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分担研究報告書

介護費の地域差および関連要因分析―全国介護レセプトから―
（Regional variation and determinants of long-term care expenditure in Japan: Evidence from national level LTC claims data）

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研究要旨
厚生労働省の報告によると、平成26年度における被保険者一人当たりの介護費用が最も高い沖縄県と最も低い栃木県では30%の差があるという。しかし、このように介護費用の地域差が大きいものの、介護費用の地域差に関連する要因についてのエビデンスは乏しい。本研究では、全国介護レセプトを用いて、介護費用の地域差および関連要因を明らかにすることを目的とした。本研究のアウトカムは介護保険利用者（要介護度1～要介護度5）の年間介護費で、地域区分による単価の違いを調整した上で算出した。統計解析は一般化線形モデルを用いた。結果、都道府県の地域差は、施設サービスでは小さい一方で、在宅サービスでは大きいことが明らかになった。また、以下の個人特性および市町村特性が介護費用と有意に関連することが明らかになった。個人特性として、高い年齢、女性、高い要介護度、施設サービスの利用、自己負担割合が高い場合は介護費用が有意に高かった。市町村特性として、都市、高齢者単身世帯の割合が高い、要介護度一人当たりの特別養護老人ホームの施設数が多い場合は介護費用が高い傾向が見られた。

A．研究目的

Japan is the oldest country in the world, with 27.7% of its population being 65 years of age or older in 2018.[1] Response to society's major concern about aging and care problem, Japan introduced long-term care insurance (LTCI) system in 2000. The universal coverage system is one of the most comprehensive social care systems for the elderly in the world, build around with the aim of assuring efficient delivery of user-centered long-term care services according to their needs.[2] However, according to Ministry labor and welfare, there are considerable regional variation on long-term care expenditure. After adjusting age, the per-capita LTCI expenditure is 30% higher in the highest spending prefecture than in the lowest. This documentation provide useful guide to understand regional disparities regarding LTCI expenditure, whereas case-mix adjustment among regions were little considered. Commonly, the regional variation in healthcare spending that cannot be explained by differences in population medical needs is used as sign of inefficiencies [3-5].

The aim of this study is to examining regional variation in LTCI expenditure and

clarify drivers of such variation.

B．研究方法

Data sources and participants

We used anonymized national LTCI claims data from April 2016 to March 2017. Most importantly, the dataset covers all of LTCI users and provided detail information on the types of LTCI services, amount of care granted, fee items, living area and demographic of LTCI users. Statistical Observations of Municipalities data were linked with LTCI claims data in municipality level. This municipality level data were collected by Statistic Japan annually and includes regional information about population structure, economic status and health care status. This study was approved by the ethics committee of the University of Tsukuba (approval numbers: 1324).

Inclusion criteria required to be aged 65 years or older, have used LTCI services in fiscal year (FY) 2016. Only LTCI users who were care-need level 1-5 were included because their eligible services are different from support level.

Dependent variables

Annual LTCI expenditure for individuals who are satisfied abovementioned inclusion criteria were calculated by summarizing insurance claims and out-of-pocket payment. Government set amount of units according to types of services and these amounts are unified in national level. Basically, one unit is 10 Japanese Yen, however what makes differences between regions are extra charge rate. Eight level regions were set by government according to their labor cost, and each level have following extra charge rate: level 1 (20%), level 2 (16%), level 3(15%), level 4(12%), level 5(10%), level 6(6%), level 7(3%) and level 8(0%). For better understanding regional variation which arise from amount in services use, we calculated price-adjusted annual LTCI expenditure for each person. Thus, in this study, the more expenditure represents the more amount of LTCI services use.

Independent variables

Variables reported as predictor of LTCI expenditure in the previous research were selected. Individual characteristics of age, sex, care-need level (care-need level 1 to 5), service type (facility service VS home and community services) were included. Four categories of co-insurance were used as a substitute of income level. Under government regulation, the extent of co-insurance decrease with income: 100% (lowest income), 90% (in general), 80% (higher income), 70% (highest income).

The following municipality variables were used to characterize demand and supply of health care. Variable captures demand of health care includes (a) proportion of elderly single households, (b) death rate. Variables represent supply of health care were (a) number of long-term care welfare facilities per 1000 LTCI users (care level 1-5) and (b) number of doctors per 1000 person (c) number of clinic per 1000 users.

Tow of regional economic status variable were included. One is eight level region which have mentioned before, the other is location

(Metropolitan VS Non-metropolitan).

Statistical analysis

Descriptive analysis was carried out to review the distribution of dependent and independent variables. To detect the skewed distribution of dependent variable, generalized linear model (GLM) were used. Box-cox test were conducted to select appropriate link function and modified park test were conducted for the distribution family.[6] Robust standard variance estimator that accounts for clustering within regions were applied.[7]

With regard to modeling LTCI expenditure, we considered 2 models of increasing complexity with the aim of adjusting for variables that might drive regional variation. Unadjusted; model 1, age and sex adjusted; model 4, additionally adjusted for users status, municipality characteristics. Data management and analyses were performed in STATA version 14.

C．研究結果

Study population and descriptive statistics

In initial dataset, there were 3992671 individuals from 1702 municipalities who were care-need level 1 to 5 and used LTCI services in FY2016. We exclude 110019(2.8%) individuals who were younger than 65 years old, 1036(0.03%) individuals whose payment was zero. After merge with municipality level data, 5768(0.14%) individuals were excluded. Finally, 3876068 individuals from 1697 municipalities were included to our statistical analysis stage.

