ORIGINAL CONTRIBUTION

Self-rated Health as a Predictor of Active Life in the Community Elderly

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The present study aims at showing the association of self-rated health with a long active life based on a 7-year longitudinal study of the community elderly.

Baseline survey was carried out at home by interviewers in 1983. Ten hundred and twenty-four subjects who were independent in activity of daily living (ADL) at baseline, were followed-up in 1990. Those who were completely independent for every item of ADL at the follow-up were regarded as being in active life. Inactive life was defined as status changed into dependence in any item of ADL, admission to institution or deceased, at the follow-up.

In 1990, 62.4% of men and 60.4% of women were defined to be in active life. Percentage with active life was the highest in the good self-rated health, followed by fair and poor in both sexes. A significantly direct relationship of the self-rated health to the active life was observed after controlling for age, education, spouse, drinking, smoking, physician visits, history of stroke using a logistic model. The present study shows that self-rated health is a useful predictor of active life. J Epidemiol, 1995; 5 : 11-15.

self-rated health, active life, community elderly, longitudinal study

Previous studies on self-rated health have demonstrated that subjective health assessment could be a valid and cost effective substitute for objective health assessment1-2). It is also known to be closely related to quality of life as assessed by life satisfaction and morale3). Therefore, self-rated health may provide a useful measurement of successful aging in the elderly.

Most people wish to live a long active life, and fear being dependent in later life. Studies concerning predictors for mortality or physical disability have often been done among the community elderly4-8). However, factors associated with extending active life, which means complete independence in activities of daily living, has not been thoroughly investigated. Identification of factors influencing active life is important for improving the quality of life for the elderly.

The present study aims at showing the association of self-rated health with a long active life based on a 7-year longitudinal study of the community elderly.

SUBJECTS AND METHODS

The study area, the town of Yuwa in Akita Prefecture, is a rural community located in the northern part of Japan. In 1983 it had a population of about 9,000, of whom 13.9 percent were elderly. Subjects were recruited from elderly adults living at home, aged 65 years and over at the baseline survey in 1983. All residents (n=1,235) of that age group were regarded as eligible.

The survey was carried out at home by trained interviewers. Eleven hundred and forty two people (92.5%) participated in the baseline survey. Out of the 1,142

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Table 1. Subjects of the present study

|                                           | Men          | Women        | Total         |
|------------------------------------------|--------------|--------------|---------------|
| Baseline survey                          | 435 (100.0)  | 589 (100.0)  | 1,024 (100.0) |
| Follow-up survey                         |              |              |               |
| Responded to follow-up                   | 293 (67.4)   | 406 (68.9)   | 699 (68.3)    |
| Admission to hospital or residential care| 14 (3.2)     | 33 (5.6)     | 47 (4.6)      |
| Deceased                                 | 116 (26.7)   | 117 (19.9)   | 233 (22.7)    |
| Refused to follow-up*                    | 7 (1.6)      | 11 (1.9)     | 18 (1.8)      |
| Moved out of the town*                   | 5 (1.1)      | 22 (3.7)     | 27 (2.6)      |

Subjects refused or moved out were excluded from the analysis.

Table 2 shows percentages for independence in each category of ADL at the follow-up survey. Subjects maintaining independence for each item of ADL were found to be from 93.9% to 96.6% in men, and from 88.7% to 97.5% in women. There was a significant sex difference for independence in walking. Percentage for independence of eating, toileting, bathing, and dressing did not differ between sexes.

The relationship of self-rated health to active life was tested using a logistic model. Seven control variables investigated at the baseline survey, age, education, spouse, drinking, smoking, physician visit, and history of stroke were entered into the model with self-rated health. Self-rated health and some control variables varied markedly between men and women, and analysis was therefore conducted separately for men and women.

Results

Table 2 shows percentages for independence in each category of ADL at the follow-up survey. Subjects maintaining independence for each item of ADL were found to be from 93.9% to 96.6% in men, and from 88.7% to 97.5% in women. There was a significant sex difference for independence in walking. Percentage for independence of eating, toileting, bathing, and dressing did not differ between sexes.

Distribution of active life and inactive life at the follow-up survey is shown in Table 3. By our definition, 62.4% of men and 60.4% of women were defined to be in active life at the follow-up. Although men were more likely to have active life than women, the sex difference was not significant. There was also little difference in active life by sex in both age groups, 65 to 74, and 75 and over.

Table 4 shows distribution of self-rated health at the baseline. Data of self-rated health in 15 subjects were missing at the baseline. The good category was observed in 12.9% of men and 10.8% of women in all age groups. On the other hand, the poor category was 12.7% for men and 20.7% for women in all age groups. Men were more likely to report better health than women (p<0.01). This sex difference was also significant in the age group of 65 to 74 years (p<0.01).

Figure 1 shows the percentage with active life according to level of self-rated health at the baseline. Percentage with active life was the highest in the good category,
followed by fair and poor in both sexes. These relationships of self-rated health to active life were significant when tested by Chi-square.

