed as mean ± SEM. *$P < 0.01$. *n*, number of patients studied.

Table 3 Mean levels of dehydroepiandrosterone (DHEA), DHEA-S, malondialdehyde-low density lipoproteins (MDA-LDL) and high-sensitivity C-reactive protein (hs-CRP). Difference in male and female patients

	DHEA (ng/ml)	DHEA-S (ng/ml)	MDA-LDL (U/L)	hs-CRP (ig/ml)
Total	2.08 ±0.10	777 ± 49.3	147 ±5.84	4.98 ±1.56
Male	2.02 ±0.15	995 ±93.8*	128 ±8.31**	3.42 ±1.66
Female	2.12 ±0.13	625 ±45.3*	158 ±7.62**	5.79 ±2.22

Data are expressed as mean ± SEM. *$p < 0.01$, **$p < 0.01$, male vs female.

was 23.4 cm. These values were also comparable to the data of community-dwelling elderly in Japan.[28]

We next measured the serum levels of DHEA, DHEA-S, MDA-LDL and hs-CRP in this population. The mean value of DHEA, DHEA-S, MDA-LDL and hs-CRP were 2.08 ng/mL, 777 ng/mL, 147 U/L and 4.98 μg/mL, respectively (Table 3). DHEA-S was higher and MDA-LDL was lower in males than in females. However, there was no statistical difference in DHEA or hs-CRP in males and females. Figure 1 A shows the age-dependent decrease of DHEA-S in this population. DHEA-S and age were negatively correlated (the coefficient was −0.4). DHEA also showed an age-dependent decline in this population, but the coefficient was −0.2 (Fig. 1b). MDA-LDL and hs-CRP did not show age-dependent changes in this population (data not shown).

To determine the association of hs-CRP with the cognitive function in the elderly, we examined the correlation to MMSE, KBD and 'Button scores'. We divided the patients into two groups according to the points of MMSE (cutoff; 24), KBD (cutoff; 12), and Button scores (cutoff; 17). We found that the level of hs-CRP was significantly higher in the patients with lower MMSE and KBD, and higher button scores (Fig. 2a). These differences were significant by multiple regression analysis after adjusting for age and sex. These results indicate the association of hs-CRP with cognitive and functional impairment. However, the level of total cholesterol, high-density cholesterol (HDL-C) or albumin was not statistically different between each group studied (data not shown). Although the level of hs-CRP was also higher in the patients who took longer time to complete 'Get up and go', the difference was not statistically significant. The levels of DHEA, DHEA-S or MDA-LDL

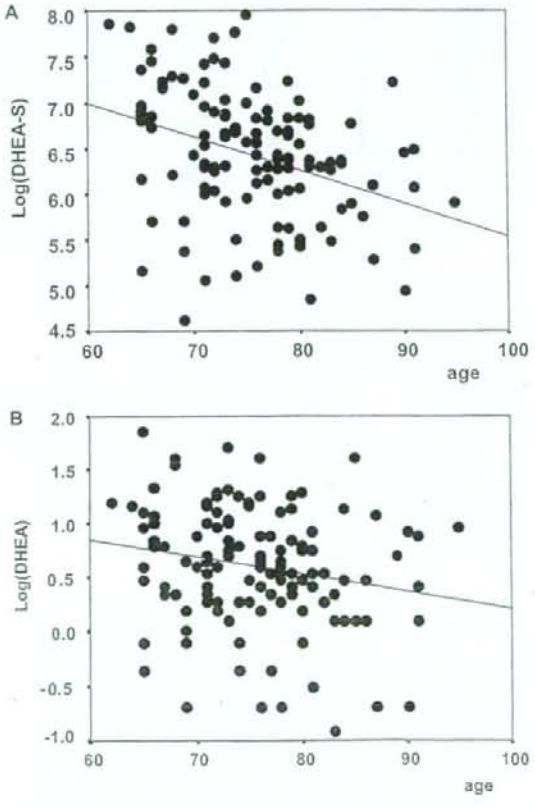

Figure 1 Age-dependent decrease of dehydroepiandrosterone (DHEA)-S and DHEA in elderly patients. Relationship between age and serum levels of (A) DHEA-S or (B) DHEA in the study patients is shown. The Y-axis is shown as natural log of (A) DHEA-S or (B) DHEA.

