

Analysis of Factors Associated with Changes in Dependency Level among the Slightly Frail Elderly Using the LTCI Services in Japan

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Abstract

In order to clarify the factors associated with changes in dependency level of frail elderly who use the Japanese Long Term Care Insurance services, the authors have investigated the 1,736 care plans that were randomly sampled from the 2002 and 2003 LTCI data base of Fukuoka prefecture. According to the results of multiple regression analysis, the prevalence of dementia was associated with decline of dependency level ($p < 0.001$). The care plan that well reflected client's expectation showed a preventive effect of dependency decline with a statistical significance ($p < 0.001$). Although there were not statistical significances, an appropriate long term goal setting and facilitation of client's self independency also showed preventive effects ($p = 0.060$ and 0.108 , respectively). The results of current study indicated that quality of care management is important to prevent the decline of independency level among the frail elderly.

Key words: Long Term Care Insurance, care management, frail elderly, dementia

❖ Introduction

The Japanese society is rapidly graying. The percentage of population over 65 yr old is 22.1% in 2008. It is estimated that this percentage will be over 30% in 2025¹⁾. Besides this very rapid ageing, the number of births has been decreasing. TFR (Total Fertility Rate) has become 1.37 in 2008²⁾.

With fewer children, more women working, and changing attitude toward family responsibilities, the traditional system of informal care-giving is widely perceived as inadequate to take care of the increasing number of the frail elderly. Considering this situation, the Japanese government implemented the Long Term Care Insurance as a new scheme for the frail elderly³⁾.

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The philosophy of LTCI is to make it possible for the frail elderly to stay at home as long as possible. In order to attain this goal, it is essential to prevent the aggravation of dependency level and to maintain their quality of life. As the health and social needs of frail elderly are multiple, there must be a person in charge of coordinating various services. This is why the Japanese LTCI has introduced the care management system. A care manager is entrusted with the entire responsibility of planning all care and services for individual clients. According to the results of needs assessment of the client and his or her wish, a care plan is drawn up. The care manager organizes the care specified in the care plan and works with the client, supervises and evaluates the care process (monitoring). When necessary, the care plan is adjusted.

Although the role of care manager is very important, there has been no research that focused to the effectiveness of care management to prevent the aggravation of dependency level under the Japanese LTCI scheme.

In order to respond this research question, we

have investigated the factors associated with aggravation of dependency level using the LTCI data (claim, physician's opinion sheet and care plan) of Fukuoka prefecture.

❖ Data and Methods

Data

1. LTCI claim data and physician's opinion sheet

The studied data was the LTCI claim data and physician's opinion sheet of April 2002 and 2003 of Fukuoka prefecture. From the Fukuoka LTCI database, we have randomly sampled 1,736 data of clients with dependency level of assistance required and care required level 1 (two lightest dependency level under LTCI scheme; total number was 13,715). All clients were users of home care services in 2002 and 2003 (that is, no institutionalized user). The LTCI data includes the following information: sex, age, residence area, dependency level, type and volume of services, and amount of total benefits. The diseases that have caused the dependency are available in the physician's opinion sheet of each client. The two data were linked by the insured ID. In order to assure the privacy, the ID matching was performed by an anonymous way using dummy codes.

2. Evaluation of care plan

In order to analyze the effectiveness of care management, we have collected individual care plans of the above mentioned 1,736 clients and then evaluated the quality of care plan of each client using the assessment sheet that was developed by our research team. The ten public health nurses were recruited for this task. Before doing this task, they were received one week's training using model care plans. Each care plan was evaluated for appropriateness of assessment (number of sub-item is 7), appropriateness of long term goal setting (number of sub-item is 6), appropriateness of short term goal setting (number of sub-item is 6), appropriateness of type and volume of services (number of sub-item is 8), quality of monitoring (number of sub-item is 8), quality of care conference (number of sub-item is 7), reflection of client's expectation (number of sub-item is 6), service coordination facilitating client's self independency (number of sub-item is 6). Each sub-item was scored from 0 (lowest: no consideration for this item) to 2 (highest: well organized plan for this item) and then sum of score was calculated for each item.

Methods

At first, descriptive analyses were employed in order to know the basic characteristics of studied clients.

Based on the results of descriptive analyses, factors associated with change in dependency level were evaluated by the multiple logistic regression analysis. The model for analysis is as follows:

Dependent variable: decline of dependency level (1: aggravated, 0: ameliorated or maintained)

Independent variables: Sex (Male=0, Female=1), Age categories (40–49=0, 50–59=1, 60–69=2, 70–79=3, 80–89=4, 90–=5), household situation (live alone=1, others=0), prevalence of malignancy (no=0, yes=1), prevalence of diabetes mellitus (no=0, yes=1), prevalence of dementia (no=0, yes=1), prevalence of heart diseases (no=0, yes=1), prevalence of cerebro-vascular diseases (no=0, yes=1; including sequelae), prevalence of osteo-muscular disease (no=0, yes=1), evaluation result of each item of care plan (0–5=0, 5 and more =1).

