CARE-SEEKING PATTERN AND COSTS OF HEALTH SERVICES IN INDIVIDUALS WITH MULTIPLE CHRONIC CONDITIONS

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OBJECTIVES:

Individuals with multiple chronic conditions (MCC) require not only intensive but also comprehensive care, which is more complicated than those with only one or no chronic condition. The extent to which the medical care they receive is coordinated can have an impact on their health status, health-related quality of life, and, medical expenditures. Therefore, this study aimed to examine the care-seeking pattern and medical costs of individuals with MCC, and identify factors associated with the pattern and medical costs.

METHODS:

Adults with multiple chronic conditions were identified from the National Health Insurance (NHI) claims data of 2019, and subjects were randomly selected from those with 2-3, 4-5, and >5 chronic conditions, respectively. Their use and costs of ambulatory care, emergency room (ER) visits, hospital admissions of the same year were retrieved from the NHI administrative data. Continuity of care of outpatient visits was measured by the Continuity of Care Index (COCI). Logistic regression model was adopted to identify factors associated with better continuity of care (> median COCI). Generalized linear models (GLMs) with log link and gamma distribution were used to examine factors associated with outpatient cost, ER/inpatient cost, and total cost. Covariates included patient characteristics, characteristics of principal health care provider, MCC levels, and interaction terms of MCC levels and continuity of care (for GLMs).

RESULTS:

The majority of the sample were more than 65 years old and female (Table 1). Subjects with more chronic conditions tended to be female, older, having lower NHI insurable income, having lower COCI, seeking medical care primarily from hospitals of higher accreditation levels, having hospitalization history, and incurring higher use and costs of outpatient care, and ER and inpatient care. Individuals with more than five chronic conditions, compared to those with fewer chronic conditions, had the highest numbers of outpatient visits, ER visits, and hospital admissions (31.95, 0.53, and 0.76, respectively). They also incurred the highest outpatient cost, ER/inpatient cost, and total cost (NT$117,022, NT$66,770, and NT$183,792, respectively (NTD:USD ≅ 30:1)).

Table 1. Characteristics of the sample

	MCC 2-3 (n=10,000)		MCC 4-5 (n=10,000)		MCC >5 (n=10,000)		p-value
Age (n, %)							
18-44	699	6.99	201	2.01	97	0.97	<.001
45-64	4,295	42.95	2,610	26.10	1,506	15.06	
>=65	5,006	50.06	7,189	71.89	8,397	83.97	
Male (n, %)	5,101	51.01	4,803	48.03	4,812	48.12	<.001
Urbanization of NHI residency							
City	2,638	26.38	2,580	25.80	2,484	24.84	0.002
Township	3,138	31.38	3,001	30.01	3,030	30.30	
Rural area	4,224	42.24	4,419	44.19	4,486	44.86	
NHI insurable income (n, %)							
Poor/low	2,873	28.73	3,291	32.91	3,628	36.28	<.001
Middle	3,274	32.74	3,548	35.48	3,649	36.49	
High	3,853	38.53	3,161	31.61	2,723	27.23	
COCI (n, %)							
<4	121	1.21	64	0.64	29	0.29	<.001
Low	3,507	35.07	5,525	55.25	5,859	58.59	
High	6,372	63.72	4,411	44.11	4,112	41.12	
Hospital accreditation level (n, %)							
Medical center	2,080	20.80	2,273	22.73	2,503	25.03	<.001
Regional hospital	2,860	28.60	3,310	33.10	3,779	37.79	
District hospital/others	5,060	50.60	4,417	44.17	3,718	37.18	
Hospitalization history (n, %)	1,652	16.52	3,012	30.12	4,635	46.35	<.001
Use of medical care (mean, std)							
Outpatient visits	13.25	9.33	22.07	13.39	31.95	18.12	<.001
ER visits	0.07	0.41	0.21	0.90	0.53	1.82	<.001
Hospital admissions	0.11	0.43	0.34	0.73	0.76	1.08	<.001
Cost of medical care (mean, std)[#]							
Outpatient care	33,373	94,330	70,365	141,209	117,022	191,936	<.001
ER and inpatient care	11,155	68,156	32,477	101,852	66,770	143,298	<.001
Total cost	44,528	120,711	102,842	182,423	183,792	253,903	<.001