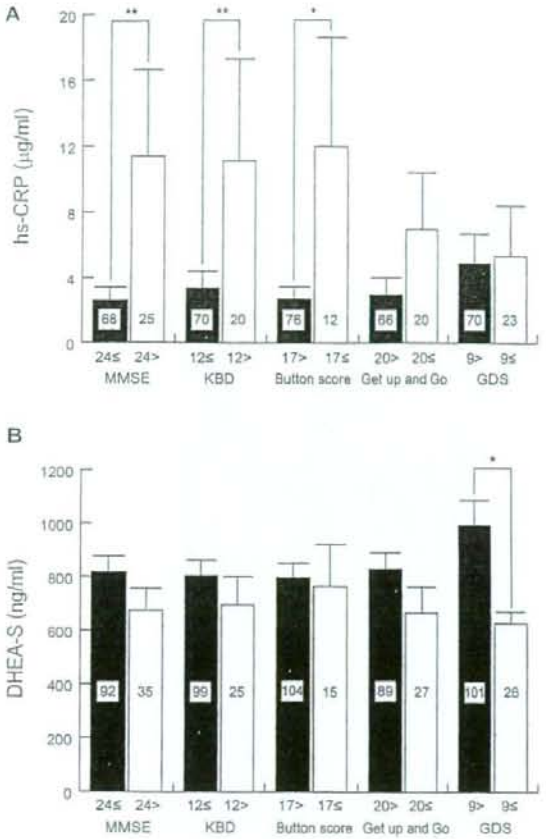

Figure 2 Levels of high-sensitivity C-reactive protein (hs-CRP) and DHEA-S in study patients. (A) Hs-CRP and (B) DHEA-S were measured in patients at the first visit to Kyoto University hospital after informed consent was taken. Patients were divided into two groups according to the level of each test. Patients were divided into two groups according to the score of Mini-Mental State Examination (MMSE); 24 and more, and less than 24, time for Kohs block design (KBD); less than 12 and 12 and more, 'Button scores'; less than 17 and 17 and more, the time required for 'Get up and go'; less than 20 and 20 and more, Geriatric Depression Scale (GDS); less than 9 and 9 and more. Values are the mean ± SEM. Number of the patients in each group is shown in each column. $^{*}P < 0.05$, $^{**}P < 0.01$.

were, however, not associated with these tests (Table 4, Fig. 2b).

In contrast, the levels of DHEA-S were significantly lower in the patients with higher GDS scores (9 or over). These differences were also significant by multiple regression analysis after adjusting for age and sex ($P < 0.05$). In contrast, the other markers, including hs-CRP, were not associated with GDS scores (Fig. 2b).

Among the patients with lower MMSE (less than 24), 52.6% had dementia while only 4.1% had dementia among the patients with normal MMSE (24 or over). As

Table 4 Mean dehydroepiandrosterone (DHEA) and malondialdehyde-low density lipoproteins (MDA-LDL) levels in each group of patients

	MMSE		KBD		'Button score'		'Get up and go'		GDS	
	≤24	> 24	≤12	> 12	≥17	<17	> 20	≤20	> 9	≤9
DHEA (ng/ml)	2.07 ±0.11	2.11 ±0.22	2.11 ±0.11	2.12 ±0.23	2.08 ±0.10	1.98 ±0.16	2.14 ±0.11	1.78 ±0.18	2.10 ±0.11	2.04 ±0.21
MDA-LDL (U/L)	146 ±6.67	150 ±12.0	151 ±7.00	134 ±11.3	150 ±6.54	145 ±17.2	152 ±7.38	141 ±12.0	147 ±6.56	145 ±13.1

Data are expressed as mean ± SEM. MMSE, Mini-Mental State Examination; KBD, Kohs block design; GDS, Geriatric Depression Scale.

a risk factors for stroke, hypertension was found in 26.3% of the patients with lower MMSE, while 32.0% of the patients with normal MMSE had hypertension. Other risk factors, such as diabetes mellitus and hyperlipidemia were found in less than 5% of the patients in both groups. In terms of GDS scores, 37.9% of the patients with high scores (nine or over) were diagnosed with depression, while only 5.4% of the patients with low scores (less than 9) were diagnosed with depression. The incidence of dementia was 20.7% and 15.2% in each group, respectively.

Discussion

In this study we demonstrate that hs-CRP could be a marker to predict the cognitive impairment in elderly patients in outpatient clinic. Our study also indicates that DHEA-S is lower in patients with depressive mood in the elderly. Thus, measuring these markers in the outpatient clinic might be very useful to assess cognitive and functional impairment as well as depressive mood in elderly patients in addition to the assessment by CGA.

Comprehensive Geriatric Assessment is a very effective way to assess cognitive and functional impairment in the elderly and to find geriatric problems to improve their quality of life (QOL). However, most of hospitals have not utilized this assessment at their outpatient clinics because it is time consuming and unprofitable. Therefore, most geriatricians assess inpatients with CGA, which is getting more and more popular in Japan. Studies with outpatient CGA have not been successful in terms of survival so far. Therefore, by utilizing outpatient CGA and serum markers we would be able to select patients with potential risk for the future decline of cognitive functions and to eventually improve survival of frail elderly patients, although Bradly *et al.* indicated that the improvement of mental health may be an appropriate and realistic goal for outpatient CGA.[29]

Findings from epidemiological studies and some small clinical trials that non-steroidal anti-inflammatory drug (NSAID) users have a lower risk of AD, with indications of dose effects, has drawn much interest in inflammatory mechanisms in AD.[30,31] As our data show that the patients with cognitive impairment or potential decline have higher levels of hs-CRP, we might be able to select those patients to treat with NSAID to prevent the progression of cognitive impairment. To rationalize this treatment, we need a larger scale of study to prove whether or not the decline in cognitive function is faster in patients with higher hs-CRP levels.

