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Effects of polypharmacy on sensory, oral, and dietary functions in older adults

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Abstract

Aim: Polypharmacy is a major health concern among older adults and is associated with increased vulnerability and adverse health outcomes. However, limited evidence exists regarding its association with sensory, oral, and dietary functions. This study examined the effects of polypharmacy on these functions using nationally representative data from the 2023 Korean Elderly Survey.

Methods: A total of 10,078 community-dwelling adults aged ≥ 65 years were analyzed. Polypharmacy was defined as the use of five or more medications. Sensory function (vision and hearing), oral function (chewing difficulty, swallowing difficulty, denture use, unmet dental needs), and dietary intake (meal frequency, fruit and vegetable consumption) were assessed using structured questionnaires. Chi-square tests and logistic regression analyses were performed. Model 1 adjusted for demographic factors, and Model 2 additionally adjusted for the number of chronic diseases.

Results: Older adults with polypharmacy showed substantially poorer sensory and oral function than those without polypharmacy. Higher prevalence was observed for vision difficulty (60.5% vs. 40.6%), hearing difficulty (48.7% vs. 20.6%), chewing difficulty (58.9% vs. 30.1%), swallowing difficulty (20.9% vs. 6.7%), and unmet dental care needs (9.6% vs. 3.0%) (all $p < 0.001$). In the fully adjusted model, polypharmacy remained significantly associated with hearing difficulty, chewing difficulty, swallowing difficulty, denture use, and unmet dental care needs. However, associations between polypharmacy and dietary intake indicators were not statistically significant after adjustment.

Conclusions: Polypharmacy is significantly associated with hearing and oral functional impairments among older adults, and these associations were attenuated but not fully explained after adjusting for chronic disease burden. These findings highlight the importance of comprehensive geriatric assessment and multidisciplinary care that integrates medication management and oral health. Strategies promoting rational prescribing and monitoring of functional outcomes are essential to mitigate the adverse effects of polypharmacy and support healthy aging.

Keywords

older adults, polypharmacy, sensory function, oral function, dietary intake

Introduction

Rapid population aging has positioned multimorbidity and medication burden among older adults as major global public health concerns [1, 2]. As chronic conditions accumulate with age, many older adults require multiple medications, increasing the risk of drug–drug interactions and adverse drug reactions (ADRs) [3, 4]. Polypharmacy, commonly defined as the concurrent use of five or more medications per day, has therefore been recognized as a critical indicator of vulnerability and clinical complexity in later life [5, 6]. Evidence consistently links polypharmacy to frailty, hospitalization, functional decline, and mortality [7, 8].

Medications used by older adults can influence sensory, oral, and dietary functions through diverse biological pathways. Certain drug classes, including cardiovascular agents, diuretics, and psychotropic medications, have been implicated in auditory or visual disturbances [9, 10]. Such impairments may exacerbate social isolation, communication barriers, and functional dependency, further diminishing quality of life. Despite these concerns, sensory health has rarely been examined alongside oral and dietary function in the context of polypharmacy.

Polypharmacy also directly affects the oral environment through xerogenic mechanisms. Several commonly used medications in older adults—including antihypertensives and antidepressants have been shown to induce hyposalivation and contribute to xerostomia [11, 12]. In addition, drugs with anticholinergic properties and diuretics further compromise salivary gland function, exacerbating oral dryness and mucosal discomfort [13]. As salivary flow declines, older adults are more likely to experience impaired mastication and swallowing, which negatively influences oral comfort and daily eating behaviors [12, 13]. Clinical studies have also reported that exposure to xerogenic medications increases the risk of periodontal disease and oral functional limitations, including difficulty chewing and swallowing [14]. These combined oral impairments may restrict dietary diversity and accelerate declines in nutritional and functional health.

Oral function plays an essential role in maintaining dietary intake and general health. Poor dental status, reduced masticatory performance, and inadequate denture function have been shown to limit the consumption of fruits, vegetables, and protein-rich foods [15, 16]. Furthermore, tooth loss and reduced chewing ability are associated with insufficient nutrient intake and increased risk of frailty, disability, and cognitive decline [17–19], demonstrating the central role of oral function in supporting functional independence in later life.

