

Evaluating the Healthcare Burden and Clinical Impact of Polypharmacy Among Older Adults in South Korea



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INTRODUCTION

Rapid Aging in South Korea

- South Korea's aging population (projected 25.3% aged 65+ by 2030) presents major healthcare challenges.

Polypharmacy Among South Korea's Aging Population

- In South Korea, 35.4% of seniors aged 65 take five or more medications, with 8.8% taking ten or more, increasing risks like drug interactions and adherence issues.
- These polypharmacy-related complications drive up healthcare utilization and costs, challenging the sustainability of the healthcare system.

Objective

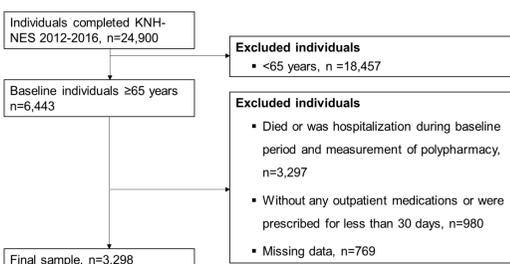
- This study evaluated the impact of polypharmacy on hospitalization rates and healthcare expenditure among individuals aged 65 years and older in South Korea.

METHOD

Data Source

Year	2012	2013	2014	2015	2016	2017
Korean National Health and Nutrition Examination Survey (KNHANES)	■	■	■	■	■	■
National Health Insurance Service (NHIS) claims data	■	■	■	■	■	■
Health Insurance Review and Assessment Service (HIRA) claims data	■	■	■	■	■	■

Study Population



Definitions and Measurement

- Medical costs:** total annual per capita medical, outpatient visit, hospitalization, and medication cost.
- Clinical outcomes:** hospitalization and mortality
- Polypharmacy** was defined as more than 30 prescription days with five or more distinct prescriptions in six months.
- Covariates:** age, sex, CCI, health lifestyles, income, insurance, etc.

Statistical analysis

- We performed a multivariable linear regression analysis to examine the effect of polypharmacy on outpatient visit, medication cost, and total expenses.
- We used a two-part model to predict the cost of hospitalization.
- In addition, we performed a multivariable logistic regression analysis to examine whether polypharmacy is a risk factor for hospitalization or death.

RESULTS

Table 1. Baseline respondent characteristics

Variables	All (n = 3297)	
	N	%
Age (years)		
65–79	2861	86.78
Sex		
Female	1809	54.87
Living alone		
No	2590	78.56
BMI		
< 25	2016	61.15
Walking days per week		
≥ 5	1426	43.25
Ever smoked		
No	1344	40.76
Drink		
Non-excessive	3197	96.97
Residential area		
Metropolitan	1501	45.53
Urban	1033	31.33
Rural	763	23.14
Income quartile (household)		
Low	1560	47.32
Lower-middle	929	28.18
Upper-middle	474	14.38
High	334	10.13
Health insurance type		
National health insurance	3090	93.72
Private medical insurance		
Yes	2160	65.51
Health screening within 2 years		
Yes	1064	32.27
Cancer screening within 2 years		
Yes	1214	36.82
Education level		
High school and above	868	26.33
Charlson comorbidity index		
0	2205	66.88
1	531	16.11
≥ 2	561	17.02
Disability		
Yes	479	14.53
Usual perception of stress		
Yes	626	18.99
Calendar year		
2012	689	20.90
2013	565	17.14
2014	610	18.50
2015	665	20.17
2016	768	23.29

Table 2. Association between polypharmacy and clinical outcomes in older adults: Multivariable logistic regression.

	Hospitalization	Mortality
Total (n = 3,297)	1.52(1.28–1.81) *	3.17(1.19–8.44) *
65–79 (n = 2,861)	1.48(1.23–1.79) *	3.72(1.06–13.05) *
≥ 80 (n = 436)	1.78(1.06–2.99) *	1.90(0.37–9.68)
Male (n = 1,488)	1.68(1.30–2.17) *	2.91(0.80–10.59)
Female (n = 1,809)	1.40(1.10–1.79) *	3.23(0.70–14.94)
Living alone (n = 707)	1.05(0.72–1.53)	1.92(0.33–11.12)
Not living alone (n = 2,590)	1.69(1.38–2.06) *	4.08(1.18–14.12) *