The all data analyses were done by SPSS ver. 15J.

❖ Results

Table 1 shows the descriptive statistics of investigated persons. The three fourths were females. Thirty percent of studied population lived alone. More than 60% were over 80 yr old. The most frequent morbidity was osteo-muscular diseases (prevalence=64.3%), followed by cerebro-vascular diseases (22.4%), cardiac diseases (17.7%), dementia (17.7%).

Table 2 shows the changes in LTCI eligibility levels between April 2003 and April 2004. In 2003, 780 persons (44.9%) were assistance required and 956 (55.1%) were care required level 1. For assistant required level of elderly, 568 (72.8%) maintained their independency level and 212 (27.2%) declined their independency level. For care required level 1, 772 (80.8%) maintained or ameliorated their independency level and 184 (19.2%) showed decline in independency level.

Table 3 shows the results of care plan assessment. For all items, more than 75% of care plan did not attain the half of full score. Especially, more than 90% of care plan did not attain the half of full score for appropriateness of short term goal setting, appropriateness of type and volume of services, reflection of client's expectation and service coordination facilitating cli-

Table 1 Basic statistics of studied population (N=1,736)

		N	%
Sex	Male	421	24.3
	Female	1,315	75.7
Family status	Live alone	536	30.9
	Others	1,200	69.1
Age category	40–49	2	0.1
	50–59	13	0.7
	60–69	80	4.6
	70–79	507	29.2
	80–89	882	50.8
	90–	252	14.5
Morbidity	Malignancy	89	5.1
	Diabetes	128	7.4
	Dementia	308	17.7
	Cardiac diseases	308	17.7
	Cerebro-vascular diseases	389	22.4
	Osteo-muscular disease	1,117	64.3
	Bone fractures	89	5.1
	Total	1,736	100.0

Table 2 Changes in eligibility levels between 2003 and 2004 (N=1,736)

April 2004		April 2003		Total
		Assistance required	Care required level 1	
Assistance required	N	568	107	675
	%	72.8	11.2	38.9
Care required level 1	N	177	665	842
	%	22.7	69.6	48.5
Care required level 2	N	26	125	151
	%	3.3	13.1	8.7
Care required level 3	N	5	37	42
	%	0.6	3.9	2.4
Care required level 4	N	4	19	23
	%	0.5	2.0	1.3
Care required level 5	N	0	3	3
	%	0.0	0.3	0.2
Total	N	780	956	1,736
	%	100.0	100.0	100.0

ent's self-independency. It was surprising to know that 22.3% of care plan were evaluated "0" for quality of care conference.

Table 4 shows the results of multiple logistic regression analyses. The prevalence of dementia was associated with decline of dependency level

($p < 0.001$). The care plan that well reflected client's expectation showed a preventive effect of dependency decline with a statistical significance ($p < 0.001$). It seems that an appropriate long term goal setting and facilitation of client's self-independency also showed preventive effects ($p = 0.060$ and 0.108 , respectively).

Table 3 Assessment results of care plan (N=1,736)

Appropriateness of assessment (Full score=14)				Quality of monitoring (Full score=16)			
Score	N	%	Cumulative %	Score	N	%	Cumulative %
0	15	0.9	0.9	0	27	1.6	1.6
1	111	6.4	7.3	1	39	2.2	3.8
2	121	7.0	14.2	2	87	5.0	8.8
3	131	7.5	21.8	3	135	7.8	16.6
4	169	9.7	31.5	4	203	11.7	28.3
5	191	11.0	42.5	5	194	11.2	39.5
6	236	13.6	56.1	6	298	17.2	56.6
7	333	19.2	75.3	7	254	14.6	71.3
8	324	18.7	94.0	8	291	16.8	88.0
9	54	3.1	97.1	9	174	10.0	98.0
10	18	1.0	98.1	10	23	1.3	99.4
11	25	1.4	99.5	11	8	0.5	99.8
12	4	0.2	99.8	12	2	0.1	99.9
13	4	0.2	100.0	13	1	0.1	100.0