Plasma DHEA shows a progressive age-related decline in men and women. DHEA and androstenedione have been shown to inhibit IL-6 secretion from human mononuclear cells *in vitro*,[32] suggesting a connection between aging of endocrine and immune systems. DHEA has also been shown to suppress IL-4, IFN-γ and astrocytic TNF-α and IL-6 production.[33,34] Despite its interesting inverse association with IL-6 levels and beneficial effects on senescence and cognition, a recent Cochrane Systematic Review found only limited evidence of an improved sense of well-being with DHEA supplementation.[35] Clinical benefit of DHEA supplementation should wait for other ongoing trials.

Association between DHEA-S levels and degenerative disorders of the nervous system, such as dementia and cognitive decline, have been controversial.[17,36–38] Some reports did not show the association of low serum DHEA-S levels with AD and other forms of cognitive dysfunction,[39,40] while others suggest a role of DHEA-S in depression, dementia and impaired cognitive performances in the elderly.[41,42] Although our study did not show the association of DHEA or DHEA-S with MMSE, KBD, 'Get up and go' or functional reach, a significant association of low DHEA-S with depressive mood was shown in our patient group. Our study is a cross-sectional study and the number of the patients is relatively small. Therefore, a longitudinal study will be necessary to determine whether or not the patients with low DHEA-S have a higher risk for the development of depression and whether or not treatment of those patients with DHEA-S can prevent the development of depression. Since the levels of DHEA-S declined according to age, the age-related increase of depression might be explained by a decrease of sex hormone, such as DHEA-S. In this study, we used 8/9 as cutoff for GDS. We used this cutoff point because it was appropriate in terms of sensitivity and specificity (Wada *et al.* unpubl. data). When we used 5/6 as cutoff for GDS, we found a lower level of DHEA-S in patients with GDS scores of 6 or over, but could not find a statistical significance.

Our data indicate higher incidence of dementia in patients with low MMSE and higher hs-CRP. We also demonstrated higher incidence of depression in patients with higher GDS scores and lower DHEA-S levels in elderly patients with relatively preserved ADL. Risk factors for stroke such as hypertension did not seem to be involved in these markers. With these cross-sectional data in hand, we think that it is important to follow these patients to determine whether or not high levels of hs-CRP results in a decrease in cognitive and functional impairment and whether or not low levels of DHEA-S predicts future depression. If low levels of DHEA-S are associated with the development of depression in the elderly, supplementation of DHEA might be beneficial to improve their QOL. It is also important to determine the cutoff point of these markers to select patients with high risk for cognitive decline or depression. A larger scale of study is necessary to address this issue.

In summary, our study indicates that measuring serum markers such as hs-CRP and DHEA-S would be useful to assess elderly patients along with CGA.

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ORIGINAL ARTICLE

Comprehensive geriatric assessment for community-dwelling elderly in Asia compared with those in Japan: VII. Khon Khen in Thailand

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Objective: To compare the findings of comprehensive geriatric assessment between community-dwelling elderly aged 60 years and older living in Thailand and Japan.

Design: A cross-sectional, interview- and examination-based study.

Setting: The community-dwelling elderly living in rural Thang Kwang villages, in the city Khon Kaen, Khon Kaen province, Thailand and in the town Sonobe, Kyoto, Japan.

Methods: The subjects consisted of 198 and 209 community-dwelling elderly aged 60 years or older in two developmentally different areas in Khon Kaen province in Thailand and 411 community-dwelling elderly aged 65 years or older in Japan, respectively, which 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 anthropometrical and blood chemical examinations were included in the assessment. Using ANOVA and the χ^2 test, the findings of the three groups were compared.

Results: In comparison with Comprehensive Geriatric Assessment (CGA) our findings among communities dwelling in the rural Thang Kwang villages, the city Khon Kaen, Thailand and in the highly-developed city Kyoto, Japan, were that ADL (except social role), QOL (except family relationship), mean systolic blood pressure, serum total and high-density cholesterol levels, hemoglobin concentrations and prevalence of hypertension were lower in the elderly in rural Thang Kwang villages than those in Khon Kaen city or in Kyoto. In contrast, a prevalence of anemia defined by World Health Organization criteria was higher in the elderly in rural Thang Kwang villages or Khon Kaen city than in Kyoto. It is noteworthy that a prevalence of suspected impaired glucose tolerance or diabetes mellitus in Thailand was extraordinarily higher than in Japan, compared to nearby South-Asian countries.

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Conclusion: It is supposed that economical and social development might bring a better CGA and a better nutritional state to Thailand. However, we should pay more attention to over-nutrition, modified lifestyle and appropriate controls for global risk factors in the community-dwelling elderly in this economically developmental country in Asia.

Keywords: activities of daily living (ADL), community-dwelling elderly, comprehensive geriatric assessment, Khon Kaen, quality of life (QOL), Thailand.

Introduction

Asian countries have diverse characteristics in terms of their geographic ecology, population and ethnicity, histories and cultural backgrounds, economical and industrial developments. However, the aging population is now rapidly growing equally in each country in Asia. This seventh paper in a consecutive series of articles dealing with the comparison of comprehensive geriatric assessment between community-dwelling elderly in six Asian countries (i.e. Singapore, Korea, Vietnam, Laos, Indonesia Myanmar)[1–6] and in Japan addresses the elderly in Thailand.

