

Health care utilization by older adults with geriatric conditions

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Abstract

Background: Geriatric conditions were associated with higher healthcare utilization but often overlooked in clinical practice. We aimed to analyze the patterns of health care utilization and costs associated with geriatric conditions in Taiwan.

Research design: population-based cross-sectional study.

Subjects: 1,729 community-dwelling older adults from 2005 National Health Interview Survey with linkage to National Health Insurance database.

Measurements: Geriatric conditions, i.e. cognitive impairment, depressive symptoms, falls, urinary incontinence, and persistent pain were ascertained by survey questionnaires. Healthcare utilization included outpatient physician services, emergency department (ED) visits, and hospitalizations. Poisson regression was used to model count data. Costs were analyzed by generalized gamma regression models.

Results: 1,729 participants (female 46.8%, mean age 73.4 yr) were enrolled. After adjustment, older adults with depressive symptoms had higher utilization of ED and inpatient services compared to their non-depressive counterparts. Combined effect analysis revealed that those with two or more geriatric conditions had 20%-higher utilization of outpatient physician services and 75%-higher ED services, compared to those without geriatric conditions. Number of geriatric conditions was associated with higher ED costs after adjusted for covariates. Unable to complete MMSE or CES-D questionnaire were associated with higher ED visits but not outpatient physician visits.

Conclusions: Proper detection and management of geriatric conditions in ambulatory settings may lower the risk of ED visits.

Background

- Geriatric conditions, or so-called geriatric syndromes, were common and have negative impact on several health outcomes, e.g. physical function, quality of life, and mortality.
- Facing the increasing burden of aging population on health care system, it is crucial to understand the utilization profile associated with geriatric conditions in order to allocate healthcare resources for older adults efficiently.

Methods

Study design and population

- Cross-sectional, population-based study
- data from the 2005 wave National Health Interview Survey with linkage to concurrent National Health Insurance database. 30,680 subjects of all age groups were drawn by multistage stratified sampling methods, with 80.6% completed the survey.
- 2,668 community-dwelling older adults aged 65+ completed survey. 1,729 older adults with consent to linkage to NHI database enrolled.

Assessment of geriatric conditions

- Cognitive impairment: using MMSE, cut-point adjusted for education level.
- Depressive symptoms: using short-form CES-D 10 scale, cut-point 11/12.
- Falls: self-reported unintentional falls to the ground during the past 12 months.
- Urinary incontinence: self-reported any unintentional urine leakage during the past 12 months.
- Pain: having moderate pain last for more than 1 month during the past 12 months.

Health care utilization and costs

- Counts and costs of outpatient physician services, emergency department (ED) services, and inpatient services in 2005 from claim data of the National Health Insurance database from Jan 2005 to Dec 2005 were analysed.
- Total healthcare costs included costs for outpatient physician services, ED services, and inpatient services, and prescriptions in 2005.
- Excluded dental care, home healthcare, and traditional medicine services.

Statistical analysis

- Geriatric conditions, individually and as aggregates, were independent variables. Number of co-existing geriatric conditions were controlled. Poisson regression was used to model count data. Generalized gamma regression models with log-link were applied to cost analysis.
- Covariates in the models included age, sex, marital status, education, living arrangement, number of chronic morbidities, functional status, income, urbanization level, co-payment exemption status.

Results

Table 1. Average utilization counts and annual costs by geriatric conditions.

Geriatric conditions	Outpatient physician visits		ED visits		Hospitalizations		
	n	counts	costs	counts	costs	counts	costs
Cognitive impairment^a							
No	1288	22.94	27975.8	0.34	907.0	0.26	13238.9
Yes	324	22.60	33390.8	0.51	1520.4	0.33	21458.3
Depressive symptoms^b							
No	1416	21.83	27741.6	0.33	879.6	0.23	12860.9
Yes	190	30.52	38624.6	0.73	2086.7	0.57	30004.5
Falls							
No	1376	21.58	27947.5	0.37	1055.7	0.26	22568.6
Yes	353	27.89	35801.9	0.56	1472.5	0.46	26789.6
Urinary incontinence							
No	1318	22.22	28287.2	0.37	1008.6	0.27	19333.4
Yes	411	24.92	33604.1	0.55	1564.8	0.40	36568.4
Pain							
No	1151	20.66	26905.9	0.38	1031.9	0.27	25135.3
Yes	578	27.26	34818.4	0.47	1357.7	0.37	20035.2
# of geriatric conditions							
0	610	19.60	23484.2	0.24	574.5	0.19	9801.3
1	500	22.35	30552.7	0.37	950.9	0.26	14356.2
2+	496	27.39	34312.5	0.54	1645.5	0.39	21683.3
Missing	123	22.92	36366.0	0.89	2685.9	0.68	134952.9

^a missing = 117 ^b missing = 123
cost based on New Taiwan Dollars, NTD (1 USD = 30 NTD)

Table 2. Poisson regression estimates of geriatric conditions on healthcare utilization counts.

