

RESEARCH PAPER

Factors associated with life satisfaction in Japanese stroke outpatients

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Abstract

Purpose. To measure life satisfaction in Japanese stroke outpatients and randomly-sampled community residents and to investigate variables influencing their life satisfaction.

Method. Data on the demographic and clinical profiles, Satisfaction in Daily Life (SDL), other measurements, were obtained from 869 stroke outpatients (552 males, 317 females) and 748 community-dwelling elderly (360 males, 388 females), aged 55 years and older. Differences in categorical variables and continuous variables were tested by chi-square test and ANCOVA with age as the covariate, respectively.

Results. The 11 SDL items were subjected to a factor analysis, which extracted two factors. Factor 1 (F1), labeled as 'satisfaction with one's own abilities', included satisfaction with housework, self-care, gait, physical health, hobby and leisure, social intercourse and mental health. Factor 2 (F2), 'satisfaction with external factors', included satisfaction with partner/family relationship, economic state and social security, and house facilities. Both F1 and F2 scores were significantly lower for stroke outpatients ($M=19.7$ and 10.9 , respectively) than for community-dwelling elderly ($M=28.2$ and 12.0 , respectively) ($p < 0.001$). Living conditions were significantly associated with F2, but not with F1. Males living alone scored lowest on F2 than the others for both groups. Among stroke outpatients, both F1 and F2 scores differed significantly by the type of hemiparesis and the severity of aphasia.

Conclusions. SDL of stroke outpatients, which was lower than community-dwelling elderly, differed by the type of hemiparesis, the severity of aphasia, and living conditions. The effects of living conditions might vary with gender.

Keywords: Stroke, life satisfaction, satisfaction in daily life, principal component analysis

Introduction

Although medical treatments for stroke have been progressing, stroke is still one of the major causes of death in most industrialized countries [1–3] and impairments and disabilities after stroke persist in many cases. After acute medical and/or neurosurgical treatments for stroke, rehabilitative treatments play a major role at the subacute and chronic stages, including improvement in hemiplegia, independence in activities of daily living (ADL), encouragement to participate in social activities, and improvement in quality of life (QOL). Activity limitations and participation restrictions, as well as life satisfaction, which constitute a subjective perception of the individual and is a subjective domain of QOL, are very important in community rehabilitation programs and home-care and home-help services.

Previous studies have revealed that life satisfaction of post-stroke patients was influenced by race [4,5], gender [6,7], marital status [1,7], living conditions [8], aphasia [4,9,10], social support [3,11,12], and returning to work [14]. However, the influence of these factors on patients' satisfaction remains controversial due to inconsistent findings.

As to the effect of aphasia, for example, Christensen and Anderson [9] reported that patients with aphasia showed lower satisfaction than those without aphasia in the central region of the USA, whereas Ross and Wertz [10] showed that life satisfaction might be independent of aphasia in the southwestern region of the USA. As to gender, marital status, and living arrangements, Jaracz [6] observed that life satisfaction of stroke patients was not significantly correlated with their gender, marital status, or living arrangements in Poland, whereas

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Kauhanen [7] found that various aspects of QOL, including life satisfaction, were associated with marital status in Finland. Thus, it seems reasonable to hypothesize that the association of these factors with life satisfaction may differ across nationality and race/ethnicity or culture.

On the other hand, the sample sizes of the previous studies were relatively small, i.e., mostly less than 100 patients. Because life satisfaction is a subjective perception of the individual, it may fluctuate easily. Thus, a larger number of subjects are needed to obtain a stable result concerning life satisfaction. As far as we know, however, only one previous report has demonstrated the life satisfaction and its related factors among post-stroke outpatients with more than 800 subjects. Wyller et al. [12] reported that the subjective well-being (SWB) of 1,417 post-stroke patients in Norway, which may be regarded as interchangeable with life satisfaction mentioned here, was considerably lower than that of the counter-age community residents. They also described its relationship with female gender, older age, good general and mental health, and a firm social network. A body of large-scale investigations is necessary to obtain a consensus about life satisfaction of patients living at home with disabilities, such as stroke, subacute myelo-optico-neuropathy [13] and others.

