

Table 1. Characteristics of the Studied Population; by Gender

	Male		Female		Chi-square test p-value
	N	%	N	%	
Age	248		502		
65-74	74	29.8	87	17.3	<0.001
75-84	124	50.0	253	50.4	
>=85	50	20.2	162	32.3	
Eligibility Care Level at Entry					
Low	124	50.0	354	70.5	<0.001
Moderate	74	29.8	84	16.7	
High	50	20.2	64	12.8	
Dementia					
None	164	66.1	371	73.9	0.060
Mild	71	28.6	105	20.9	
Severe	13	5.3	26	5.2	
Comorbidity					
Cerebro-vascular disease	91	36.7	116	23.1	<0.001
Musculo-skeletal disease	74	29.8	245	48.8	<0.001
Neurological disease	12	4.8	16	3.2	0.262

Initial Care at Home	156	62.9	383	76.3	<0.001
Prognosis after 1 Year					
No change	116	46.8	274	54.6	0.008
Declined	57	23.0	93	18.5	
Improved	37	14.9	92	19.3	
Dead	38	15.3	43	8.6	

Table 2. Results of Polynomial Logistic Regression to Predict Care Level Transition and Mortality at 1 Year

	All	N=750	Male	N=248	Female	N=502
	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval
Level Declined vs. Unchanged						
Sex	0.70 [	0.46 - 1.07]	NA		NA	
Age						
65-74	1.00		1.00		1.00	
75-84	1.23 [	0.71 - 2.13]	0.43 [	0.20 - 0.91]	0.85 [	0.41 - 1.75]
>=85	0.80 [	0.5 - 1.28]	0.49 [	0.18 - 1.29]	0.78 [	0.45 - 1.36]
Eligibility Care Level at Entry						
Low	1.00		1.00		1.00	
Moderate	0.59 [	0.33 - 1.06]	0.44 [	0.19 - 1.06]	0.74 [	0.33 - 1.64]
High	0.36 [	0.16 - 0.85]	0.44 [	0.14 - 1.31]	0.14 [	0.03 - 0.81]
Dementia						
None	1.00		1.00		1.00	
Mild	2.40 [	1.47 - 3.91]	2.31 [	1.00 - 5.33]	2.17 [	1.17 - 4.02]
Severe	0.93 [	0.27 - 3.16]	0.44 [	0.04 - 4.38]	1.99 [	0.41 - 9.67]

Cerebro-vascular disease 1.33 [0.87- 2.06] 2.03 [1.03- 4.03] 0.97 [0.53- 1.77]

Level Improved vs. Unchanged

Sex	1.68 [1.03- 2.76]	NA	NA
Age			
65-74	1.00	1.00	1.00
75-84	0.89 [0.48- 1.66]	0.70 [0.29- 1.70]	0.62 [0.28- 1.38]
>=85	1.03 [0.62- 1.73]	0.75 [0.23- 2.41]	1.15 [0.63- 2.13]
Eligibility Care Level at Entry			
Low	1.00	1.00	1.00
Moderate	6.52 [3.84- 11.09]	3.85 [1.53- 9.73]	9.45 [4.75- 18.81]
High	4.69 [2.30- 9.57]	2.70 [0.81- 9.05]	7.59 [2.84- 20.29]
Dementia			
None	1.00	1.00	1.00
Mild	0.79 [0.46- 1.36]	1.66 [0.67- 4.13]	0.50 [0.24- 1.04]
Severe	0.13 [0.03- 0.50]	-- [-]	0.09 [0.02- 0.42]
Cerebro-vascular disease	1.54 [0.97- 2.45]	0.55 [0.23- 1.34]	2.43 [1.38- 4.31]