Thailand is one of the most economically developed and noticeable countries in South-east Asia. The gross domestic product (GDP)-per capita is increasing to $US8100 and the GDP-per growth rate is increasing by 6.1% year by year. Thailand is located in central South-east Asia and its total population is 64 865 523 people (November 2004), living in a total of 76 provinces. The rate of population aged 65 years and older was 7.3% in 2004. In 2004, life expectancy in Thailand was a mean age of 71.4 years, or 69.2 years in males and 73.7 years in females.

Regarding ethnicity, the population is 75% Thai, 15% Chinese, and 10% other ethnic groups.[7]

Since 1990, we have carried out a comprehensive assessment of the geriatric functioning of community-dwelling elderly and have provided efficient education to promote a healthy state of the elderly population living in several towns in Japan.[8–21] In the present study, we have applied the common method of comprehensive geriatric assessment (CGA) to the community-dwelling elderly population living in two areas (urban and rural) in Khon Kaen province in Thailand compared with the CGA findings of community-dwelling elderly in Kyoto in Japan.

Methods

Subjects

Our study population consisted of 198 community-dwelling elderly subjects aged 60 years and older (male : female = 92 : 106; mean age: 68.2 years) living in rural Thang Kwang villages, and 209 subjects (male : female = 50 : 159; mean age: 68.7 years) living in the city Khon Kaen, Khon Kaen province, located 440 km north-east of the capital, Bangkok, Thailand (Fig. 1). In both sets, approximately 60% of the elderly subjects were retired. The comparative control subjects consisted of 411 community-dwelling elderly (male : female = 174 : 237; mean age: 71.7 years) living in the town Sonobe, Kyoto, Japan. The geriatric survey for community-dwelling elderly living in Thailand and in Japan was carried out in March 2005 and in April 2003,

Figure 1 Map of Thang Kwang villages, Khon Kaen city in Khon Kaen province in Thailand.

respectively. The rural Thang Kwang villages in Waeng Noi district had a population of 2098 people, 222 of whom were elderly (60 years old or older). We examined 198 of the elderly (89.1% of eligible subjects). Khon Khan city in Khon Khan province had a population of 127 470 people, 10 382 of whom were elderly (60 years old or older; male : female = 4875 : 5507) and we examined 209 elderly subjects who were randomized volunteers (2.0% of eligible subjects). Sonobe, Kyoto had a population of 16 700, 3340 of whom were elderly (65 years or older). We examined 411 of the elderly (12.3% of eligible subjects). The proportion aged 65 years or older in Sonobe was 20.0%. All elderly subjects living in this town were given a self-rating questionnaire by mail, and were then invited to get their health status checked, including blood chemical examination and blood pressure measurement by consultation with a physician at several community houses.

Items of comprehensive geriatric assessment

Items of the CGA included activities of daily living (ADL), screening of depression, quantitative assessing of quality of life (QOL) as well as medical and anthropometrical indicators.

Activities of daily living

For basic ADL assessment, each subject rated his/her independence on seven items (walking, ascending and descending stairs, eating, dressing, going to the toilet, bathing and grooming) as to the help needed, and rated them from 3 to 0 (score 3 = completely independent, score 2 = need some help, score 1 = need much help, score 0 = completely dependent). The items were added together to give scores ranging 0–21, with low scores indicating disability.[10,16,19] The information-related function was defined as scores we summed the scores for four item functions (visual activity, hearing activity, conversation and memory in 1 day) using a rating scale from 0 (cannot at all) to 3 (completely independent) adding together to a score ranging 0–12. For higher level functional capacity, each subject rated his/her independence on the Tokyo Metropolitan Institute of Gerontology (TMIG) index of competence.[22,23] This assessment consists of a 13-item index including three sublevels of competence: (i) instrumental ADL (five items: the ability to use public transport, buy daily necessities, prepare a meal, pay bills, handle banking matters, rated on a yes/no basis); (ii) intellectual ADL (four items: the 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 (iii) social ADL (four items: the ability to visit friends, give advice to relatives and friends who confide in them, visit someone at the hospital and initiate conversation with younger people, rated on a yes/no basis).

Depression and QOL

We screened for depressive symptoms using the English version of the 15-item-Geriatric Depression Scale (GDS-15).[24,25] 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'. QOL 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 satisfaction and subjective happiness.[26–28]

Social, anthropometrical and medical assessments

Living conditions, lifestyle (current exercise, drinking alcohol, smoking and so on), and medical histories (histories of stroke, heart diseases and osteoarthropathy, as well as taking antihypertensive drugs) were also assessed. Blood pressure levels were measured twice in a sitting position by auto-sphygmomanometer (HEM 757, Omron, Japan) and then averaged. Blood chemical analysis (total cholesterol, high-density cholesterol [HDL-C], creatinine, blood sugar, hemoglobin, uric acid) was performed by auto-blood chemical analyzer (SP-4410, 4420, Arkrey, Japan) in the Thailand survey, and was done by a laboratory company (SRL, Tokyo, Japan) in the Kyoto survey. Each blood test was taken in a casual setting (someone in fasting and someone in non-fasting condition) in both Thailand and Japan.