The aims of the present study are to measure the life satisfaction of a large number of stroke patients living at home and community-dwelling elderly in Japan, and to disclose the features and influencing factors of their life satisfaction. We paid particular attention to the influence of living condition, which might play a supportive role for the outpatients after stroke, and to the influence of the time duration after onset of stroke as well. In the future, we intend to investigate the SDL of patients with subacute myelo-optico-neuropathy.

Methods

Stroke outpatients

All of Japan was divided into 10 regions, and one to three hospitals were selected from each region based on the following criteria: (i) the hospital has first-grade rehabilitative facilities in the legal medical insurance system, (ii) a board-certified doctor of rehabilitation medicine organizes the department of rehabilitation medicine, and (iii) the hospital serves the region. Finally, 16 hospitals were chosen from all over the country, and were asked to join the collaborative study. The board-certified doctor in each hospital was asked to select a maximum of 80 consecutive stroke outpatients according to our common inclusion criteria: patients (i) are 55 years of age or older, (ii) have a history of stroke confirmed

with computed tomography or magnetic resonance image, (iii) have already received stroke rehabilitation in the hospital, (iv) have no dementia or extremely severe aphasia, or who could not understand the questionnaire, (v) are able to respond to a self-rating questionnaire, and (vi) agree to join this study.

The SDL and other questionnaires were administered to stroke outpatients by these doctors. The doctors evaluated the severity of aphasia into 4 degrees: no aphasia, mild aphasia, moderate aphasia and severe aphasia. Stroke outpatients with aphasia were interviewed by trained speech therapists who were allowed to be proxy for patients with aphasia who were unable to complete the questionnaires by themselves, while the other outpatients and community residents responded to each item by themselves.

Although the doctors sent us anonymous data on 1,070 stroke outpatients from 16 hospitals nationwide, only 869 participated in the study (Table I), as the remaining 201 patients were in long-term hospital or nursing home care, or had missing values. Of the 869 patients, 59.0% had cerebral infarction, 35.1% had cerebral hemorrhage, 4.3% subarachnoid hemorrhage (SAH), 0.9% others, and 0.7% unknown; and the duration from onset was 5.3 ± 4.8 years (mean \pm standard deviation).

Community-dwelling elderly

One thousand community-dwelling elderly were randomly selected from the register of electors of Yahatanishi Ward, Kitakyushu City, Japan. Kitakyushu City, a large city located in a rural province of Japan, was designated by the national government as a model city for treating the elderly. Yahatanishi Ward is a residential area of the city, and its elderly residents were regarded as representative of aged persons in Japan. First, we sent a letter of request and questionnaires to 1,000 elderly people, asking them to participate in the survey; 780 agreed to take part in it. One hundred forty-nine did not respond, 46 refused to join the survey, and 25 had died or moved. Members of our survey team then called at the subjects' homes, and collected 748 questionnaires (Table I), as 32 of the 780 were excluded because they were in a hospital or nursing home, or less than 55 years old. Details regarding the data collection have been described elsewhere [15]. Of the 748 community-dwelling elderly, 451 (205 males, 246 females) received some medical treatments and rehabilitation services.

Instruments

The questionnaires consisted of a subject's profile sheet, the Satisfaction in Daily Life (SDL) [16],

Table I. Characteristics of stroke outpatients and community-dwelling elderly.

	Stroke outpatients (<i>n</i> = 869)				Community-dwelling elderly (<i>n</i> = 748)			
	Male		Female		Male		Female	
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)
Subjects	552	(63.5)	317	(36.5)	360	(48.1)	388	(51.9)
Age (years old)								
mean (SD)	67.3	(7.5)	69.2	(8.6)	66.5	(7.6)	67.7	(7.8)
range	55–91		55–96		55–89		55–90	
Living conditions								
Alone	23	(4.2)	27	(8.5)	16	(4.4)	69	(17.8)
With spouse	261	(47.3)	103	(32.5)	213	(59.2)	148	(38.1)
Spouse and/or other family members	266	(48.2)	185	(58.4)	131	(36.4)	170	(43.8)
Type of hemiparesis								
Without hemiparesis	57	(10.3)	42	(13.2)				
Right hemiparesis	222	(40.2)	129	(40.7)				
Left hemiparesis	248	(44.9)	135	(42.6)				
Bilateral hemiparesis	25	(4.5)	11	(3.4)				
Severity of aphasia								
Without aphasia	252	(45.7)	194	(61.2)				
Mild aphasia	199	(36.1)	89	(28.1)				
Moderate-severe aphasia	100	(18.1)	34	(10.7)				

other measurements, such as the Short Form-36 (SF-36) [21,22], the Self-Rating Barthel Index [15], and the Self-Rating Frenchay Activity Index [23]. Details regarding these measurements without SDL have been described elsewhere [15].