Dead vs. Unchanged

	0.57 [	0.32-	0.98]	NA	NA
Sex					
Age					
65-74	1.00			1.00	
75-84	0.41 [	0.19-	0.92]	1.89 [	0.67- 5.37]
>=85	0.63 [	0.35-	1.13]	3.25 [	1.02- 10.39]
Eligibility Care Level at Entry					
Low	1.00			1.00	
Moderate	3.73 [	1.81-	7.67]	2.86 [	1.09- 7.48]
High	12.71 [	5.98-	27.02]	3.15 [	1.01- 9.86]
Dementia					
None	1.00			1.00	
Mild	0.99 [	0.52-	1.91]	1.32 [	0.51- 3.45]
Severe	0.53 [	0.19-	1.46]	1.59 [	0.36- 7.02]
Cerebro-vascular disease					
	0.64 [	0.34-	1.21]	0.95 [	0.42- 2.16]
				0.34 [	0.11- 1.11]
					106.5 5

Effect of a Subsidy Policy on the Utilization of Home Care Services under Long-Term Care Insurance in Rural Japan

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ABSTRACT

Objective. To assess how a subsidy policy for socio-economically disadvantaged beneficiaries under Japanese public long-term care insurance (LTCI) affected their utilization of homecare services. The subsidy was effective only for those who had used an older welfare program before the LTCI started in April 2000, and selectively reduces the price of home help service among various homecare services under the LTCI.

Data Sources/Study Setting. Electronic claim bill data and municipal records between October and December 2001 were provided by public insurers of 6 rural towns in south-eastern Japan. Additional information on households, length of care, and comorbidity were obtained from an interview survey in December 2001.

Study Design. This was a cross-sectional, observational study. Taking the proportion of monthly service utilization to the benefit limits as a targeted outcome variable, we conducted multivariable regression analysis to assess the effect of the subsidy status on the service utilization after controlling for beneficiaries' age, gender, care eligibility levels, the size of households, and length of care.

Data Collection Method. Beneficiaries who consecutively used homecare services for three months since October 2001 without institutionalization and hospitalization were selected from the claim bill database (N=1580). Of them, those who were covered by the subsidy policy (N=137), and those who were not but met household income criteria for

the subsidy (N=567) were selected.

Principal Findings. Subsidized beneficiaries used more homecare services in total than non-subsidized beneficiaries. The utilization of homecare services, specifically of home help service, remarkably increased in the subsidized as their care level went up. To the contrary, the utilization by the non-subsidized increased only up to ¥100,000 even in the highest care level. Multivariable analysis found that, even after controlling for potential confounders, the subsidy status was significantly associated with increased service utilization. The difference in the utilization pattern between the two groups was more prominent in higher care levels.

Conclusions. Our results suggested that the subsidy did produce economic incentives to buy more homecare service. However, it might also provide care services substituting with informal care that those with higher service needs could have not afforded. The results implied that the effect of a social policy and socio-economic characteristics of the households needs further investigation for the evaluation of the Japanese LTCI system.

Key Words. Long-term care insurance, subsidy, homecare services, socio-economic conditions

INTRODUCTION

Japan enjoys the longest life expectancy in the world, although approximately 20% of Japanese over age 80 needed long-term care as of 2000 (Ministry of Health, Labor and Welfare 2002a). A government agency estimated that by 2025, more than five million people will need long-term care in this country (Ministry of Health and Welfare 1995). Facing a rapidly aging population in which care for the elderly will no longer be able to rely on the traditional family system, the Japanese government introduced a public long-term care insurance (LTCI) system in April 2000, to sustain care for the frail elderly (Ministry of Health, Labor and Welfare 2002a; Ikegami 1998, Campbell and Ikegami 2000; Matsuda 2002). The LTCI system purports to share the caregiving and financial burden in the community, to clarify benefits and responsibility, and to allow service users to make their own choice of an appropriate combination of services.

Japanese LTCI is a social insurance that requires to municipal government insurers mandatory inclusion of all the Japanese residents of age 40 and over without any selection (Ministry of Health, Labor and Welfare 2002a). The insured, when they become in need of care, will apply to the Local Care Needs Assignment Committee who decides whether the applicants meet the care eligibility criteria according to a single nationwide protocol, which reflects the applicant's physical and cognitive functions, but not socio-economic conditions. Eligibility criteria assign 6 care levels: support required (in need of preventive

care), and levels 1 through 5 (mildly to severely disabled). Each care level corresponds to an upper limit of the monthly reimbursement (See NOTE 1).