Appropriateness of long term goal setting (Full score=12)				Quality of care conference (Full score=14)			
Score	N	%	Cumulative %	Score	N	%	Cumulative %
0	58	3.3	3.3	0	387	22.3	22.3
1	220	12.7	16.0	1	19	1.1	23.4
2	216	12.4	28.5	2	87	5.0	28.4
3	218	12.6	41.0	3	95	5.5	33.9
4	270	15.6	56.6	4	141	8.1	42.0
5	190	10.9	67.5	5	217	12.5	54.5
6	275	15.8	83.4	6	244	14.1	68.5
7	236	13.6	96.9	7	312	18.0	86.5
8	29	1.7	98.6	8	203	11.7	98.2
9	16	0.9	99.5	9	19	1.1	99.3
10	7	0.4	99.9	10	6	0.3	99.7
12	1	0.1	100.0	11	3	0.2	99.8
				12	2	0.1	99.9
				14	1	0.1	100.0

Appropriateness of short term goal setting (Full score=12)				Reflection of client's expectation (Full score=12)			
Score	N	%	Cumulative %	Score	N	%	Cumulative %
0	50	2.9	2.9	0	27	1.6	1.6
1	121	7.0	9.9	1	75	4.3	5.9
2	203	11.7	21.5	2	82	4.7	10.6
3	245	14.1	35.7	3	194	11.2	21.8
4	337	19.4	55.1	4	502	28.9	50.7
5	343	19.8	74.8	5	618	35.6	86.3
6	278	16.0	90.8	6	191	11.0	97.3
7	122	7.0	97.9	7	36	2.1	99.4
8	25	1.4	99.3	8	10	0.6	99.9
9	11	0.6	99.9	9	1	0.1	100.0
10	1	0.1	100.0				

Appropriateness of type and volume of services (Full score=16)				Service coordination facilitating client's self independency (Full score=12)			
Score	N	%	Cumulative %	Score	N	%	Cumulative %
1	1	0.1	0.1	0	13	0.7	0.7
2	14	0.8	0.9	1	164	9.4	10.2
3	31	1.8	2.6	2	214	12.3	22.5
4	96	5.5	8.2	3	309	17.8	40.3
5	246	14.2	22.4	4	469	27.0	67.3
6	469	27.0	49.4	5	350	20.2	87.5
7	574	33.1	82.4	6	203	11.7	99.2
8	247	14.2	96.7	7	12	0.7	99.9
9	53	3.1	99.7	8	2	0.1	100.0
10	3	0.2	99.9				
11	2	0.1	100.0				

Table 4 Factors associated with decline of independency level among the frail aged (N=1,736)

	B	SE	p-value	OR	95% CI of OR	
sex	-0.160	0.140	0.253	0.852	0.647	1.121
agecategory	-0.002	0.008	0.776	0.998	0.983	1.013
Live alone	0.106	0.131	0.418	1.112	0.860	1.438
Malignancy	-0.079	0.282	0.779	0.924	0.532	1.605
Diabetes	0.044	0.236	0.854	1.045	0.657	1.660
Dementia	1.189	0.145	<0.001	3.283	2.472	4.359
Heart diseases	-0.014	0.165	0.931	0.986	0.713	1.362
CVD	0.209	0.149	0.159	1.233	0.921	1.649
OMD	-0.091	0.141	0.520	0.913	0.692	1.205
Bone fractures	0.366	0.255	0.151	1.442	0.875	2.377
Assessment of Care plan						
Assessment	0.091	0.142	0.523	1.095	0.829	1.447
Long term goal	-0.300	0.159	0.060	0.741	0.542	1.012
Short term goal	-0.123	0.162	0.447	0.884	0.643	1.215
Services provided	-0.028	0.148	0.852	0.973	0.728	1.300
Monitoring	0.226	0.130	0.083	1.254	0.971	1.618
Care conference	0.247	0.127	0.051	1.281	0.999	1.642
Client's expectation	-0.821	0.217	<0.001	0.440	0.287	0.674
Self-independency	-0.342	0.213	0.108	0.710	0.468	1.079
Constant	-1.109	0.637	0.082	0.329892	0.095	1.150

Dependent variable: decline of dependency level (1: aggravated, 0: ameliorated or maintained)

Independent variables: Sex (Male=0, Female=1),

Age categories (40-49 =0, 50-59=1, 60-69=2, 70-79=3, 80-89=4, 90-95=5),

Live alone (yes=1, no=0)

Prevalence of malignancy (no=0, yes=1), Prevalence of diabetes mellitus (no=0, yes=1),

Prevalence of dementia (no=0, yes=1), Prevalence of heart diseases (no=0, yes=1),

Prevalence of cerebro-vascular diseases (CVD: no=0, yes=1; including sequelas),

Prevalence of osteo-muscular disease (OMD: no=0, yes=1),

Evaluation result of each item of care plan (0-5=0, 5 and more=1).

(see text for the detail)

On the contrary, care conference showed positive relationships with decline of dependency level with statistical significance ($p < 0.001$, respectively). Although there was no statistical significance, quality of monitoring also showed a tendency of positive relationship ($p = 0.051$).

