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Taizo Wada^{**}

Abstract

Health is vital for sustainable development, and obviously, there is no health without mental health. 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 2529 community-dwelling elderly subjects aged 60 years or older living in five rural Asian towns (Myanmar 213, Indonesia: 411, 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, 764 participants (30.2%) appeared to have depression (Myanmar 22.2% Indonesia: 33.8%, Japan: 30.3%). Subjects with depression had significantly lower scores for both ADL and QOL than those without depression in all the three countries. In all the three countries, 22.2–33.8% of community-dwelling elderly subjects had screening-based depression, which was commonly associated with both lower quantitative ADL and lower QOL.

1. Introduction

Over the course of the 20th century, world population increased from 1.7 billion to 6 billion. Meanwhile, population ageing is rapidly growing worldwide, not only in developed countries but also in developing countries. This phenomenon is expected to continue in the 21st century and could be a major threat to sustainable development. Challenges of aging in developing countries are increasing burdens of chronic disease, pensions and income security for older people. Especially, health is vital for sustainable development, and obviously, there is no health without mental health.

Depressive illness is a major threat not only to the mental health and well-being of elderly patients but also a matter of concern to any caregiver treating such patients and local community. Depressive illness is projected to be the second-leading cause of disability worldwide in 2020 (Murray and Lopez, 1997). Thirty-four studies have reported prevalence of depression in the community-dwelling elderly, but with widely

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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 variation 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 not only as regards physical condition, but also emotional condition, social activity, and 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 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 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 for community-dwelling elderly persons.

2. Methods

2.1. Sample size

A total of 2529 Asian subjects aged 60 years or older living in three Asian countries (one town in Myanmar, two towns in Indonesia, and one town in Japan) were studied between June 2002 and November 2004. All four towns were rural. Standardized questionnaires were used throughout. In Myanmar and Indonesia, 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 osteoarthropathies).

2.1.1. Myanmar

The study population consisted 213 elderly subjects living in downtown Maubin city (male : female, 119 : 94; mean age, 71.2 ± 7.4 years). Subjects examined were 35.9% in downtown Maubin of eligible subjects who were randomly sampled. This research was carried out in November 2004 at Maubin township in the Irrawaddy delta, 80 km south-east from Yangon. Downtown Maubin have populations of 49 400 and the proportion aged 60 years or older was estimated at the average level for Myanmar (5.8%). Most people in downtown Maubin were employed as merchants, shopkeepers, government workers, as well as farmers. In Myanmar there are several minorities throughout the country, but 82.1% of the study population was Burmese followed by Kayin (12.4%), Indian (1.4%), Chinese (1.1%), Chin (0.6%) and Shan (0.3%). All the elderly living in those areas were informed that they could have a health check-up including questionnaire, blood chemical examination, blood pressure measurement and consultation with a physician. Finally, 213 elderly subjects participated in our survey after giving informed consent. All subjects were interviewed by eight medical students from Yangon Medical Institute I under the guidance of Japanese researchers and physicians.

2.1.2. 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.

2.1.3. Japan

S town is situated in Kyoto, 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 ± 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 minutes to complete and score. Using a cut-point of 6 or more, the GDS-15 has a sensitivity of 88% to 92% and specificity of 62% to 81%, compared with results of structured clinical interviews for 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 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 140mmHg 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 4 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 3 sublevels of competence: (1) instrumental self-maintenance (5 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 (4 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 (4 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 there among the three countries. 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. Figures 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 22.0% of those in Myanmar, 33.8% of those in Indonesia, and 30.3% of those in Japan, while with a cut-point of 9/10 the corresponding percentages were 5.3%, 11.7%, and 10.7%. Although the proportion of subjects with basic ADL independence was lowest in

Myanmar, 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).

4. Discussion

The prevalence of depression as determined using a cut-point of 5/6 for the GDS-15 were 22.0% in Myanmar, 33.8% in Indonesia, and 30.3% in Japan. The reported prevalence of screening-based depression using the GDS-15 in other countries have varied (14% in US study, with cut-point of 5/6 (Whooley et al., 2000); 40.2% in Estonia, with cut-point of 5/6 (Saks et al., 2002); and 8.8% in Taiwan, with 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 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 Myanmar 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 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 22.0-33.8% 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. In considering our strategies for sustainable development in developing countries, we should pay more attention to depression in the elderly populations as it could be a heavy burden for human health and the community.