Regional variation in LTCI expenditure

Regarding unadjusted per-capita expenditure, the highest prefecture was 20% higher than the lowest. Moreover, after stratified by service type, the external ratio reached 37% in home and community care expenditure. Even external ratio reduced slightly after adjusting for individual and municipality characteristics (model 3), expenditure in community and home care still revealed high variation.

Table 1 presents factors associated with annual LTCI expenditure. Individuals with older age, higher care-need level and women were associated with higher LTCI expenditure. Facility services users spend 850 thousand yen than home-community care services users. Highest income individuals who are only receiving 70% of co-insurance significantly associated with less expenditure compared to others. Municipalities that have more number of doctors per 1000 citizens, higher proportion of single elderly household, located in metropolitan were associated with higher LTCI expenditure. Number of long-term care welfare facilities strongly associated with higher total LTCI expenditure and home and community care expenditure, but no significant association was showed in facility care expenditure. Death rate were negatively associated with LTCI expenditure.

D．考察

Within Japanese LTCI system, per capita annual LTCI expenditure on LTCI services users (care-need level 1 to 5) amount to 1730 thousand yen.

A remarkable prefecture variation was shown in home and community care per capita spending, that the difference between highest to lowest is 30% even adjusted for population and municipality characteristics.

Compare to home and community care setting, the difference of per-capita spending is quite small (8%) in facility setting. Potential reasons for the wide variation in home and community care might be the large variety of services, whereas there are only three types of facility services. A care manager was given entire responsibility of planning all services for individuals.[8] Decision making on coordination of services among more than twenty home and community services largely depend on users' health status, priority and family request. Thus, home and community services itself do have great variation.

Women spend more than man which is in accordance with previous studies [9, 10]. One of this reason could be more of single women than man. As women live longer than men, men are more likely to benefit from informal care.

Consistent with Germany[11] and Canada[12] studies, our results indicated that facility services users spend more than home and community services users. One possible reason is that a higher risk of care-need level deterioration in facility setting may result in a rise in expenditure. One Japanese study have reported that facility services users are more likely to experience care-need level deterioration than home and community services users. [13]

Ｅ．結論

In summary, we confirmed that per-capita LTCI expenditure varied substantially among prefectures, and these variation were partly explained by individual and municipality characteristics.

Ｆ．研究発表

なし

１．論文発表

投稿予定

論文投稿および査読後の修正により結果が変わる可能性がある

２．学会発表

なし

Ｇ．知的財産権の出願・登録状況（予定を含む）

１．特許取得

なし

２．実用新案登録

なし

３．その他

なし

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Table 1. Association of annual LTCI expenditure with individual and municipality char acteristics (model 4).

	LTCI services			Facility services				Home and community services			
	dy/dx	95%CI	P-value	dy/dx	95%CI		P-value	dy/dx	95%CI		P-value
Individual characteristics											
Age	7.0	6.8-7.2	<0.001	2.4	1.9	3.0	<0.001	6.6	6.3	6.9	<0.001
age2	-0.04	-0.04--0.04	<0.001	-0.02	-0.02	-0.01	<0.001	-0.03	-0.03	-0.03	<0.001
Female(ref.: male)	27.5	27.2-27.7	<0.001	27.4	26.8	28.0	<0.001	27.0	26.8	27.3	<0.001
Care-need level (ref.: care-need level 1)											
care-need level 2	42.6	42.4-42.9	<0.001	20.6	19.6	21.7	<0.001	38.2	37.9	38.4	<0.001
care-need level 3	92.3	92.0-92.6	<0.001	40.2	39.2	41.1	<0.001	90.3	89.9	90.6	<0.001
care-need level 4	106.0	105.6-106.3	<0.001	47.3	46.4	48.2	<0.001	110.1	109.7	110.5	<0.001
care-need level 5	123.3	122.9-123.8	<0.001	53.0	52.1	53.9	<0.001	144.5	143.9	145.1	<0.001
Service type											
home and community s ervices	-85.0	-85.3--84.6	<0.001								
Service combination	-5.1	-5.6--4.7	<0.001	-132.2	-132.7	-131.8	0.0	-61.5	-61.9	-61.2	<0.001
Co-insurance (ref.:100%)											
90%	-0.2	-1.9-1.5	0.821	-2.6	-5.9	0.8	0.133	0.2	-1.8	2.2	0.830
80%	-1.9	-3.6--0.2	0.029	-9.0	-12.5	-5.5	<0.001	0.7	-1.3	2.8	0.481
70%	-75.2	-78.9--71.5	<0.001	-54.1	-66.5	-41.8	<0.001	-71.8	-75.5	-68.1	<0.001
Municipality characteristics											
Metropolitan (ref.: non-metropolitan)	1.0	0.6-1.4	<0.001	2.3	1.6	3.1	<0.001	0.5	0.0	0.9	0.034
Proportion of single el derly households (%)	0.4	0.3-0.5	<0.001	0.1	-0.1	0.2	0.352	0.5	0.4	0.6	<0.001
number of long-term c are welfare facilities pe r 1000 LTCI users wh o are care level1 to 5	10.9	9.5-12.3	<0.001	0.5	-2.6	3.7	0.737	12.8	11.2	14.4	<0.001
number of doctors per 1000 person	0.5	0.4-0.6	<0.001	0.2	0.1	0.4	0.002	0.6	0.5	0.7	<0.001
Death rate (per 1000 p eople)	-1.8	-1.9- -1.7	<0.001	-0.6	-0.8	-0.4	<0.001	-2.4	-2.5	-2.3	<0.001