The SDL, a simple measurement of subjective QOL referring to the Life Satisfaction Measure by Viitanen et al. [16], was used to assess the life satisfaction of stroke outpatients. The SDL was initially developed to evaluate the life satisfaction of sub-acute myelo-optico-neuropathy [17], and has been widely applied to stroke patients [18] and hemophiliacs [19]. The SDL consisted of 11 items, i.e., physical health, mental health, self-care, gait, housework, house facilities, partner and family relationships, hobby and leisure activities, social intercourse, economic state and social security, and having a job [20]. Each item was rated along a 5-point rating scale from 'dissatisfied' (rated as 1) through to 'satisfied' (rated as 5); thus, giving a possible range of SDL scores from 11 (the lowest state of satisfaction) to 55 (the highest state of satisfaction).

Living conditions were asked by a single item with 5 response alternatives: 'living alone', 'living with spouse', 'living with spouse and other family member(s)', 'living with child (daughter or son), their spouses, and grandchild(ren) etc.', and 'others'.

Data analysis

A principal component analysis was performed to: (i) clarify the dimensionality of the SDL which might cover various aspects of the life satisfaction, and (ii)

construct some summary variables rather than individual items. The latter might prevent increased possibilities of type I error due to repeat comparisons using 11 items. After the promax rotation, items showing loadings exceeding 0.50 were regarded as salient on a component. Differences in categorical variables and continuous variables were tested by a chi-square test and ANCOVA with age as the covariate. Statistical analyses were conducted using the SPSS 11.0 J.

Results

Dimensionality of the SDL scale

A total of 1,617 data responses on individual SDL items were factor analyzed. According to an initial unrotated solution, the eigenvalues of the first two factors exceeded 1.0. These factors were then subjected to the promax rotation. Table II shows the factor loadings of individual SDL items.

The SDL consisted of two factors, and one item was quite independent to other items. Factor 1 (F1) included satisfaction with housework, self-care, gait, physical health, hobby and leisure, social intercourse, and mental health. These seven items seemed to represent several aspects of 'one's own abilities'. Factor 2 (F2) included satisfaction with partner/family relationship, economic state and social security, and house facilities. These three items were related to the satisfaction with 'external factors' of the respondents. One item, satisfaction with having a job, showed extremely lower communality estimate (0.16) as compared to any other items' counterpart

Table II. Promax rotated factor loadings of 11 items of satisfaction in daily life.

Items of satisfaction	Factor 1: Satisfaction with One's Own Abilities	Factor 2: Satisfaction with External Factors
Housework	0.97	-0.16
Self-care	0.95	-0.12
Gait	0.89	-0.07
Physical health	0.70	0.13
Hobby/leisure	0.67	0.15
Social intercourse	0.62	0.18
Mental health	0.57	0.30
Partner/family relationship	-0.14	0.85
Economic state and social security	-0.05	0.75
House facilities	0.20	0.65
Having a job	0.16	0.28
Interfactor correlation	.55	

Bold-faced values: factor loadings ≥ 0.50 .

(>0.53), and had no salient loadings on either factor. Two scale scores were calculated based on the factor structure, excluding that item. Cronbach's α 's were 0.91 and 0.66 for F1 and F2, respectively.

Differences in life satisfaction according to the history of stroke and gender

Total SDL scores were significantly lower for stroke outpatients (entire 33.3; males 32.7, females 34.2) than for community-dwelling elderly (entire 43.3; males 43.7, females 42.9) ($p < 0.01$). However, the SDL involved two components (Table II), and one relatively independent item as mentioned above. Therefore, we decided to use these two factors separately in the subsequent analyses rather than the total SDL score.