Dietary intake is another key health determinant that interacts with both chronic disease burden and medication use. Malnutrition and inadequate dietary intake are major threats to older adults and often coexist with multimorbidity and polypharmacy [20, 21]. Numerous medications can alter appetite, impair taste, or reduce gastrointestinal absorption, contributing to weight loss, sarcopenia, and impaired immunity [22, 23]. Given these associations, it is essential to understand how polypharmacy influences dietary patterns in older adults.

Despite the growing recognition of the risks associated with polypharmacy, few studies have assessed its combined associations with sensory, oral, and dietary functions. Moreover, it is unclear whether these associations persist after accounting for sociodemographic variables and multimorbidity, which are major determinants of medication burden in older adults. This gap limits understanding of how polypharmacy may contribute to multisystem functional decline.

Therefore, this study aimed to examine the effects of polypharmacy on three essential functional domains: sensory function, oral function, and dietary intake in a nationally representative sample of Korean older adults. By adjusting for sociodemographic characteristics and the number of chronic diseases, this

study sought to clarify the independent contribution of polypharmacy to functional health outcomes and to provide foundational evidence for integrated geriatric care and oral health promotion.

Materials and methods

Study design and data source

This study employed a cross-sectional design using raw data from the 2023 Korean Elderly Survey, a nationally representative survey of community-dwelling adults aged 65 years and older in South Korea. The survey used a stratified, multistage cluster sampling method to ensure proportional representation by region and key demographic characteristics. A total of 10,078 older adults participated in the survey. Sampling weights provided by the survey administrators were applied in all analyses to generate nationally representative estimates.

Study population

This study included all 10,078 respondents aged 65 years or older who participated in the survey. Although some variables (sensory, oral, and dietary-related items) contained missing values, participants were not excluded from the overall analytic sample. Instead, missing values were treated as variable-specific omissions, meaning that individuals with missing data for a given variable were excluded only from analyses involving that specific variable. As a result, the effective sample size varied across analyses.

Variable definitions

Polypharmacy

Polypharmacy, the primary independent variable, was defined as the concurrent use of five or more prescribed medications per day. Participants were categorized into either the polypharmacy group (≥ 5 medications) or the non-polypharmacy group (0–4 medications).

Sensory function

Sensory function outcomes were assessed using self-reported measures of vision and hearing status. Variables included the presence of vision difficulty, use of visual aids, presence of hearing difficulty, and use of hearing aids.

Oral function

Oral function was evaluated through four indicators relevant to daily oral health: chewing difficulty, denture use, difficulty in eating or swallowing, and unmet dental care needs.

Dietary intake

Dietary intake patterns were assessed through three indicators of inadequate dietary behaviors: consuming fewer than two meals per day, non-consumption of fruits, and non-consumption of vegetables.

Covariates

Covariates included sex, age, educational level, and employment status. To account for underlying disease burden known to influence both medication use and functional outcomes, the number of chronic diseases was included as a key health-related confounder in the fully adjusted model.

Statistical analysis

All statistical analyses were performed using IBM SPSS Statistics version 27.0 (IBM Corp., Armonk, NY, USA). Sampling weights were applied to all analyses to ensure national representativeness. Weighted descriptive statistics were used to summarize the general characteristics of the study population.

Differences in sensory, oral, and dietary functions according to polypharmacy status were examined using chi-square tests. For the number of chronic diseases, which did not follow a normal distribution,

group differences were assessed using the Mann-Whitney *U* test, and the results were presented as median (interquartile range, IQR). Logistic regression analyses were then conducted to investigate the associations between polypharmacy and each functional outcome. A crude model was first estimated with polypharmacy as the sole predictor. Model 1 adjusted for demographic covariates (sex, age, educational level, and employment status), and Model 2 further adjusted for the number of chronic diseases. For all models, odds ratios (ORs) and 95% confidence intervals (CIs) were calculated, and statistical significance was set at $p < 0.05$.