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

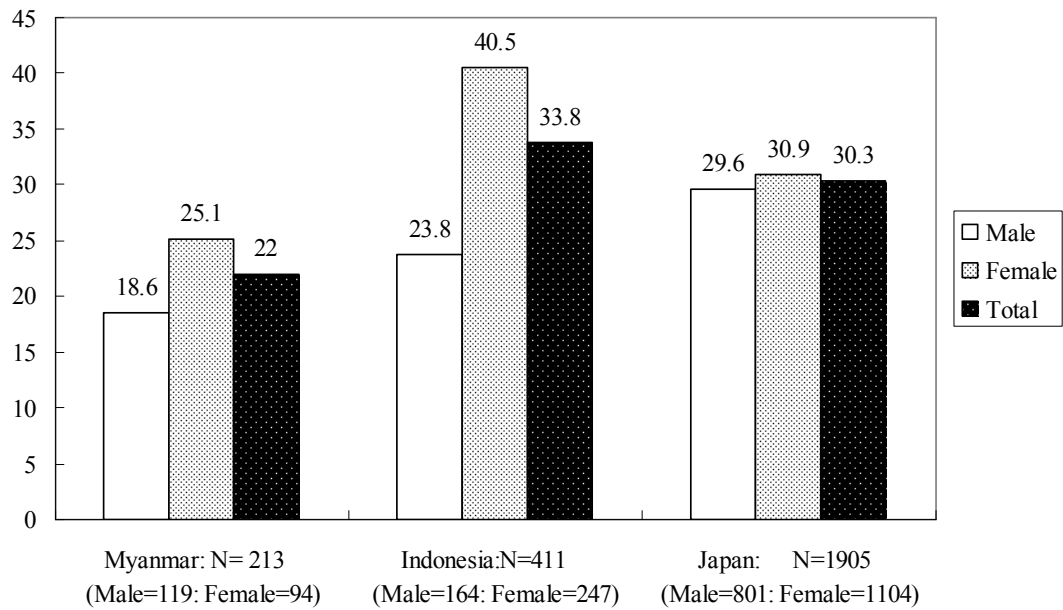


Fig. 2. Prevalence of depression defined as a 15-item GDS score of 10 or more.
(%)

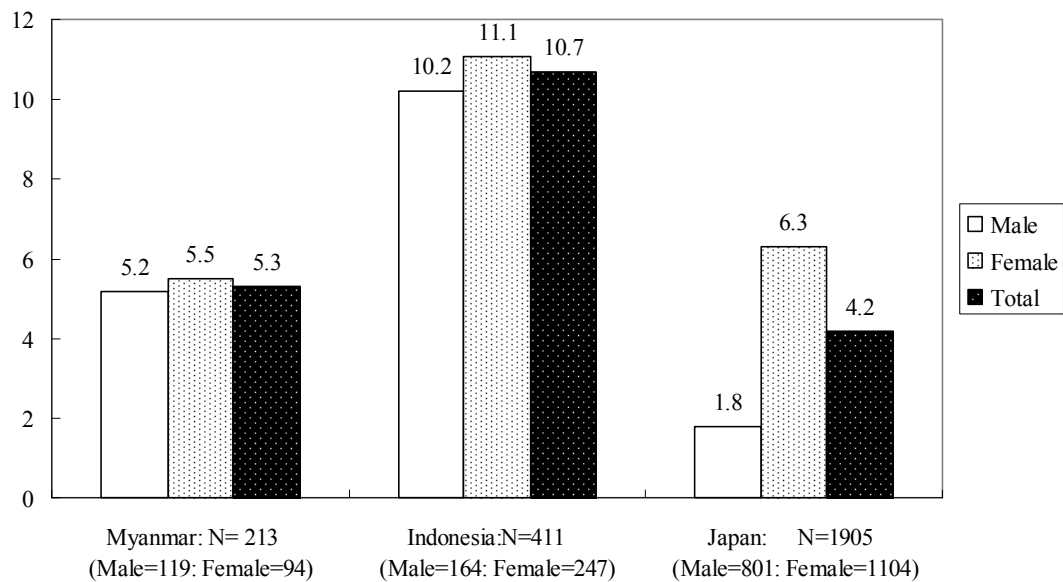


Table 1. Baseline characteristics of 2529 elderly subjects in three Asian countries