Figure 1a depicts the mean scores of F1, 'satisfaction with one's own abilities' by gender and subject characteristics (stroke outpatients vs community-dwelling elderly). F1 scores were significantly lower for the stroke outpatients ($M = 19.7$, $SE = 0.23$) than for the community-dwelling elderly ($M = 28.2$, $SE = 0.24$) ($F = 644.7$, $p < 0.001$). Also, a significant interaction with gender was observed ($F = 6.7$, $p < 0.01$). Among the stroke outpatients, males ($M = 19.1$, $SE = 0.28$) showed lower scores than females ($M = 20.2$, $SE = 0.37$), but among the community-dwelling elderly, females ($M = 27.9$, $SE = 0.33$) showed lower scores than males ($M = 28.4$, $SE = 0.35$).

As displayed in Figure 1b, the mean scores of F2, 'satisfaction with external factors', were also significantly lower for the stroke outpatients ($M = 10.9$, $SE = 0.09$) than for the community-dwelling elderly ($M = 12.0$, $SE = 0.14$) ($F = 66.6$, $p < 0.001$), while

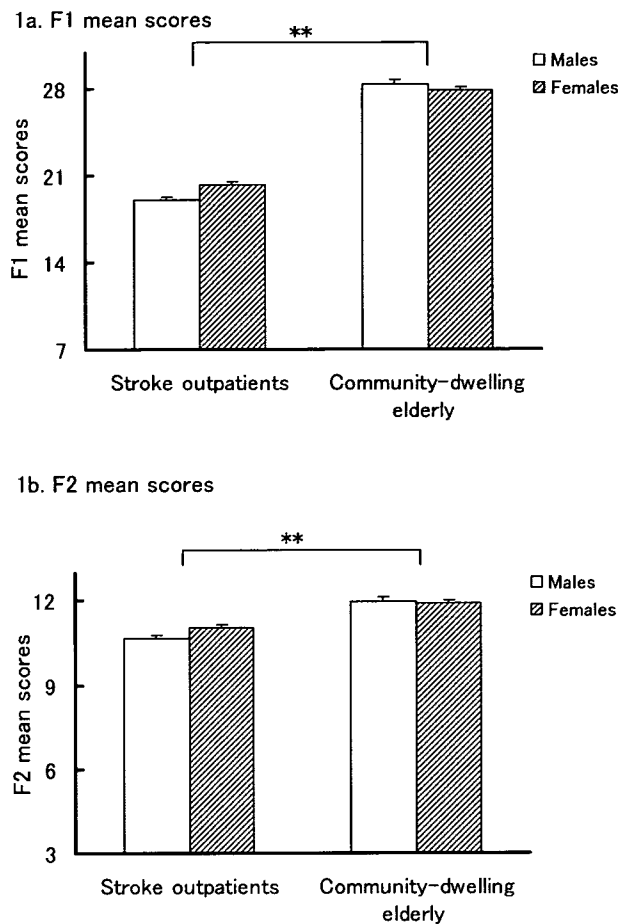


Figure 1. Comparison of F1 and F2 mean scores with stroke outpatients and community-dwelling elderly. Both scores (Figure 1a and 1b) were significantly lower for stroke outpatients than for community-dwelling elderly ($F = 644.7$ for F1, $F = 66.6$ for F2, both $p < 0.001$). $**p < 0.01$, by ANCOVA.

the interaction with gender was marginal ($F = 2.9$, $p < 0.09$). Gender difference was not observed in F1 and F2 scores.

Differences in life satisfaction of stroke outpatients and community-dwelling elderly according to living conditions

Of the 5 categories of living condition, the category of 'living with my children (daughters or sons), their spouses, and grandchild(ren) etc.' was combined with another category of 'living with spouse and other family members' because of the fewer number of stroke outpatients in the former category. In addition, 5 subjects who responded to 'others' in their living conditions were omitted in the subsequent analyses. Then the differences in life satisfaction according to living conditions were examined by ANCOVA, with gender and their interaction, controlling for the effect of age. The analysis was conducted separately for stroke outpatients and community-dwelling elderly.

Among the stroke outpatients, although the main effect of living conditions and its interaction with gender were not significant on F1 scores, a significant main effect of living conditions ($F=3.6$, $p < 0.05$) on F2 scores was observed. As displayed in Figure 2a, F2 scores were comparable between genders living with a spouse, and the scores of females did not differ between those who were living with a spouse and those who were living alone. Thus, the significant difference according to living conditions observed here might be attributable to the lower F2 scores for males who were living alone.