Geriatric conditions	Outpatient physician visits		ED visits		Hospitalizations	
	β (SE)	Exp (β)	β (SE)	Exp (β)	β (SE)	Exp (β)
Cognitive impairment	-0.065 (0.054)	0.94	0.135 (0.137)	1.14	-0.113 (0.152)	0.89
Depressive symptoms	0.177 (0.061)	**1.19	0.453 (0.149)	**1.57	0.400 (0.158)	**1.49
Falls	0.121 (0.048)	*1.13	0.090 (0.123)	1.09	0.162 (0.129)	1.18
Urinary incontinence	-0.067 (0.048)	0.93	0.166 (0.12)	1.18	-0.004 (0.129)	1.00
Pain	0.135 (0.044)	**1.14	0.054 (0.117)	1.06	0.082 (0.125)	1.08
No. of GCs (ref=0)						
1	0.066 (0.053)	1.07	0.349 (0.156)	*1.42	0.121 (0.167)	1.13
2+	0.179 (0.056)	**1.20	0.561 (0.159)	***1.75	0.231 (0.169)	1.26
Missing	0.022 (0.097)	1.02	0.593 (0.213)	*1.81	0.277 (0.223)	1.32

Regression estimates adjusted for age, sex, marital status, education, living arrangement, urbanization level, functional status, number of chronic morbidities, number of co-existing geriatric conditions, income, and co-payment exemption status. * P < 0.05 ** p<0.005 *** p<0.0005

Results

Table 3. Gamma regression estimates of geriatric conditions (GCs) on annual healthcare utilization costs.

	Outpatient cost		ED cost		Inpatient cost		Total cost	
	β (SE)	Exp (β)	β (SE)	Exp (β)	β (SE)	Exp (β)	β (SE)	Exp (β)
Cognitive impairment	0.007 (0.083)	1.01	0.417 (0.177)	*1.52	-0.067 (0.225)	0.94	0 (0.092)	1.00
Depressive symptoms	0.124 (0.104)	1.13	0.189 (0.216)	1.21	0.383 (0.293)	1.47	0.196 (0.116)	1.22
Falls	0.069 (0.078)	1.07	0.133 (0.161)	1.14	-0.312 (0.210)	0.73	-0.083 (0.086)	0.92
UI	-0.105 (0.075)	0.90	0.075 (0.158)	1.08	0.136 (0.190)	1.15	-0.031 (0.082)	0.97
Pain	0.071 (0.069)	1.07	0.177 (0.141)	1.19	0.290 (0.179)	1.34	0.053 (0.075)	1.05
No. of GCs (ref=0)								
1	0.080 (0.078)	1.08	0.503 (0.166)	**1.65	0.262 (0.206)	1.30	0.104 (0.085)	1.11
2+	0.082 (0.086)	1.09	0.692 (0.177)	***2.00	0.098 (0.229)	1.10	0.060 (0.094)	1.06
Missing	-0.085 (0.148)	0.92	0.374 (0.322)	1.45	0.691 (0.428)	2.00	0.513 (0.175)	**1.67

Regression estimates adjusted for age, sex, marital status, education, living arrangement, urbanization level, functional status, number of chronic morbidities, number of co-existing geriatric conditions, income, and co-payment exemption status. UI indicates urinary incontinence. * P < 0.05 ** p<0.005 *** p<0.0005

Conclusions

- Selected geriatric conditions, i.e. depressive symptoms, falls, and persistent pain, were associated with higher healthcare utilization, after adjustment for chronic morbidities and physical limitations.
- Combined effect of geriatric conditions on utilization were significantly in ED service utilization and cost.
- Care programs for older adults should address detection and management of geriatric conditions in ambulatory settings.

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