Results

General characteristics of the study population

The results of the descriptive analysis of the general characteristics of the study population are presented in Table 1. A total of 10,078 older adults were included in the analysis, of whom 43.9% were male, and 56.1% were female. The age distribution showed that 40.9% were 70–79 years old, followed by 34.5% aged 65–69 years and 24.7% aged 80 years or older. More than half of the participants (61.8%) had completed middle school or less, and 39.0% were currently employed. Regarding health-related behaviors, 9.4% were current smokers, 37.3% reported alcohol consumption, and 52.8% engaged in regular physical activity. The median number of chronic diseases was 2 (IQR = 2), and 5.3% of the total population met the criteria for polypharmacy (≥ 5 medications).

Table 1. General characteristics of participants.

Variables	Categories	*N*	%
Sex	Male	4,429	43.9
	Female	5,649	56.1
Age (years)	65–69	3,473	34.5
	70–79	4,120	40.9
	≥ 80	2,485	24.7
Education level	≤ Middle school	6,225	61.8
	High school	3,145	31.2
	≥ University	707	7.0
Employment status	Employed	3,931	39.0
	Unemployed	6,147	61.0
Alcohol consumption	No	6,324	62.7
	Yes	3,754	37.3
Smoking status	Non-smoker	9,134	90.6
	Smoker	944	9.4
Regular exercise	No	4,760	47.2
	Yes	5,318	52.8
Polypharmacy (≥ 5 drugs)	No (0–4)	9,548	94.7
	Yes (≥ 5)	530	5.3
Number of chronic diseases	Median (IQR)	2.00 (2)	

All categorical variables were analyzed using frequency analysis, and the number of chronic diseases was presented as median (interquartile range, IQR) because it did not follow a normal distribution. All analyses applied sampling weights. Because of weighting and variable-specific missing data, the total *N* and weighted percentages may vary slightly and may not sum exactly to 100%.

Differences in general characteristics by polypharmacy status

The results of the comparative analysis of general characteristics according to polypharmacy status are presented in Table 2. The prevalence of polypharmacy (≥ 5 drugs) was significantly higher among females (5.9%) than males (4.4%) ($p < 0.001$). Polypharmacy increased markedly with advancing age, with the highest prevalence observed among adults aged ≥ 80 years (8.7%), followed by those aged 70–79 years (5.7%) and 65–69 years (2.2%) ($p < 0.001$). The prevalence of polypharmacy was higher among those with a lower educational level (≤ middle school, 7.2%) than among those with a high school education (2.0%) or

university-level education (2.4%) ($p < 0.001$). The prevalence of polypharmacy was marginally higher among non-smokers (5.3%) than current smokers (4.4%); however, the difference was not statistically significant ($p = 0.242$). Polypharmacy was more frequent among participants who did not exercise regularly (6.1%) compared with those who exercised (4.5%) ($p < 0.001$). The number of chronic diseases was significantly higher in the polypharmacy group than in the non-polypharmacy group, with a median of 5 (IQR = 3) versus 2 (IQR = 2), respectively ($p < 0.001$).

Table 2. General characteristics according to polypharmacy status.

Variables	Categories	0–4 drugs *N* (%)	≥ 5 drugs *N* (%)	*p
Sex	Male	4,233 (95.6)	196 (4.4)	< 0.001
	Female	5,315 (94.1)	334 (5.9)	
Age (years)	65–69	3,395 (97.8)	77 (2.2)	< 0.001
	70–79	3,884 (94.3)	236 (5.7)	
	≥ 80	2,269 (91.3)	217 (8.7)	
Education level	≤ Middle school	5,777 (92.8)	448 (7.2)	< 0.001
	High school	3,081 (98.0)	64 (2.0)	
	≥ University	690 (97.6)	17 (2.4)	
Smoking status	Current smoker	902 (95.6)	42 (4.4)	0.242
	Non-smoker	8,646 (94.7)	488 (5.3)	
Alcohol consumption	No	5,901 (93.3)	423 (6.7)	< 0.001
	Yes	3,648 (97.2)	107 (2.8)	
Regular exercise	No	4,470 (93.9)	290 (6.1)	< 0.001
	Yes	5,079 (95.5)	239 (4.5)	
Number of chronic diseases Median (IQR)		2.00 (2)	5.00 (3)	< 0.001

*p-values were calculated using chi-square tests or the Mann-Whitney U test. All analyses applied sampling weights. Because of weighting and variable-specific missing data, the total N and weighted percentages may vary slightly and may not sum exactly to 100%.