Next, an investigation of influences on active life according to self-rated health while controlling for other confounding factors was examined by multivariate logistic regression. Table 5 shows regression coefficient(β), relative odds, and 95% confidence interval. Self-rated health was transformed into two dummy variables: one dummy variable scored 0 for poor and 1 for good, while the other dummy variables scored 0 for poor and 1 for fair. Even controlling for other confounding variables, self-rated health displayed a significant correlation with active life in both men and women. Those with good self-rated health were more likely to have active life in 3.57 times of men and in 4.11 times of women than those with poor self-rated health. Those with fair self-rated health were likely to have active life in 2.36 times of men and 2.23 times of women than those with poor self-rated health. In addition to self-rated health in men, age (75 and over), current smoking, and physician visits revealed significantly inverse correlations to active life. Further, current drinking in-
Table 5. Multivariate logistic regression analysis of active life for self-rated health and other variables

| Variables          | categories | Men               | Women              |
|-------------------|------------|-------------------|--------------------|
|                   |            | **β**             | **Relative Odds (95%CI)** | **β**             | **Relative Odds (95%CI)** |
| self-rated health | good/poor  | 1.27**            | 3.57 (1.39-9.11)   | 1.41**            | 4.11 (1.91-8.78)          |
|                   | fair/poor  | 0.86*             | 1.36 (1.21-4.62)   | 0.80**            | 2.23 (1.39-3.55)          |
| Age               | 75+/65-74  | -1.68**           | 0.18 (0.11-0.31)   | -1.49**           | 0.23 (0.15-0.34)          |
| Education*        | high/low   | 0.72              | 2.04 (0.89-4.76)   | -0.58             | 0.56 (0.21-1.51)          |
| Spouse            | yes/no     | 0.47              | 1.60 (0.84-3.03)   | 0.33              | 1.39 (0.93-2.09)          |
| Drinking          | current/no, ex- | 0.48* | 1.61 (1.01-2.59)   | 0.05              | 1.05 (0.64-1.72)          |
| Smoking           | current/no, ex- | -0.51* | 0.60 (0.37-0.97)   | -1.01             | 0.37 (0.09-1.43)          |
| Physician visits  | yes/no     | -0.76*            | 0.47 (0.46-0.85)   | 0.22              | 1.25 (0.76-2.03)          |
| History of stroke | yes/no     | -0.45             | 0.64 (0.31-1.30)   | -0.17             | 0.84 (0.34-2.11)          |

*p<0.05, **p<0.01

* Education; high=higher than primary school; low=primary school graduate of lower

Indicated a significantly direct correlation in men. In terms of variables other than self-rated health for women, only age (75 and over) was of significance.

**DISCUSSION**

There has been considerable research into factors of longevity, however epidemiological research into factors pertaining to a long active life for the elderly is in its infancy. Katz et al.10) proposed the concept “active life expectancy”, meaning “the duration of functional well-being”, as an index for measuring group levels of health. For the elderly, maintaining functional well-being is essential for quality of life. The aim of the present study was to clarify, by means of a seven year longitudinal study, factors contributing to long active life of the elderly. Based on the definition of active life by Katz et al., our study investigated living a long active life by maintaining complete independence for each item of basic DDL at home.

There has hitherto been much research by longitudinal surveys into factors influencing decline of physical functioning, however, almost all of this research was based on follow-up data obtained from living respondents7-9). Since the purpose of the present study was to investigate factors for “a long active life”, deceased persons were also included in the follow-up data. The primary object of the present study was to clarify the degree of contribution of self-rated health to maintaining active life. It is well-known that self-rated health presents a good reflection of objective health1,11). Self-rated health is further recognized as a useful predictor of mortality1,12,13). The present authors, too, have reported that even controlling for objective health status by follow-up survey of elderly subjects after a seven year duration, self-rated health had a significant correlation to mortality9). However, research into whether self-rated health is useful as a predictor of long active life for the elderly is just beginning to be undertaken.

The present paper is based on a longitudinal survey of elderly subjects over a seven-year period, in which we investigated the degree of correlation between self-rated health at the time of baseline interview and subsequent active life. Results for both men and women showed that, even controlling for the effect of age, education, spouse, drinking, smoking, physician visits, and history of stroke, self-rated health was an important predictor for active life.

Roos and Havens14) demonstrated the significance of self-rated health as a predictor of successful aging, based on their longitudinal study undertaken between 1971-1981 of 3573 subjects aged from 65 to 84 years. Their research indicated that self-rated health at baseline interview could be an even stronger predictor of successful aging when other confounding factors were controlled. While their definition of successful aging is different from our definition of active life in that their physical function represents a higher level than our ADL and also includes remaining mentally alert, their report supports the results of the present study.

Self-rated health is reported to be not only a useful indicator of objective health, but closely related to life satisfaction15-17), subjective well-being18), and social activity19). These factors latent in self-rated health may contribute to the significance of self-rated health as a predictor of a long active life for the elderly.