Before 2000 when the LTCI started, social welfare driven by tax had covered home and institutionalized care for disabled elderly selectively who had fewer family support and/or lower income. On the contrary, disabled elderly with abundant family support or economic resources relied on informal care by family, purchased private care, or hospitalization for chronic medical care (Ministry of Health, Labor and Welfare 2002a; Campbell and Ikegami 2000). Since the LTCI started, these long-term care services were totally covered by a single scheme of the system with 10% copayment regardless of socio-economic conditions of households, except for those under the public livelihood aids who were exempted from premium payment.

For those households with lower income who had already received homecare through social welfare before the LTCI, however, a transient measure was taken in which copayment for home help service, one of the cheapest services among homecare services, was reduced to 3% instead of 10% to alleviate the economic impact (Ministry of Health, Labor and Welfare 2002a; Sugisawa et al. 2002). This subsidy policy is in effect until 2005. Newer applicants, registered after the LTCI started, are not eligible for this subsidy policy even though they have similar levels of disability and income as the subsidized.

A debate was brought about whether the subsidy should be extended to all the poorer

disabled elderly, or it should be expired after all. Although the subsidy may help the poorer beneficiaries afford necessary care, it may possibly induce inefficient use of the LTCI services due to moral hazard. Several studies suggested that socio-economic conditions such as family structure and household income were also influential on care needs and service utilization, independently of functional levels (Sugisawa et al. 2002; Tamiya et al 2002). Since the selection process for the subsidy was related to these characteristics, it is complicated to determine whether increased service use among the subsidized, if existed, resulted from higher care needs of the subsidized, or from economic incentives induced by the subsidy.

In this study, we compared utilization of homecare services in total and specifically that of home help service between the subsidized and the non-subsidized, after adjusting for household composition, income levels, and beneficiary's care level. Through this analysis, we purported to clarify the effect of the subsidy policy on beneficiaries' service utilization.

MATERIALS AND METHOD

Types of care covered by the LTCI

The LTCI system covers "homecare" in the community, "respite stay" at nursing homes, and institutional care (Ministry of Health, Labor and Welfare 2002a). Homecare services

include “home help” for caregiving or housekeeping, and other services such as “bath service”, “visiting nurses”, “rehabilitation”, and “adult daycare service”. Each service has a fixed fee schedule determined by the central government that is applied to any service providers. Although there are several private insurances that cover monetary benefits for long-term care, they are almost negligible in current Japan. Thus, the LTCI is the only and dominant system that covers formal long-term care in this country.

Subjects

Data were derived from six rural towns in Kimotsuki County, Kagoshima Prefecture, a southeastern rural area of Japan. There were approximately 52,000 residents as of October 1, 2001. Population of age 65 years and over was 30%, which was higher than the national average (17%; 2000) (Health and Welfare Static Association 2001). Number of certificated beneficiaries at the time was 1,870. Of them, 1,580 (81%) lived in the community and used homecare services under the LTCI. Following subjects were excluded from the analysis; beneficiaries who were younger than 65 years (N=13), and whose household income was not in the range for the subsidy policy (N=707 with income beyond the range, and N=150 in the lowest poverty level and exempted for all the premium and copayment). Subjects were further limited only to those who continuously used homecare services during the studied period (from October to December, 2001), without long respite stay, institutionalization, or hospitalization. Consequently, 704

subjects were available for further analysis. By retrieving subsidy status from the claim data, subjects were assigned into either subsidized (N=137) or non-subsidized group (N=567).

Measurement

The electronic claim data of the six towns from October 1 to December 31, 2001 were used to assess the utilization of homecare in total, and the utilization limited to home help service. We took the average of individual utilization per month for homecare and home help utilization during the studied period. For multivariable analysis, we used the proportion of averaged service utilization to monthly benefit limits so that it allowed comparison across care levels with different benefit limits (Sugisawa et al. 2002).

Users' age as of 1 October 2001, sex, and assigned care level were obtained from municipal records. The household income category that was officially used to determine the eligibility for the subsidy and LTCI premiums was also retrieved from the records. In addition, an interview survey was conducted to collect information regarding household composition (living alone, with spouse, and with other family members), length of care (less than 2 years, 2~5 years, over 5 years) and comorbidity (presence or absence of cerebrovascular and organic diseases).