Discussion

In order to respond multiple health and social needs of the frail elderly, it is essential to comprehensively assess the health and social conditions of frail aged. For this purpose, various comprehensive assessment tools have been developed. MDS-HS and SMAF are such examples. Their usefulness and validity are numerous reported⁴⁻⁸⁾.

On the contrary, the planning task has not received enough attention although this process is essential for governing implementation, monitoring and reassessment. To our knowledge, there has been no scientific report focusing the effect of quality of care management process on outcome at least in Japan. Somme et al focused this problem and remarked the importance of individualized service plan for realization of integrated services that fitted client's needs⁹⁾.

The present study identified that a care plan with well reflection of client's expectation showed a preventive effect of dependency decline with a statistical significance. Somme et al also indicated the importance of attendance of client to the meeting to organize the services in order to fit the services to real needs of

clients⁹). The Canadian Home Care Association (CHCA) defines care management as “a collaborative client-driven strategy for the provision of quality health and support services through the effective use of resources in order to support the client’s achievement of goals”¹⁰). They also emphasize the client’s responsibility in the process of case management, indicating that this process is a collaborative strategy between health professionals and the client. Our results are compatible with these indications.

Our results showed a positive relationship between the quality of case conference and decline of independence. It is considered that the high risk client required more changes in the care plan and more frequent care conferences. This might explain the positive relationship between the quality of monitoring and decline of independence.

As other studies have indicated, the prevalence of dementia related to worsening of dependency. Brickman *et al.* showed that dependency in Alzheimer disease patient significantly declined with time independent of global cognition and other self-care deficits¹¹). In contrast to certain more “medically oriented” chronic diseases such as congestive heart failure, care management of dementia requires more attention to behavioral problems and service coordination in the community. There have been several community based care management projects to better manage the dementia patients. The ACCESS program in California is such a project¹²). In this program, each care manager was requested to work “preventive” rather than “reactive”. The crisis-oriented management requires much physical and psychological effort that often leads to burn out of care givers. Viatonou *et al.* have suggested that depression, malnutrition and care givers burden are predictors of rapid cognitive decline among demented aged¹³). In order to maintain the QOL of dementia patient and their care givers, the care manager must be cautious about these predictors.

The meta-analysis conducted by Gorey *et al.* suggested that case management intervention, especially intensive care management is effective to prevent the re-hospitalization of severely ill Alzheimer patients¹⁴). However, this study also showed that there was no significant difference in effectiveness among the various management models. In this meaning, there has been no golden model for care management of dementia persons. This finding indicates that the ability of individual care manager is a crucial factor

for the quality of dementia care management.

The Japanese Ministry of Health, Labour and Welfare (MHLW) estimates that there will be 3.4 million of dementia elderly in 2035, twice more than in 2005¹⁵). In order to construct a system for caring dementia persons in the community setting, MHLW has launched a series of programs, i.e., memory clinic, portal site of dementia counseling at local government office, group home, training seminar for dementia care, small community home with multiple functions, etc. Enough volume of services is a precondition of good care management.

Although the results of this study are interesting and suggestive for the future policy discussion about care management, there are several problems to be solved. At first, as this kind of care plan evaluation study was the first challenge for our research team, the validity of study method should be carefully re-examined. Most of the care plan received relatively low scores. This fact might suggest that our criteria for evaluation would be inappropriately strict. Further field testing must be organized. The second problem is that there is no official standard for assessment for care planning and care plan sheet under the LTCI scheme. This situation makes it difficult to evaluate each care plan by equal viewpoint. After the introduction of LTCI, each organization, such as the Japanese Nursing Association and the Japanese Association of physiotherapist, has developed their own assessment tool and care plan sheet. Thus there are various tools for establishing care plan in Japan. The patient-centered care coordination requires a collaboration and good communication among the different health and social professionals. The standardized assessment tool and care plan sheet are indispensable for realizing a good communication among them. But there are many barriers among them because of rivalry. In order to ameliorate this situation, the strong leadership by MHLW is expected.

As another limitation of this study is that our data did not include clients who did not receive home care services in April 2003. Thus clients who used home care services in 2002 but not in 2003 were excluded from this study. Therefore there is a possibility that our data was biased for better ADL status. More detailed and complete data must be necessary in order to validate the current results.

Anyway, in order to provide appropriate services for the frail elderly, the care management plays a core

role. Therefore, it is essential to continuously ameliorate the quality of care management. This requires an evaluation cycle. The result of current study is expected to be used for the further discussion for establishing the official quality assurance program of care management in Japan.

❖ Conclusion

The present study has suggested that quality care management could have a preventive effect for aggravation of dependency level of the frail elderly. Further study is necessary in order to establish a quality assurance program of care management in Japan.

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