Statistical analysis

Statistical analysis was performed using Stat View version 5 for Macintosh (SAS Institute, Cary, NC, USA). ANOVA 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. Where *P*-values were less than 0.05 by one-factor ANOVA, Fisher's test was performed to compare the scores between the two groups.

Results

Table 1 shows the comparison of baseline characteristics among the elderly subjects living in the Thang Kwang villages and Khon Kaen city in Thailand, and in Sonobe, Kyoto in Japan. There was a significant difference in mean age; the elderly subjects in the Thang Kwang villages (68.2 years) and Khon Kaen city (68.7 years) in Thailand, were significantly younger than

Table 1 Baseline characteristics between the community-dwelling elderly living in Thailand and Japan

	Thang Kwang villages in Thailand ($n = 198$)	Khon Kaen city in Thailand ($n = 209$)	Sonobe, Kyoto in Japan ($n = 411$)	P
Age	68.2 ±7.3*	68.7 ±5.9*	71.7 ±4.8	<0.0001
Male/Female	92/106	50/159	174/237	<0.0001
Marital status				<0.0001
Widowed (%)	30.3	37.8	18.8	
Unmarried (%)	3.0	2.4	0.2	
Divorced (%)	1.0	4.3	0.7	
Lifestyle				
Living (%)				<0.0001
With children or parents	73.7	67.5	53.4	
With spouse only	11.6	12.9	38.2	
Alone	0.5	8.1	7.6	
Work or do gardening every day (%)	57.6	46.4	81.4	<0.0001
Walk and exercise every day (%)	84.3	87.5	45.5	<0.0001
Habits				
Drinking alcohol every day (%)	3.0	2.4	22	<0.0001
Current smoking (%)	14.6	6.7	13.8	<0.0001
Medical				
Taking anti-hypertensive medication (%)	6.6	31.1	31.5	<0.0001
History of stroke (%)	1	3.3	0.5	0.0045
History of heart disease (%)	3	9.2	5.8	<0.0001
History of osteoarthropathy (%)	51.0	34.9	59.4	<0.0001
History of fall (%)	44.9	34.1	12.8	<0.0001

SD, standard deviation. P value based on ANOVA for continuous variables and χ^2 test for categorical variables. *$P < 0.05$ vs Sonobe in Fisher's PLSD.

those in Kyoto (71.7 years old). There were also differences in the male : female ratio among the three populations. The percentage of widows in Khon Kaen city (37.8%) was higher than in the Thang Kwang villages (30.3%) or in Kyoto (18.8%). The percentage of the elderly living with children or parents in the Thang Kwang villages (73.7%) was higher than in Khon Kaen city (67.5%) or in Kyoto (53.4%). The percentage of the elderly living alone in the Thang kwang villages (0.5%) was much lower than in Khon Kaen city (8.1%) or in Kyoto (7.6%). The percentage of the elderly working or gardening everyday in Kyoto (81.4%) was higher than in the Thang Kwang villages (57.6%) or in Khon Kaen city (46.4%). The percentage of the elderly walking or exercising everyday in Kyoto (81.4%) was lower than in the Thang Kwang villages (84.3%) or in Khon Kaen city (87.5%). The percentage of the elderly drinking alcohol everyday was higher in Kyoto (22%) than in the Thang Kwang villages (3.0%) or in Khon Kaen city (2.4%). The percentage of the elderly currently smoking in Khon Kaen city (6.7%) was lower than in the Thang Kwang villages (14.6%) or in Kyoto (13.8%). In a medical situation, the rate of elderly subjects taking antihypertensive medication in Kyoto (31.5%) and in Khon Kaen city (31.1%) was higher than in the Thang Kwang villages (6.6%). The rate of subjects recognizing their apparent history of stroke in Khon Kaen city (3.3%) was higher than in the Thang Kwang villages (1.0%) or in Kyoto (0.5%).The rate of subjects recognizing their apparent history of heart disease in Khon Kaen city (9.2%) was higher than in Kyoto (5.8%) or in the Thang Kwang villages (3.0%). Past history of osteoarthropathy in the elderly subjects in the Thang Kwang villages (34.9%) was lower than in Khon Kaen city (51.0%) or in Kyoto (59.4%). Past history of falls in the elderly subjects in the Thang Kwang villages (44.9%) was higher than in Khon Kaen city (34.1%) or in Kyoto (12.9%).

Table 2 shows the comparison of scores in ADL, GDS-15 score and quantitative QOL among community-dwelling elderly living in the two areas in Thailand and in Japan. There were significant differences in scores of basic ADL, information-related function, instrumental ADL, intellectual ADL, social role and TMIG Index. The mean scores of all ADL except social role were significantly highest in Japanese elderly followed by subjects in Khon Kaen city, and those in the Thang Kwang villages. However, the mean score of social role was not significantly different among the three. The mean score of GDS-15 in elderly subjects in Kyoto were significantly lower than in the Thang Kwang

Table 2 Comparison of activities of daily living (ADL) and quality of life (QOL) among the community-dwelling elderly living in two areas in Thailand and in Japan

