

Factors Associated with the Degradation of Dependency Level among the Slightly Frail Aged in a Japanese Community

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Abstract

In order to investigate the appropriateness of the health promotion program targeting to the slightly frail aged, the authors analyzed the data of 5,193 aged who received the screening test for dependency in 2008. After calculating the descriptive statistics for basic characteristics, such as age, sex, and results of screening test, the factor associated with degradation of dependency level were analyzed by a logistic regression model. If a person becomes a user of LTCI covered services, this person is evaluated as “become dependent”. Higher age category, male, bad mobility score, higher tendency to stay indoors (Tojikomori) and bad dementia score were detected as statistically significant risk factors in the current study. It is interesting that use of preventive services was detected as a risk factor of degradation of dependency level. Mismatch of expectation of users and organized services, supply side induced demand and mismatch between LTCI eligibility assessment and 25-items screening test were considered as possible reasons. In order to ameliorate the effectiveness of program, it is necessary to reconsider the content of screening test and preventive services.

Key words: frail elderly, LTCI, prevention, screening, Japan

❖ Introduction

After the introduction of Long Term Care Insurance in 2000, its users have been rapidly increasing from 1.49 million in 2000 to 4.17 million in 2011. Naturally, this increase in users has caused the increase of monthly premium from 3,293 yen in 2003 to 5,200 yen in 2012. As the half of budget of Japanese LTCI is funded by the taxes of central and local governments, this increase becomes a considerable financial burden for the governments.

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In order to lessen the financial difficulty, the government has introduced the health promotion program targeting to the slightly frail aged in 2006. In order to screen out such frail aged persons, the government has introduced 25-items questionnaire as shown in Table 1. However, this program has faced to a number of critics indicating less participants and unclear effectiveness.

In this study the authors have analyzed the data from one local community of Fukuoka prefecture in order to investigate the appropriateness of this health promotion program targeting to the slightly frail aged.

❖ Studied Population and Methods

Studied population

The data of 5,193 aged who received the screening test in 2008 was used for analysis. We have fol-

Table 1 Official check list for dependency

Question	Yes	No
1 Do you go out by a bus and a train alone?	0	1
2 Do you buy daily necessities?	0	1
3 Do you deposit and withdraw deposits and savings?	0	1
4 Do you visit the house of the friend?	0	1
5 Do you guide a family and the friend?	0	1
6 Do you go up the stairs without being transmitted through a handrail and the wall?	0	1
7 Do you stand up without any support from the sitting position on a chair?	0	1
8 Do you walk successively for around 15 min?	0	1
9 Have you fallen down for this one year?	1	0
10 Do you have big uneasiness for a fall?	1	0
11 Were there the weight losses more than 2–3 kg in six months?	1	0
12 Body Mass Index	1	0
13 Compared with 6 months ago, has it become more difficult to eat hard foods?	1	0
14 May you be choked on tea or soup?	1	0
15 Are you worried about the thirst of the mouth?	1	0
16 Do you go out more than once a week?	0	1
17 Does the frequency of going out decrease in comparison with last year?	1	0
18 Do other persons say that you have a problem of forgetfulness? i.e., “always ask the same thing”	1	0
19 Do you seek a phone number by oneself and do call?	0	1
20 Do you sometimes have time orientation problems of day and month?	1	0
21 For the last two weeks, do you have any thought that everyday life does not have a sense of fulfilment?	1	0
22 For the last two weeks, do you have any thought that you are not able to enjoy that you have enjoyed before?	1	0
23 For the last two weeks, do you feel uneasiness to do something that you were able to do it easy before?	1	0
24 For the last two weeks, do you feel a sence of worthless for yourself?	1	0
25 For the last two weeks, do you feel tired for no reason?	1	0

Criteria for “positive”: sum of question 1 to 20 \geq 10 or sum of question 6 to 10 \geq 3 or sum of question 11 and 12 = 2 or sum of question 13 to 15 \geq 3.

lowed up these aged for one year and analyzed the factors associated with degradation of dependency level. If a person becomes a user of LTCI covered services, this person is evaluated as “become dependent”.