The present study investigated the effects on active life of such health behavior as drinking and smoking with the relation of self-rated health, and found that, among men, current drinking had a positive effect, while current smoking had a negative effect. Other studies with concepts similar to the present study’s active life, Pinsky’s et al.18) “good function”, LaCroix’s et al.19) “maintaining mobility”, Guralnik’s et al.20) “healthy aging”, have investigated the effects of drinking and smoking, too. Their results were in accordance with those of the present survey for
smoking. However, in the cases of drinking, other surveys adopted the quantitative assessment, while our survey investigated whether or not subjects habitually drank. Though the approaches were different, LaCroix et al. and Guralnik et al. found that moderate drinking maintains higher mobility and acts more positively on healthy aging than total abstinence, which generally supports the results of the present study.

A strong positive correlation has been reported between level of education as socio-economic status and active life expectancy21) or maintaining good function. However, this correlation was not clearly shown in the present study. This is due to the region where the survey was undertaken; there were few individual differences in educational background, and thus this factor did not reflect differences in socio-economic status.

As stated earlier, the present study found self-rated health to be useful as a predictor of active life, however, the study was limited in that biological variables considered to effect aging were not involved in the variables investigated. Further research will be necessary to determine if self-rated health is significant as a predictor of long active life when the effects of biological measures are examined.

REFERENCES

1. Ferraro KF. Self-rating of health among the old and the old-old. J Health Soc Behav, 1980; 21: 377-383.
2. Haga H, Ueno M, Nagai H, et al. Longitudinal study of self-rated health in elderly community residents. Jpn J Gerontol,1988; 10 : 163-174 (in Japanese).
3. Larson R. Thirty years of research on the subjective well-being of older Americans. J Gerontol,1978 ; 33 : 109-125.
4. Shibata H, Haga H, Nagai H, et al. Predictors of all-cause mortality between ages 70 and 80 : the Koganei Study. Arch Gerontol Geriatr, 1992 ; 14 : 283-297.
5. Parker MG, Thorslund M, Nordstrom ML. Predictors of mortality for the oldest old. A 4 year follow-up of community-based elderly in Sweden. Arch Gerontol Geriatr, 1992 ; 14 : 227-237.
6. Haga H, Shibata H, Ueno M, et al. Relationship of self-rated health to mortality among the community elderly. Jpn J Public Health, 1991 ; 38 : 783-789 (in Japanese).
7. Haga H, Shibata H, Ueno M, et al. Factors contributing to longitudinal changes in activities of daily living (ADL) : the Koganei Study. J Cross-Cultural Gerontol, 1991 ; 6 : 91-99.
8. Deeg DJH, Haga H, Yasumura S, et al. Predictors of 10-year change in physical, cognitive and social function in Japanese elderly. Arch Gerontol Geriatr, 1992 ; 15 : 163-179.
9. Keil JE, Gazes PC, Sutherland SE, et al. Predictors of physical disability in elderly blacks and whites of the Charleston Heart Study. J Clin Epidemiol, 1989 ; 42 : 521-529.
10. Katz S, Branch LG, Branson MH, et al. Active life expectancy. N Engl J Med, 1983 ; 309 : 1218-1224.
11. Cockerham WC, Sharp K, Wilcox JA. Aging and perceived health status. J Gerontol, 1983 ; 38 : 349-355.
12. Kaplan G, Barell V, Lusky A. Subjective state of health and survival in elderly adults. J Gerontol, 1988 ; 43 : S114-120.
13. Jagger C, Clarke M. Mortality risks in the elderly : Five-year follow-up of total population. Int J Epidemiol, 1988 ; 17 : 111-114.
14. Roos NP, Havens B. Predictors of successful aging: A twelve-year study of Manitoba elderly. Am J Public Health, 1991 ; 81 : 63-68.
15. Haga H, Shichita K, Nagai H, et al. Social, Psychological and physical factors correlates of self-rated health. Social Gerontol, 1984 ; 20 : 15-23 (in Japanese).
16. Tissue T. Another look at self-rated health among the elderly. J Gerontol, 1972 ; 27 : 91-94.
17. Palmore E, Luikart C. Health and social factors related to life satisfaction. J Health Soc Behav, 1972 ; 13 : 68-80.
18. Pinky JL, Leaverton PE, Stokes III J. Predictors of good function : The Framingham Study. J Chron Dis, 1987 ; 40(suppl 1) : 159s-167s.
19. LaCroix AZ, Guralnik JM, Berkman LF, et al. Maintaining mobility in late life : II Smoking,alcohol consumption, physical activity, and body mass index. Am J Epidemiol, 1993 ; 137 : 858-869.
20. Guralnik JM, Kaplan GA. Predictors of healthy aging: Prospective evidence from the Alameda County Study. Am J Public Health, 1989 ; 79 : 703-708.
21. Guralnik JM, Land KC, Blazer D, et al. Educational status and active life expectancy among older blacks and whites. N Engl J Med, 1993 ; 329 : 110-116.