Analyses

The characteristics of the subsidized and the non-subsidized were compared using t-test or

chi-square test. The averaged service utilization was graphically described by care levels and subsidy status. Total service and home-help utilization proportions were compared between the subsidized and non-subsidized groups by their characteristics. Following descriptive analyses, multivariable regression analyses were performed on the proportion of total homecare service and home help utilization as dependent variables with subsidy status, after controlling for age, care level, comorbidity, length of care, and household composition. Tobit model was adopted since some beneficiaries did not use any home help, and the distribution of utilization proportion was truncated at zero (Kenney 1993). All the analyses were performed with SAS version 8.2 (SAS Institute: United States). *P*-values less than .05 were considered significant.

RESULTS

Table 1 shows the basic characteristics of the subsidized and non-subsidized groups. Age was similarly distributed in both two groups. Gender did not show a significant difference. Those at the lowest care level were fewer in the subsidized than in the non-subsidized. Single household composition was more often observed in the subsidized than in the non-subsidized. A half of the non-subsidized experienced less than 2 years of length of care, whilst about three quarters of the subsidized experienced more than 2 years. Comorbidity status showed no significant differences between the two groups. All the

subsidized beneficiaries used home help, though less than a quarter of non-subsidized beneficiaries used the service. By contrast, the non-subsidized group used other homecare services more frequently than the subsidized group.

Figure 1 compares the averaged monthly utilization between the subsidized and non-subsidized groups at each care level. In the subsidized group, the homecare service utilization, especially the utilization of home help service, drastically increased in care levels 4 and 5. By contrast, in the non-subsidized group, homecare service utilization increased only up to ¥100,000. The non-subsidized used few home help, and instead mainly used services other than home help.

Table 2 describes the proportions of service utilization to the benefit limit. The subsidized showed higher proportions of homecare service utilization in total than the non-subsidized. Among the subsidized, the proportion reached 70% at care levels 4 and 5.

Table 3 shows multivariable regression results predicting the proportion of total service use and home help use. Subsidy status was positively associated with the utilization proportion of homecare in total, after adjusting for age, sex, care levels, length of care experience, and household composition ($\beta = 6.4$, 95% confidence interval = 1.6 ~ 11.1).

Age and gender had no significant relationship with the proportion. The utilization proportion of homecare in total was higher at the lowest and the highest care levels, taking a U-shape relationship with care levels. Finally, single household composition and the

longer care experience were related with a larger proportion of service use. The utilization proportion of home help showed a similar trend except that a larger proportion was seen in care level 2 and 5.

Since Figure 1 and Table 2 suggested that the pattern of utilization by care levels was different between the two groups, we also analyzed a model including an interaction term between the dummy codes of the subsidy status and care levels. A set of the interaction terms turned to be significant on total service utilization proportion (log-likelihood test: χ^2 (DF=5) = 42.26, $p < 0.001$), suggesting that the association of the subsidy status with a homecare utilization proportion significantly varied across eligibility care levels.

DISCUSSION

The subsidized group used more home help and consequently more homecare services in total even after adjusting for age, gender, care levels, length of care, and household composition. The subsidized used more services, yet paid the same amount of out-of-pocket copayment (data not shown). These imply that reduced copayment for home help might affect the pattern of service utilization among the subsidized.

Since the LTCI started, the provision of formal long-term care was integrated under a single scheme of the LTCI system (Ministry of Health, Labor and Welfare 2002a). Besides, since the LTCI is mandatory, the LTCI claim data should capture almost the whole picture of formal care provided in the community. The LTCI was designed so that all the

beneficiaries should have fair access to formal care services according to their functional disabilities, but not to their socio-economic conditions such as the size and income of households (Campbell and Ikegami 2000). However, whether the beneficiaries apply to care provision should depend not only on the severity of disabilities, but also on the characteristics of their households because these features may determine the capacity and willingness to provide informal care that substitutes formal care covered by the LTCI (Sugisawa et al. 2002; Tamiya et al 2002).