Methods

After calculating the descriptive statistics for basic characteristics, such as age, sex, and results of screening test, the factor associated with degradation of dependency level were analyzed by a logistic regression model. The criteria of “positive” for the screening test is described in Table 1.

All statistical procedures were conducted by IBM SPSS Statistics ver.19 (Tokyo, IBM).

The study was approved by the ethical committee of studied city council and UOEH.

Results

Table 2 shows the basic characteristics of studied population. The number of male and female aged was

2,168 (41.7%) and 3,025 (58.3%), respectively. For the age category, 70–79 yr old persons were the first (2,643; 50.9%) followed by 60–69 yr old (1,456; 28.0%), 80–89 yr old (1,011; 19.5%) and 90 yr old and more (83; 1.6%). The average age was 74.1 (SD: 6.5, Min: 64, Max: 101). The number of aged who was screened as ‘positive’ was 1,009 (19.4%).

Table 3 shows the results of correlation analysis among mobility level, oral function level, tendency to stay indoors (Tojikomori), dementia score, depression score and age category. There are statistically significant positive correlations among all the seven items.

Table 4 shows the relationship between the screening result and change in dependency. Among 1,009 ‘positive’ elderly persons, 73 aged (7.2%) showed the degradation of dependency level, while only 61 of 4,184 “negative” person (1.5%) became the LTCI service users ($p < 0.01$; χ^2 test).

Table 5 shows the result of logistic regression analysis concerning factors associated with degradation of dependency level. Higher age category, male,

Table 2 Basic characteristics of studied population

	N	%
Sex		
Male	2,168	41.7
Female	3,025	58.3
Age category		
60-69 yr old	1,456	28.0
70-79 yr old	2,643	50.9
80-89 yr old	1,011	19.5
90 yr old and more	83	1.6
Results of Screening test for dependency		
Negative	4,184	80.6
Positive	1,009	19.4
Number of participants of health promotion activity		
Total	5,193	100.0

Table 3 Results of correlation analysis among studied factors

	Mobility score	Nutrition score	Oral function	Tendency to stay indoors	Dementia score	Depression score	Age category
Mobility score							
CC*	1.000	0.142	0.440	0.459	0.370	0.519	0.321
p value		0.000	0.000	0.000	0.000	0.000	0.000
Nutrition score							
CC		1.000	0.210	0.148	0.130	0.211	0.054
p value			0.000	0.000	0.000	0.000	0.000
Oral function							
CC			1.000	0.350	0.405	0.510	0.170
p value				0.000	0.000	0.000	0.000
Tendency to stay indoors							
CC				1.000	0.344	0.478	0.267
p value					0.000	0.000	0.000
Dementia score							
CC					1.000	0.465	0.196
p value						0.000	0.000
Depression score							
CC						1.000	0.217
p value							0.000
Age category							
CC							1.000
p value							

*CC: correlation coefficient.

bad mobility score, higher tendency to stay indoors, bad dementia score and use of preventive services were detected as statistically significant risk factors

for degradation of dependency level. On the contrary, oral function, nutrition score, depression score were not evaluated as significant risk factors.

Table 4 Relationship between the screening result and change in dependency

Screening test		Change in dependency		Total
		No change	Worsened	
Negative	N	4,123	61	4,184
	%	98.5%	1.5%	100.0%
Positive	N	936	73	1,009
	%	92.8%	7.2%	100.0%
Total	N	5,059	134	5,193
	%	97.4%	2.6%	100.0%

Table 5 Results of logistic regression analysis concerning factors associated with degradation of dependency level

	Beta	SE	Odds ratio	95%confidence interval	p value
Age category	0.082	0.013	1.085	1.059–1.112	0.000
Sex	-0.516	0.190	0.597	0.411–0.867	0.007
Mobility score	0.245	0.074	1.277	1.105–1.477	0.001
Nutrition score	-0.191	0.174	0.826	0.587–1.163	0.273
Oral function	-0.082	0.100	0.921	0.757–1.120	0.411
Tendency to stay indoor	0.505	0.138	1.657	1.264–2.171	0.000
Dementia score	0.317	0.100	1.373	1.129–1.670	0.001
Depression score	0.071	0.064	1.074	0.947–1.218	0.268
Use of prevention services	1.596	0.333	4.935	2.567–9.489	0.000
Constant	-10.144	0.947	114.634		0.000

Dependent variable: degradation of dependency level; 0=no change, 1=worsened.