Among the community-dwelling elderly, similar to the stroke outpatients, although living conditions had no significant effects on F1 scores, its main effect on F2 scores was significant ($F=13.7$, $p < 0.001$) and its interaction with gender was marginal ($F=2.9$,

$p < 0.06$): i.e., as displayed in Figure 2b, F2 scores were comparable for both genders who were living with a spouse or living with a spouse and other family members, but the scores were lower for those who were living alone, particularly for males.

Differences in life satisfaction of stroke outpatients according to clinical features

F1 scores varied significantly by the type of hemiparesis ($F=9.4$, $p < 0.001$) and the severity of aphasia ($F=6.1$, $p < 0.01$), while gender and any other possible interactions were not significant (Figure 3). Further inspection by Bonferroni post-hoc test indicated that F1 scores were significantly higher for the stroke outpatients without hemiparesis ($M=23.6$, $SE=0.97$) than for those who had right hemiparesis ($M=19.1$, $SE=0.42$), left hemiparesis ($M=17.4$, $SE=0.64$), and bilateral hemiparesis ($M=18.4$, $SE=1.57$). Also, F1 scores significantly differed between those without aphasia ($M=21.6$, $SE=0.58$) and those with moderate-severe aphasia ($M=17.8$, $SE=0.94$), while F1 scores of those with mild aphasia ($M=19.5$, $SE=1.01$) did not differ among any of these groups.

The similar analysis on F2 scores yielded significant main effects of the types of hemiparesis ($F=2.95$, $p < 0.05$), the severity of aphasia ($F=7.5$, $p < 0.01$), and significant gender X aphasia interaction ($F=3.2$, $p < .05$). Bonferroni post-hoc test indicated that F2 scores differed significantly between those without hemiparesis ($M=11.4$, $SE=0.38$) and those with left hemiparesis ($M=10.1$, $SE=0.25$), while other comparisons, including those with right hemiparesis ($M=10.7$, $SE=0.17$) and bilateral hemiparesis ($M=10.5$, $SE=0.62$), was not significant. The significant gender X aphasia interaction indicated that the effect of aphasia on F2 scores differed by gender.

As displayed in Figure 4a and 4b, F2 scores of males seemed comparable across the three levels of aphasia (no, mild, and moderate-severe), while F2 scores of females were slightly higher than those of males at no aphasia and mild aphasia conditions, but considerably lower than males at the moderate-severe aphasia condition. Further analysis by gender provided supportive results that no significant main effect was observed for males, but both types of hemiparesis ($F=2.8$, $p < 0.05$) and the severity of aphasia ($F=8.3$, $p < 0.001$) showed significant main effects for females. In particular, the effect of aphasia was crucial for the female outpatients, if they suffered from hemiparesis.

The time after onset of stroke, which might have some influence on life satisfaction for the stroke outpatients, showed no association with either F1 or F2 scores.