Note: COCI: Continuity of Care Index; ER: emergency room; MCC: multiple chronic conditions; NHI: National Health Insurance.
[#]NTD:USD ≅ 30:1

Older age, being female, more chronic conditions, seeking medical care primarily from hospitals of lower accreditation levels were associated with poorer continuity of care (Table 2). Being male, younger, higher number of chronic conditions, poorer continuity of care, and seeking medical care primarily from hospitals of higher accreditation levels were associated with higher outpatient, inpatient, and total medical costs. Lower NHI insurable income and history of hospitalization were associated with higher outpatient cost and total cost.

Table 2. Analysis results of factors associated with continuity of care, outpatient cost, ER/inpatient cost, and total cost

	Better continuity of care OR (95% CI)	Outpatient cost Estimate (SD)	ER and inpatient cost Estimate (SD)	Total cost Estimate (SD)
Age (ref: 18-44)				
45-64	0.83* (0.72-0.96)	-0.15* (0.04)	-0.08 (0.08)	-0.18* (0.04)
≥ 65	0.72*(0.62-0.82)	-0.38* 0.04)	-0.27* (0.08)	-0.37* (0.04)
Male (ref: female)	1.25* (1.19-1.31)	0.05* (0.01)	0.15* (0.02)	0.12* (0.01)
Urbanization of NHI residency (ref: rural area)				
City	1.06 (0.99-1.13)	-0.02 (0.02)	0.02 (0.03)	-0.05* (0.02)
Township	1.05 (0.99-1.12)	-0.01 (0.02)	0.04 (0.03)	-0.02 (0.02)
NHI insurable income (ref: poor/low)				
Middle	0.90* (0.85-0.95)	-0.04* (0.02)	0.01 (0.03)	-0.02 (0.02)
High	0.97 (0.91-1.03)	-0.05* (0.02)	-0.03 (0.03)	-0.07* (0.02)
Hospital accreditation level (ref: district hospital/others)				
Medical center	2.19* (2.05-2.33)	0.33* (0.02)	0.29* (0.03)	0.46* (0.02)
Regional hospital	2.20* (2.08-2.32)	0.22* (0.02)	0.08* (0.03)	0.31* (0.02)
Hospitalization history (ref: no)	1.00 (0.94-1.05)	0.58* (0.01)	0.02 (0.02)	0.54* (0.01)
MCC (ref: MCC 2-3)				
MCC 4-5	0.42* (0.40-0.45)			
MCC >5	0.36* (0.34-0.38)			
Multiple chronic conditions and continuity of care (ref: MCC 2-3 and high COCI)				
MCC 4-5, high COCI		0.80* (0.02)	0.13* (0.06)	0.93* (0.02)
MCC >5, high COCI		1.24* (0.02)	0.29* (0.06)	1.45* (0.02)
MCC 2-3, low COCI		0.08* (0.02)	0.07 (0.07)	0.22* (0.02)
MCC 4-5, low COCI		0.67* (0.02)	0.18* (0.06)	0.87* (0.02)
MC C>5, low COCI		1.12* (0.02)	0.30* (0.06)	1.40* (0.02)

Note: COCI: Continuity of Care Index; ER: emergency room; MCC: multiple chronic conditions; NHI: National Health Insurance.
*p-value<0.05

CONCLUSIONS:

The findings of this study demonstrated that individuals with more chronic conditions were more likely to have poorer continuity of care. Both poorer continuity of care and more concurrent chronic conditions were factors associated with higher medical costs. Therefore, it is of importance to provide coordinated care to individuals with multiple chronic conditions, particularly those suffering from more chronic conditions.