Figure 2. Medical costs by polypharmacy

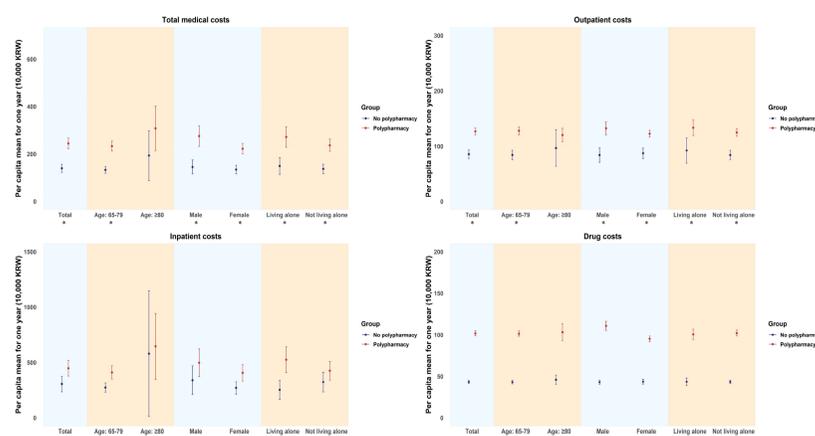
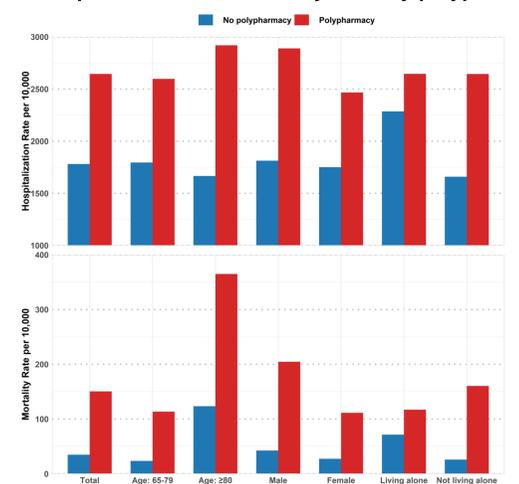


Table 3. The association between polypharmacy and medical costs (KRW)

Reference: Non-polypharmacy Comparison: Polypharmacy	Total cost ¹	Outpatient costs ¹	Drug costs ¹	Inpatient costs ²
Total (n = 3,297)	872,018 (153,868) *	324,879 (51,512) *	536,721 (20,589) *	1,282,226 (569,015) *
65–79 (n = 2,861)	847,661 (136,103) *	359,304 (54,547) *	534,199 (21,104) *	1,340,837 (447,457) *
≥ 80 (n = 436)	825,784 (771,406)	138,873 (156,864)	529,577 (74,149) *	1,056,337 (3,288,392)
Male (n = 1,488)	1,034,734 (278,886) *	390,089 (91,796) *	634,259 (32,586) *	1,213,485 (1,008,922)
Female (n = 1,809)	703,429 (160,331) *	270,219 (55,606) *	451,030 (26,085) *	1,257,406 (591,987) *
Living alone (n = 707)	1,080,115 (314,014) *	355,408 (133,679) *	494,303 (43,979) *	2,851,996 (897,463) *
Not living alone (n = 2,590)	819,306 (176,264) *	327,679 (54,811) *	548,063 (23,362) *	857,487 (693,495) *

Figure 1. Hospitalization and mortality rates by polypharmacy



- The polypharmacy was significantly associated with increased risks of hospitalization (OR, 1.52; 95% CI, 1.28–1.81) and mortality (OR, 3.17; 95% CI, 1.19–8.44).
- Polypharmacy also correlated with higher healthcare expenses, including total, outpatient visit, and medication cost, especially for those aged 65–79 and individuals living alone.
- Multivariable linear regression analysis demonstrated a mean annual increase of 872,018 KRW in total healthcare costs, with outpatient and medication costs elevated by 324,879 KRW and 536,721 KRW, respectively (p < 0.05).

- Superscript 1 denotes the results from the multivariable regression and superscript 2 indicates the results from the two-part model.
- The model for inpatient costs included 748 people who had hospitalization experience, of whom 641 were 65–79 years old, 107 were ≥ 80 years old, 354 were male, 394 were female, 177 lived alone, and 571 did not live alone.
- Standard errors are in brackets. *p < 0.05.

CONCLUSIONS

- This study demonstrates that polypharmacy in older adults is significantly associated with increased healthcare costs and elevated hospitalization and mortality risks.
- The findings highlight that integrated care with medication reviews and personalized plans, plus targeted support for isolated seniors through community resources, can reduce costs and improve outcomes.

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