	M town, Myanmar (N = 213)	K and S towns, Indonesia (N = 411)	S town, Japan (N = 1905)
Eligible subjects (%)	35.9	44.8	57
Age, mean \pm S.D.	71.2 \pm 7.4	72.3 \pm 7.3	74.0 \pm 6.6
Female (%)	45	59.9	58
Lifestyle			
Partner alive (%)	53.8	53.5	66.6
Living alone (%)	13.9	31.3	10
Alcohol consumption (%)	6.6	0.7	35.9
Non-smoker (%)	55.2	55	78.8
Working everyday (%)	56	53.9	65.5
Average monthly income, (USD) a	Not available	Not available	1244
GDP/capita (International \$)	1800	3121	25901
Total health expenditure/capita	N.A	84	2009
Life expectancy at birth, male/female	54.2/57.9	64.4/67.4	77.9/84.7
Medical			
Hypertension (%) b	42.6	76.1	41.2
Current use of antihypertensives (%)	13.9	Not available	44.5
Past medical history of heart disease (%)	11.4	4.4	20.3
History of stroke (%)	15.7	1.2	5
History of osteoarthropathy (%)	26.2	22.5	42.7
History of fall (%)	Not available	Not available	18.9
ADL			
Basic ADL score (range, 0–21)	19.7 \pm 2.7	20.0 \pm 12.6	19.9 \pm 3.2
Tokyo Metropolitan Institute of Gerontology index (range 0–13)	9.1 \pm 4.0	6.7 \pm 3.2	10.7 \pm 3.3
GDS-15, mean \pm S.D.	3.8 \pm 3.3	4.9 \pm 3.3	4.1 \pm 3.6

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 total of 991 elderly individuals from S town of Japan volunteered the information.

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

Four hundred eleven elderly from K and S towns, Indonesia, and 213 elderly from M towns, Myanmar, were measured for blood pressure in sitting position.

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

Characteristic	M town, Myanmar		P-value	K and S town,		P-value	S town, Japan		P-value
	With depression* (n = 47) GDS-15 ≥ 6	Without depression# (n = 166) GDS-15 ≤ 5		With depression* (n = 139) GDS-15 ≥ 6	Without depression (n = 272) GDS-15 ≤ 5		With Depression* (n = 578) GDS-15 ≥ 6	Without Depression# (n = 1327) GDS-15 ≤ 5	
Age	72.1 ± 8.1	71.0 ± 7.2	0.4	72.2 ± 8.1	72.7 ± 7.0	0.7	73.7 ± 6.8	74.1 ± 6.5	0.2
ADL score									
Basic ADL (range 0–21)	18.8 ± 3.6	20.0 ± 2.3	0.01	19.2 ± 3.2	20.6 ± 1.1	<0.001	18.9 ± 4.3	20.6 ± 1.8	<0.001
Self-maintenance (range 0–5)	2.5 ± 1.9	3.8 ± 1.7	<0.001	2.2 ± 1.5	3.0 ± 1.3	<0.001	3.7 ± 1.8	4.6 ± 1.0	<0.001
Intellectual activity (range 0–4)	1.4 ± 1.5	2.6 ± 1.6	<0.001	0.5 ± 0.9	1.2 ± 1.5	<0.001	2.9 ± 1.3	3.6 ± 0.8	<0.001
Social role (range 0–4)	2.6 ± 1.5	3.5 ± 0.9	<0.001	2.6 ± 1.3	3.3 ± 1.1	<0.001	2.4 ± 1.5	3.4 ± 1.0	<0.001
TMIG index (range 0–13)	6.4 ± 4.0	9.9 ± 3.7	<0.001	5.3 ± 3.0	7.5 ± 3.1	<0.001	9.0 ± 4.0	11.6 ± 2.3	<0.001
QOL score (range 0–100)									
Sense of subjective health	49.4 ± 18.9	57.7 ± 19.8	0.01	38.6 ± 29.7	60.5 ± 23.8	<0.001	51.5 ± 19.0	69.4 ± 17.0	<0.001
Relationship with family	56.9 ± 18.9	72.6 ± 21.2	<0.001	70.4 ± 29.1	85.5 ± 15.8	<0.001	69.3 ± 22.3	84.4 ± 14.9	<0.001
Relationship with friends	55.1 ± 18.6	66.3 ± 19.9	<0.001	71.9 ± 23.5	82.3 ± 18.1	<0.001	67.3 ± 20.8	81.9 ± 15.7	<0.001
Financial satisfaction	35.5 ± 17.6	47.3 ± 17.8	<0.001	29.0 ± 22.6	49.8 ± 23.1	<0.001	49.7 ± 25.0	65.7 ± 22.3	<0.001
Subjective happiness	44.9 ± 22.8	64.8 ± 19.6	<0.001	47.5 ± 29.0	75.2 ± 21.6	<0.001	57.0 ± 20.4	77.3 ± 15.5	<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. Myanmar—Female: (*) 69.2%, (#) 51.9%; *p* = 0.01. TMIG: Tokyo Metropolitan Institute of Gerontology; ADL: activities of daily living; QOL: quality of life.