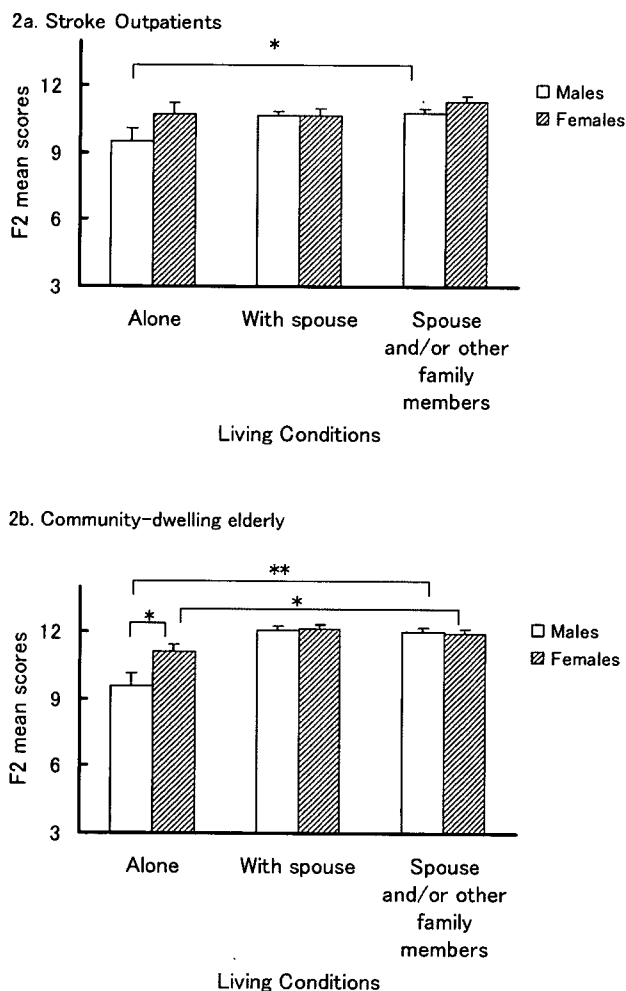


Figure 2. F2 mean scores by living conditions. For stroke outpatients (Figure 2a), living conditions showed a significant main effect on F2 scores ($F=3.6$, $p < 0.05$). For community-dwelling elderly (Figure 2b), living conditions showed a significant main effect ($F=13.7$, $p < 0.001$) and a marginal interaction effect with gender ($F=2.9$, $p < 0.06$) on F2 scores. * $p < 0.05$, by ANCOVA.

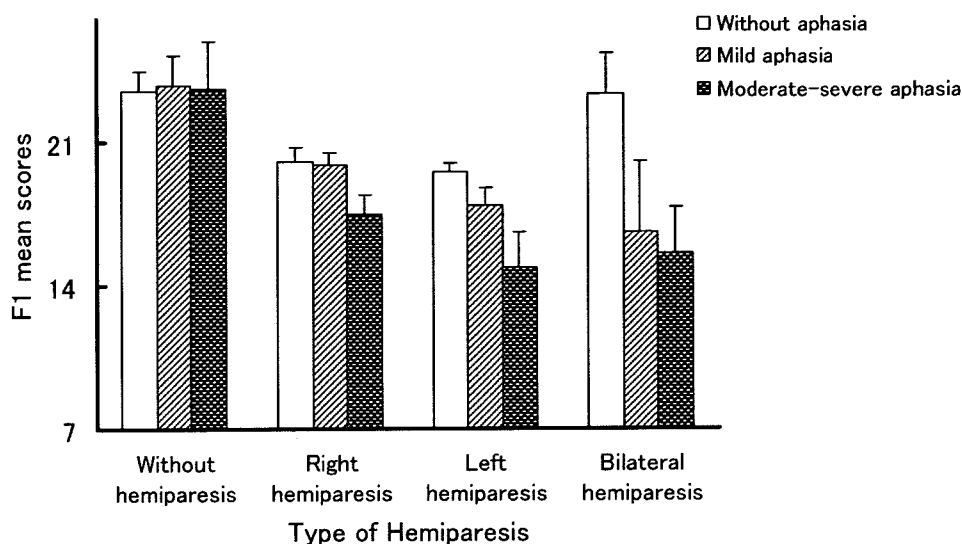


Figure 3. F1 mean scores by type of hemiparesis and severity of aphasia for stroke outpatients. F1 mean scores of types of hemiparesis are shown in without aphasia, mild aphasia and moderate-severe aphasia. F1 mean scores varied significantly by the type of hemiparesis ($F = 9.4$, $p < 0.001$) and the severity of aphasia ($F = 6.1$, $p < 0.01$), while gender and any other possible interactions were not significant.

Discussion

In a sample of 869 post-stroke outpatients living at home and 748 community-dwelling elderly randomly sampled in Yahatanishi Ward, Kitakyushu City, Japan, we found that: (i) life satisfaction could be assessed by two different but correlated constructs, (ii) life satisfaction differed significantly between stroke outpatients and community-dwelling elderly, and (iii) life satisfaction among stroke outpatients varied according to their living conditions in general. As far as we know, no previous research, except for one study in Norway [12], has investigated the life satisfaction and/or QOL of hundreds of stroke patients living at home, with simultaneous reference to their clinical diagnoses and assessments.