	Thang kwang villages in Thailand ($n = 198$)	Khon Kaen City in Thailand ($n = 209$)	Sonobe, Kyoto in Japan ($n = 411$)	*P*
Age	68.2 ±7.3*	68.7 ±5.9*	71.7 ±4.8	<0.0001
ADL				
Scores of basic ADL (0–21)	20.5 ±1.1*	20.5 ±0.7*	20.8 ±0.7	<0.0001
% of independence of basic ADL	63.6	52.1	89.2	<0.0001
Information-related function (0–12)	10.9 ±1.2*	10.9 ±1.3*	11.7 ±0.8	<0.0001
% of independence of information-related function	37.9	59.5	81.1	<0.0001
Scores of instrumental ADL (0–5)	3.9 ±1.4*†	4.3 ±1.0*	4.9 ±0.5	<0.0001
% of independence of instrumental ADL	47	53.6	92.6	<0.0001
Scores of intellectual ADL (0–4)	2.2 ±1.4*†	2.9 ±1.2*	3.8 ±0.6	<0.0001
% of independence of intellectual ADL	23.2	43.5	80.2	<0.0001
Scores of social role (0–4)	3.5 ±0.8	3.6 ±0.8	3.5 ±1.0	NS
% of independence of social ADL	68.7	71.8	69.2	<0.0001
Scores of TMIG (0–13)	9.7 ±2.8*†	10.7 ±2.3*	12.1 ±1.6	<0.0001
% of independence of TMIG	21.5	29.7	58.3	<0.0001
Depression				
Scores of Geriatric Depression Scale (0–15)	4.1 ±3.0*	4.2 ±3.2*	3.4 ±3.2	<0.0001
% of GDS ≥ 6	27.3	27.3	22.7	NS
% of GDS ≥ 10	7	9.6	5.1	NS
QOL (0–100)				
Subjective health	54.9 ±24.1*†	61.0 ±20.9*	67.2 ±17.8	<0.0001
Family relationship	84.1 ±15.9*†	75.6 ±21.9*	81.5 ±16.9	<0.0001
Friend relationship	77.2 ±19.9	72.9 ±19.7*	79.8 ±16.7	<0.0001
Financial satisfaction	49.9 ±22.9*†	51.6 ±22.3	64.0 ±21.5	<0.0001
Subjective happiness	68.2 ±25.8*†	61.0 ±24.7*	73.2 ±17.6	<0.0001

SD, standard deviation. *P* value based on ANOVA for continuous variables and χ^2 test for categorical variables. *$P < 0.05$ vs Sonobe in Fisher's PLSD. †$P < 0.05$ between Khon Kaen city and Thang kwang villages in Fisher's PLSD.

villages or in Khon Kaen city. But the prevalence of mild depression (GDS ≥ 6) and severe depression (GDS ≥ 10) in elderly subjects in Khon Kaen city were higher than in the Thang Kwang villages or in Kyoto. All scores in QOL items, including subjective sense of health, financial satisfaction and subjective happiness except in family relationships, were higher in Japanese elderly subjects than in Thailand's elderly. The scores in QOL items of family relationship in elderly subjects in the Thang Kwang villages were significantly higher than in Khon Kaen city or Kyoto.

Table 3 shows the comparison of anthropometrical indicators among three elderly groups. Body mass index (BMI) was significantly highest in the elderly subjects in Khon Kaen city followed by the ones in the Thang Kwang villages and ones in Kyoto. Mean systolic blood pressure was significantly highest in elderly subjects in Kyoto, followed by those in Khon Kaen city and the Thang Kwang villages. Diastolic blood pressure was not significantly different in elderly subjects among the three elderly groups. The prevalence of hypertension defined as systolic pressure ≥140 mmHg or diastolic pressure ≥90 mmHg based on the measurements of casual blood pressure was also highest in Kyoto (49.9%), followed by the Thang Kwang villages (39.4%) and Khon Kaen city (34.5%). The ratio of those taking antihypertensive drugs in the elderly in Kyoto and Khon Kaen city were higher than in the Thang Kwang villages. Therefore, prevalence of hypertension was highest in Kyoto (59.9%), followed by Khon Kaen city (43.4%) and the Thang Kwang villages (40.5%) according to World Health Organization (WHO) criteria for hypertension (systolic pressure ≥140 mmHg or diastolic pressure ≥90 mmHg or taking hypertensive drugs).

Table 4 shows the comparison of blood chemical findings among the three elderly groups. Both levels of serum total cholesterol and high-density cholesterol (HDL-C) were higher in Japanese subjects than Thailand's subjects. Atherogenic index, blood sugar levels, uric acid and glutamic-pyruvic transaminase were higher in Thailand's elderly than in Japanese elderly. Glucose intolerance was defined as casual blood glucose

Table 3 Comparison of anthropometrical indicators and blood pressure measurement among the community-dwelling elderly in Thailand and Japan