The subsidized and the non-subsidized were different in their distribution of care levels, household structures, and the length of care experiences. The subsidized had received long-term care under the older welfare system and, by definition, had longer care experiences on average, compared to the non-subsidized. When we limited our analysis to those who had the middle range of care experiences (2~5 years), the subsidized still tended to belong to a single household, and was less likely to be categorized in the lowest care level, compared to the non-subsidized. The subsidy status was still significantly and even more strongly associated with an increased utilization proportion of homecare after controlling for these variables ($\beta = 12.1$, 95% confidence interval = 3.9 ~20.3).

The both groups were under similar economic conditions since their households had annual income lower enough to be exempted from income tax, but not enough to receive public livelihood aids. Although actual data on household's precise income and assets

were not available due to confidentiality concerns, the classification we relied on was the one adopted by the municipal government for their decision to exempt the household from tax and LTCI premium collection.

We used the information regarding household composition as a proxy of the capacity for providing informal care by family. Higher utilization proportion in the subsidized should partly be explained by the fact that the subsidized were more likely to be in a single household. Previous studies in the U.S. also found that single household was related to increased service utilization (Kemper 1992; Logan and Spitze 1994). Even after controlling for the household composition, however, there might still remain some difference between the subsidized and the non-subsidized in the amount of informal care that they could enjoy, since family and neighborhood outside of the household could provide informal care. Although our data did not include enough information to capture all the sources of informal care, disproportional utilization of home help and other homecare services between the two groups might suggest that it was the case. Ohkusa conducted the conjoint analysis based on a questionnaire survey data, and found that home help among other homecare services were price elastic, whereas other homecare services such as visiting nurse and visiting rehabilitation were price inelastic (Ohkusa, 2002). Then, it was speculated that the subsidized who had less substitution sources for informal care were willing to purchase more amount of cheaper home help, whereas the non-subsidized

tended to buy other homecare services instead of home help for which they could substitute available informal care.

It was worthy of further consideration, however, that the discrepancy of service uses between the subsidized and the non-subsidized was more prominent in higher care levels. Since the subsidy policy will expire in 2005, several changes in service use behaviors are predicted. Subsidized beneficiaries, especially in higher care levels, would use fewer home help than before due to raised price of the service. If subsidized beneficiaries overuse home help only because of reduced copayment, the service utilization would be optimized to the level similar to that of the non-subsidized beneficiaries. Alternatively, subsidized beneficiaries with higher care levels might be able to use less home help service, which in turn leads to difficulties to stay at home, and more likelihood of institutionalization. Institutional care for each beneficiary costs approximately ¥330,000 (\$3,000), while approximately ¥130,000 (\$1,200) was spent for each beneficiary in the community at care level 5 as of October 2001 (Ministry of Health, Labor and Welfare 2002b). If the demand for institutional care would increase, total cost of regional long-term care should be increased. Thus, further investigation would be worthy on whether selective subsidy for those at higher care levels, with low household income or few family support may have potentials to reduce institutionalization and total cost of the care.

The results reported here are subject to several limitations. First, they were based on cross-sectional data. A longitudinal study that compares institutionalization events between the subsidized and non-subsidized beneficiaries would be able to clarify whether the subsidy is likely to reduce the risk of institutionalization. Second, the findings were based on a limited sample derived from a single rural area in Japan. The generalizability of the findings should be confirmed by similar studies in other regions, especially urban areas (Cohen 1997; Denney and Dubay 1992). However, the utilization pattern across care levels shown here was similar to what had been reported in a previous study in an urban setting (Sugisawa 2002) and whole Japan (Ministry of Health, Labor and Welfare 2001), suggesting the findings might not differ.

Final and the most important was that the comparability between the subsidized and non-subsidized groups might need careful interpretation of our results. The subsidized were those who had received older welfare program before the LTCI started. By contrast, the non-subsidized were those either who had been ineligible to the program, or who were newly registered after the LTCI started. Thus, the major difference could be found in the length of care and/or the capacity of informal support. Although we conducted multivariate analysis and restriction in care length, we might not fully control for the difference. Thus, it was not possible to determine from our analysis how much the different utilization pattern could be explained by reduced price and how much by the