Independent variables

Sex: 0=male, 1=female; Mobility score: 0=best to 5=worst; Nutrition score: 0=best to 2=worst;

Oral function: 0=best to 3=worst; Tendency to stay indoors: 0=best to 2=worst;

Demetia score; 0=best to 3=worst; Depression score; 0=best to 5=worst;

Use of prevention services; 0=no, 1=yes.

Discussion

As our previous study indicated¹⁻³⁾, higher age category, male, bad mobility score, higher tendency to stay indoors (Tojikomori) and bad dementia score were detected as statistically significant risk factors in the current study. Various prevention activities have been organized based on these kinds of studies. The effectiveness of intervention has been concordant for positive effect of physical fitness on improvement of ADL and IADL, prevention of chute, prevention of sarcopenia^{4, 5)}. However, the programs targeting to dementia and depression prevention have not shown a concordant results.

There have been many literatures that indicate the nutrition status as risk factor for degradation of depen-

dependency level^{6, 7)}. However, this item did not show any significant relationship in our results. In the current screening test, one tries to evaluate the nutrition status by BMI and change in body weight during the last one year. These items might not be sensitive to detect the nutritional risk of frail elderly. Further studies must be organized in order to develop more plausible questionnaire items. Furthermore, there have been a few literatures that showed a statistically significant effect of nutritional intervention on ADL and IADL⁷⁾.

It is interesting that use of preventive services was detected as a risk factor of degradation of dependency level. In order to explain this disappointed result, we have conducted the hearing of related persons of the studied community. They indicated the following three explanations;

- 1) Mismatch of expectation of users and organized services: The formal preventive services do not include home help services that are most wanted ones by frail aged. Thus they apply for use of LTCI covered home help services.
- 2) Supply side induced demand: As most of the preventive services are provided by the contracted 'private' suppliers, they have a tendency to suggest the frail aged to apply the LTCI services that are more profitable.
- 3) Mismatch between LTCI eligibility assessment and 25-items screening test: As Ikegami et al have indicated⁸⁾, an aged who is evaluated as positive by the 25-items screening test shows a higher possibility to be assessed as 'eligible' under the LTCI scheme.

If above explanations are reasonable, it is necessary to reconsider the content of screening test and preventive services. For example, the home help services must be prepared as one of preventive services. However, there is a critic indicating too much home help services for slightly dependent aged might cause more dependent tendency. In fact there is a discussion to exclude the home help service for the frail aged from the LTCI scheme and reorganize it as one of general welfare services of municipalities. The supplier organizations are strongly against this proposal.

It is very important that the preventive activities must be organized to facilitate the daily voluntary activities of frail aged. As the current study indicated, the tendency to stay indoors must be a target of community based rehabilitation activities. Here the notion of "community" is important. Usually, the sphere of daily life of aged people corresponds to the elementary school district or junior high school district. The aged people go to medical facilities and daily shopping within this sphere for most of the cases. In order to facilitate the 'outdoor' activities of frail aged, the services must be organized within this sphere. The 'Iki-iki Hyakusai Taiso' (Active centenarian physical fitness program) of Kochi city is such a scheme⁹⁾.

As the community based preventive activities requires a fine tuned reflection of local conditions, it is not appropriate to set the nationally fixed 'solid' program. The current program must be more flexible and the more freedom should be given to the local

staffs in order to make them possible to organize original services based on their witness. We have to reconsider the effectiveness and validity of current bureaucratic approach that is finely defined by the central government.

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