	Thang Kwang villages in Thailand ($n = 198$)	Khon Kaen City in Thailand ($n = 209$)	Sonobe, Kyoto in Japan ($n = 411$)	P
Anthropometrical				
Height (mean ±SD) (cm)	155.3 ±8.0	154.5 ±7.2	154.2 ±8.6	NS
Weight (mean ±SD)(kg)	54.9 ±11.8†	58.7 ±11.7*	53.9 ±8.7	<0.0001
Body mass index (mean ±SD)	22.7 ±4.2†	24.5 ±4.3*	22.6 ±2.7	<0.0001
Blood pressure				
Systolic blood pressure (mean ±SD) (mmHg)	134.8 ±22.9*	131.9 ±20.3*	140.6 ±20.3	<0.0001
Diastolic blood pressure (mean ±SD) (mmHg)	78.0 ±13.0	77.4 ±12.8	78.3 ±10.6	NS
Prevalence of hypertension (%)(SBP = 140 orDBP ≥ 90)	39.4	34.5	49.9	0.0005
Prevalence of hypertension (%)(WHO criteria)	41.9	49.3	61.3	<0.0001

SD, standard deviation. P value based on ANOVA for continuous variables and χ^2 test for categorical variables. *$P < 0.05$ vs Sonobe in Fisher's PLSD. †$P < 0.05$ between Khon Kaen city and Thang kwang villages in Fisher's PLSD.

Table 4 Comparison of blood chemical findings among the community-dwelling elderly in Thailand and Japan

	Thang Kwang villages in Thailand ($n = 198$)	Khon Kaen City in Thailand ($n = 209$)	Sonobe, Kyoto in Japan ($n = 411$)	P
Total cholesterol (mean ±SD) (mg/dl)	180.0 ±41.6*†	189.1 ±37.7*	209.5 ±35.0	<0.0001
HDL-cholesterol (mean ±SD)(mg/dl)	33.4 ±9.3*†	27.2 ±10.3*	65.8 ±17.5	<0.0001
Atherogenic index (mean ±SD)	4.8 ±2.1*†	7.0 ±3.6*	2.4 ±0.9	<0.0001
Creatinine (mean ±SD)(mg/dl)	1.2 ±1.1*†	1.0 ±0.7	0.9 ±0.2	<0.0001
Uric acid (mean ±SD)(mg/dl)	6.2 ±2.0*	6.5 ±5.5*	5.0 ±1.3	<0.0001
GOT (mean ±SD)(IU/L)	28.8 ±14.1*	26.6 ±14.4	25.5 ±16.2	<0.0001
GPT (mean ±SD) (IU/L)	27.9 ±17.6*	25.5 ±16.0*	20.8 ±22.3	0.041
Casual blood sugar (mean ±SD) (mg/dl)	142.4 ±73.7*	151.7 ±85.8*	99.3 ±21.1	<0.0001
% of glucose intolerance (BS ≥ 140mg/dl)	34.3	38.3	4.4	<0.0001
Hemoglobin (mean ±SD) (g/dl)	11.6 ±1.3*†	12.1 ±1.3*	13.6 ±1.4	<0.0001
% of anemia (men: Hb < 13g/dl, women: Hb < 12g/dl)	77	59.4	14.2	<0.0001

SD, standard deviation. P value based on ANOVA for continuous variables and χ^2 test for categorical variables. *$P < 0.05$ vs Sonobe in Fisher's PLSD. †$P < 0.05$ between Khon Kaen city and Thang kwang villages in Fisher's PLSD.

levels ≥140 mg/dL. Glucose intolerance in this study was much higher in Thailand elderly than in Japanese elderly. Hemoglobin concentration was highest in Japanese elderly, followed by subjects in Khon Kaen city and those in the Thang Kwang villages. According to the WHO criteria of anemia (men: Hb < 13 g/dL; women: Hb < 12 g/dL), percentage of anemia in the elderly in the Thang Kwang villages (77.0%) and Khon Kaen city (59.4%) were extraordinarily higher than in Kyoto (14.2%).

Discussion

In comparison between community-dwelling elderly in Thailand and in Japan, scores in all ADL items except social role and in quantitative QOL except family relationship were higher in Japanese elderly subjects than in Thailand's elderly subjects. Especially, the ratios of independence in basic, information-related instrumental, intellectual ADL and TMIG Index were lower in Thailand elderly subjects than in Japanese elderly subjects. These higher functions may be more historically influenced by differences in economic status, infrastructure and educational level between the two countries than basic ADL, because instrumental ADL was associated with economic activities, such as public transportation and shopping. Intellectual activities depend on the levels of literacy of old people.

However, it is noteworthy that it is the family relationship scores in quantitative QOL were higher in the

elderly in the Thang Kwang villages than in Khon Kaen city in Thailand or in Japan, partly because over 70% of the elderly in the Thang Kwang villages lived with children or parents. Kanchanakitsaku reported that senior citizens with children in Thailand were affected by levels of satisfaction including their life support.[29]

In the present study, it was shown that the mean score of GDS-15 in elderly subjects in Kyoto was significantly lower than those in Thailand, so the elderly subjects in Thailand might be depressive. However, the prevalence of mild and severe depression was not significantly different between the two countries. Analysis of other contributing factors to this factor in Thai elderly, such as detailed spiritual or mental factors, remain to be determined due to the limitation of this study.