Exploratory factor analysis revealed that the SDL consisted of two factors (Table II). Factor 1 reflected 'satisfaction with several aspects of one's own abilities'. Factor 2 was related to 'satisfaction with external factors'. These two components regarding life satisfaction were significantly lower for the stroke outpatients than for the community-dwelling elderly (Figures 1a, 1b). In comparison between the stroke outpatients and the community-dwelling elderly, both similarity and dissimilarity were observed in living conditions related to higher or lower 'satisfaction with external factors' (Factor 2) (Figures 2a, 2b), although their 'satisfaction with own ability' (Factor 1) was not associated with living conditions.

The similarity was found for males: (a) males who were 'living alone' showed the lowest 'satisfaction with external factors'; (b) the satisfaction levels were comparable between males who were 'living with

spouse' and males who were living with spouse and/or other family'. On the contrary, females showed a different feature between the two groups: although 'satisfaction with external factors' was independent of living conditions among female stroke outpatients, 'living with spouse and/or other family' might appear the most satisfying condition and 'living alone' was the least satisfying condition (post-hoc test, $p < 0.05$) among female community-dwelling elderly. A Post-hoc test further revealed that male community-dwelling elderly who were 'living alone' showed significantly lower F2 scores than their female counterparts ($p < 0.05$). That is, 'satisfaction with external factors' could be influenced by living conditions for males, but not particularly so for females.

It might be suggested that males who were 'living alone' tended to have less communication with others and thus to be more isolated than males who were living with others. Social support may, therefore, be needed particularly for male post-stroke patients who are living alone. There have been several researches on the effects of social support on post-stroke patients and their caregivers. Wyller et al. [12] found that a firm social network was related to higher life satisfaction in 1,417 stroke patients in Norway. Some other studies, although the sample sizes were not necessarily sufficient, have also demonstrated that social support is an important determinant for life satisfaction of stroke outpatients living in the community [3,11,26–29]. Gottlieb et al. [11] reported the direct effect of social support on QOL in Israel, and Åström et al. [29] found that social disintegration was associated with reduction in life satisfaction in stroke patients in Sweden.

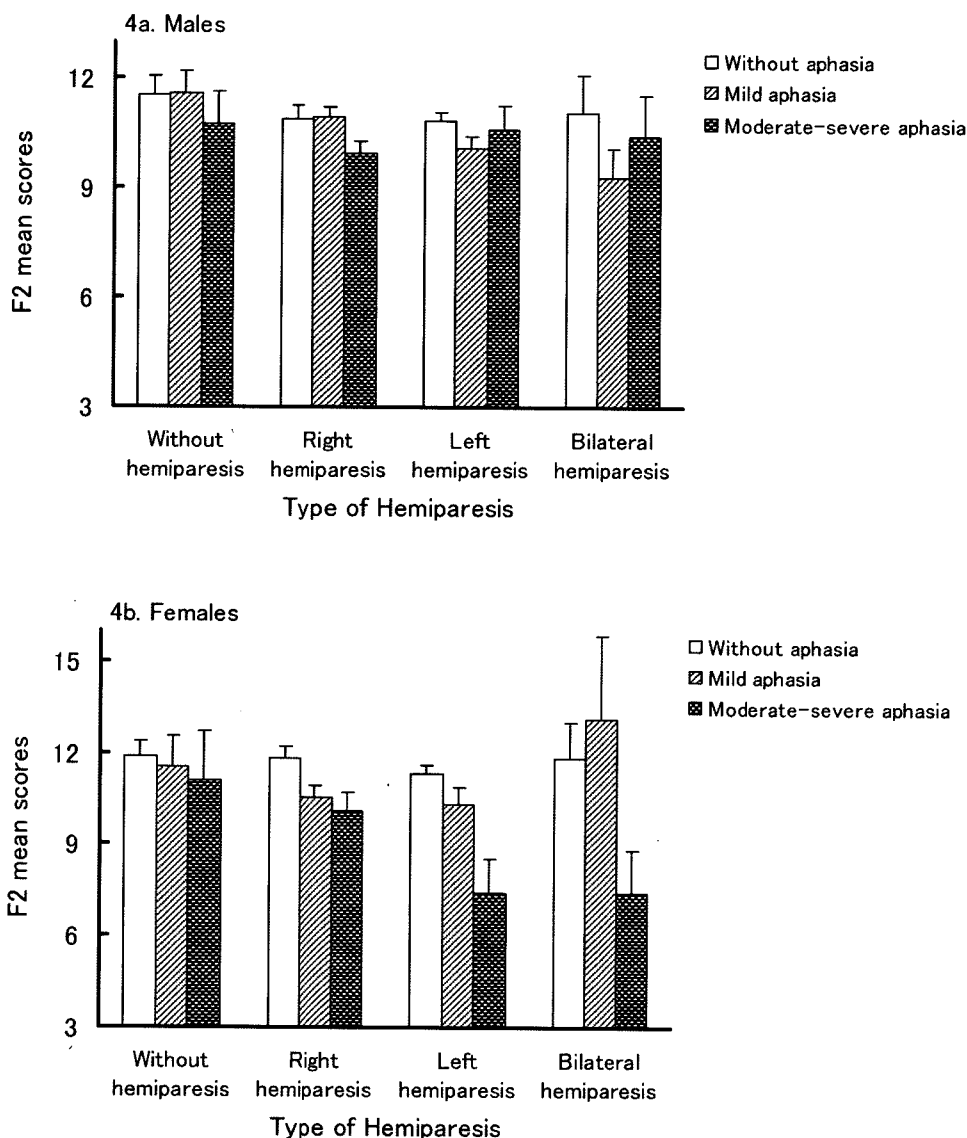


Figure 4. F2 mean scores by type of hemiparesis and severity of aphasia for stroke outpatients. F2 mean scores of males seemed comparable across the three levels of aphasia (no, mild, and moderate-severe) in figure 4a, while F2 scores of females were slightly higher than those of males at no aphasia and mild aphasia conditions in figure 4b, but considerably lower than males at the moderate-severe aphasia condition ($F = 8.3, p < 0.001$).

On the other hand, Clarke et al. [27] noted that social support might act as a moderator of the effects of disability on well-being in Canada. Kauhanen [7], in Finland, found that married patients coped less well in terms of mental health than unmarried patients, because of overprotective and over-caring spouses and noted that the support for caregivers was important for the success of stroke rehabilitation. In the present study, although the direct and indirect effects of social support could not be tested, lower 'satisfaction with external factors' scores for male stroke outpatients who were 'living alone' might suggest the importance of social support for them.

One of the clinical phenomena for post-stroke patients is depression. Post-stroke depression

occurs in about 40% of patients [24], and clinical severity in stroke is related to severe post-stroke depression [25]. Because of such psychological impairment, many patients might be likely to show reduced enthusiasm for continuing rehabilitation treatment. If their spouses and/or family members do not notice this common phenomenon, such patients may be regarded as lazy, and then feel isolated due to the lack of sympathy from family members. Glass et al. [26] and Glass and Maddox [28] demonstrated that a high level of social support was associated with faster and more extensive recovery of functional status after stroke, based on a longitudinal observation of ADL among stroke patients. Social support may have such a desirable influence.

There is no doubt that both types of hemiparesis and the severity of aphasia have a larger impact on 'satisfaction with own ability' (Factor 1) of stroke outpatients (Figure 3). Following the significant gender X aphasia interaction on 'satisfaction with external factors' (Factor 2), detail analyses conducted separately by gender indicated that significant findings on these clinical features were peculiar for females (Figure 4b), but not for males (Figure 4a). Lack of communication might make post-stroke patients feel alone and depressed [9], suggesting that the adverse impact of aphasia might be stronger for females. Although communication is an important factor for males and females, a component of communication influencing life satisfaction might be different between genders. Females may be more likely to seek verbal communication, but males may be more likely to seek any care/help for their daily life.

In conclusion, life satisfaction of Japanese stroke outpatients was influenced not only by clinical features (hemiparesis and aphasia), but also by their living conditions. We discussed several reasons, such as family factors and social support, explaining why 'living alone' was the least satisfactory condition, particularly among male stroke outpatients. We did not, however, research the reason why living conditions influence life satisfaction of stroke outpatients in this study. More details about daily activities, living conditions and the needs of stroke outpatients should be investigated in a future study.

There exist several strategies in rehabilitation medicine for enhancing the life satisfaction of stroke outpatients. It seems desirable that rehabilitation staff should provide general education for family members of stroke patients so that they might understand the physical and mental problems after stroke, and facilitate manifold social support with adequate timing and/or sufficient quantity [28].

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