In blood chemical examinations, elderly people in Thailand had higher atherogenic index scores, and lower total cholesterol, HDL-C levels and hemoglobin concentrations than Japanese subjects, probably due to the differences in caloric intake of nutrition, lifestyles, prevalence of infectious diseases, especially the parasites in Khon Kaen district, or other environmental, economic and hereditary factors and rapid progress in changing their life styles. Mean blood pressure measurements and prevalence of hypertension were higher in Japanese elderly subjects than in Thailand's elderly subjects. But the ratio of prevalence of hypertension (WHO criteria) and the ratio of those taking antihypertensive medication were greatly different between the elderly subjects in Khon Kaen city and in the Thang Kwang villages, probably because hypertensive elderly in the rural Thang Kwang villages leave untreated similarly to Indonesia.[4] And there was a significant difference in mean casual blood sugar levels between the two countries. In this study, the ratio of glucose intolerance in Thai elderly was much higher than in Japanese elderly, which might indicate their own poor recognition and loose control of impaired glucose tolerance or diabetes mellitus among community-dwelling elderly in Thailand and the habitual high-carbohydrate diets similar to Lao PDR in comparison to nearby Asian countries.[3–6]

Also of particular note are the comparative CGA findings among the three elderly populations. CGA findings in the elderly in urban Khon Kaen city lay between the CGA findings of the rural Thang Kwang villages and those in highly developed Kyoto in ADL scores except social roles, serum cholesterol levels, hemoglobin concentrations and prevalence of anemia and hypertension defined based on the WHO criteria. It is also important to note that BMI, atherogenic index and glucose intolerance in Khon Kaen city were much higher among the three elderly groups. This might be because the differences in levels of caloric intake of nutrition, better socioeconomic status and rapid progress in changing their life styles. Otherwise the energy from cereal, per capita protein and fat supply were almost the same as in WHO's 2000 regional report and the Ministry of Health, Labour and Welfare's 2003 report in Japan.[30,31] Thailand's non-elderly population had a higher caloric intake (2330 kcal/per capita energy supply) than non-elderly Japanese adults (2138 kcal/per capita energy supply). Therefore, it is supposed that economic and social development might bring an over-nutritional state to Thailand.

From the comparison of CGA findings of the community-dwelling elderly among the three different areas, it is clear that appropriate controls for global burden risk factors in the community-dwelling elderly population are needed. In a cross-sectional comparison of CGA findings of the elderly between the rural Thang Kwang villages and urban Khon Kaen city in Thailand, we might be able to find the longitudinal process that Japan has traced during the past several decades. This international comparative study may have some limitations including translated interview questionnaires on ADL or QOL. Although there are differences in history, culture, habits and medical development between Thailand and Japan, this preliminary international cross-sectional comparison of CGA for community-dwelling elderly may contribute in clarifying a fragment of the actual health situation of elderly Thailand subjects compared with that of elderly Japanese subjects.

Conclusion

In comparison of CGA findings among community-dwelling elderly in the rural Thang Kwang villages, urban Khon Kaen city in Thailand and in highly developed Kyoto in Japan, ADL except social role, QOL except family relationship, mean systolic blood pressure, serum total and HDL-C levels, hemoglobin concentrations and prevalence of hypertension were lower in the elderly in the Thang Kwang villages than in Khon Kaen city or Kyoto. In contrast, prevalence of anemia defined by WHO criteria was higher in the elderly in the Thang Kwang villages or urban Khon Kaen city, the same as close south-Asian countries around Thailand have higher levels than in Kyoto. It is noteworthy that a prevalence of suspected impaired glucose tolerance or diabetes mellitus in Thailand was extraordinarily higher than in Japan, compared to nearby South Asian countries.[3–6] It is supposed that economic and social development might bring a better CGA and a better nutritional state to Thailand. However, we should pay more attention to over-nutrition, modified lifestyle and appropriate controls for global risk factors in the community-dwelling elderly in this economically developmental country in Asia.

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ORIGINAL ARTICLE

Comprehensive Geriatric Assessment for outpatients is important for the detection of functional disabilities and depressive symptoms associated with sensory impairment as well as for the screening of cognitive impairment

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Background: The Comprehensive Geriatric Assessment (CGA) for inpatients is very useful to improve the outcomes of elderly patients. However, most of the elderly patients are provided their care by general practitioners in primary care settings without comprehensive assessment. Concise and practical assessment is necessary for the detection of geriatric problems and sufficient care in the outpatient clinic.

Methods: The CGA was introduced in the outpatient clinic for elderly people in Kyoto University Hospital and 309 patients participated in the study, where cognitive impairment, depressive symptoms, activities of daily living, and self-reported hearing and visual impairment were assessed.

Results: In the patients studied, the most prevalent chief complaint was memory loss (19%). Among the patients complaining of memory loss, two-thirds of the patients were diagnosed as cognitively impaired by the Mini-Mental State Examination. Multiple logistic regression analysis showed that hearing and visual impairment was significantly associated with functional disabilities and that hearing impairment was significantly associated with depressive symptoms.

Conclusions: Thus, the CGA for outpatients is useful for the detection of functional disabilities and depressive symptoms by asking about their sensory impairment as well as for the detection of cognitive impairment in elderly patients. Therefore, concise and practical assessment should be introduced in the primary care settings to improve the quality of life of elderly people.

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