Differences in sensory function by polypharmacy status

Table 3 presents the differences in sensory function according to polypharmacy status. Older adults with polypharmacy consistently exhibited poorer sensory outcomes than those without polypharmacy. Vision difficulty was notably more common in the polypharmacy group (60.5%) than in the non-polypharmacy group (40.6%) ($p < 0.001$), and the use of visual aids was also higher among individuals with polypharmacy (51.0% vs. 44.0%, $p = 0.001$). A similar trend was observed for hearing-related measures: hearing difficulty was reported by 48.7% of those with polypharmacy compared with 20.6% of those without ($p < 0.001$), and the use of hearing aids was nearly twice as frequent in the polypharmacy group (16.3% vs. 7.8%, $p < 0.001$).

Table 3. Differences in sensory function (vision and hearing) by polypharmacy status.

Variables	Categories	0–4 drugs *N* (%)	≥ 5 drugs *N* (%)	*p
Vision difficulty	None	5,617 (59.4)	198 (39.5)	< 0.001
	Present	3,837 (40.6)	303 (60.5)	
Use of visual aids	No	5,348 (56.0)	259 (49.0)	0.001
	Yes	4,200 (44.0)	270 (51.0)	
Hearing difficulty	None	7,509 (79.4)	257 (51.3)	< 0.001
	Present	1,945 (20.6)	244 (48.7)	
Use of hearing aids	No	8,799 (92.2)	443 (83.7)	< 0.001
	Yes	749 (7.8)	86 (16.3)	

*p-values were calculated using chi-square tests. Because of variable-specific missing data and weighting, the total N and weighted percentages may vary across variables.

Differences in oral function and dietary intake by polypharmacy status

The results of the comparative analysis of oral function and dietary intake by polypharmacy status are presented in Table 4. Older adults with polypharmacy demonstrated substantially poorer oral function than those without polypharmacy. The prevalence of difficulty in chewing was markedly higher among the polypharmacy group (58.9%) compared with the non-polypharmacy group (30.1%) ($p < 0.001$). The use of dentures was also more common in the polypharmacy group (50.0% vs. 23.6%, $p < 0.001$). Similarly, difficulty in eating or swallowing was more frequently reported among older adults with polypharmacy (20.9%) than among those without (6.7%) ($p < 0.001$).

Table 4. Differences in oral function and dietary intake by polypharmacy status.

Variables	Categories	0–4 drugs *N* (%)	≥ 5 drugs *N* (%)	*p
Difficulty in chewing	None	6,611 (69.9)	206 (41.1)	< 0.001
	Present	2,844 (30.1)	295 (58.9)	
Use of dentures	No	7,294 (76.4)	265 (50.0)	< 0.001
	Yes	2,255 (23.6)	265 (50.0)	
Difficulty in eating or swallowing	None	8,908 (93.3)	419 (79.1)	< 0.001
	Present	640 (6.7)	111 (20.9)	
Unmet dental care needs	No	9,167 (97.0)	453 (90.4)	< 0.001
	Yes	287 (3.0)	48 (9.6)	
Eating fewer than two meals per day	No	9,238 (96.7)	491 (92.6)	< 0.001
	Yes	311 (3.3)	39 (7.4)	
Non-consumption of fruits	No	8,653 (90.6)	450 (84.9)	< 0.001
	Yes	896 (9.4)	80 (15.1)	
Non-consumption of vegetables	No	9,204 (96.4)	494 (93.2)	< 0.001
	Yes	345 (3.6)	36 (6.8)	

*p-values were calculated using the chi-square test. Because of variable-specific missing data and weighting, the total *N* and weighted percentages may vary across variables.

Unmet dental care needs were significantly more prevalent in the polypharmacy group (9.6%) compared with the non-polypharmacy group (3.0%) ($p < 0.001$). Indicators of inadequate dietary intake were likewise more frequent among participants with polypharmacy, including eating fewer than two meals per day (7.4% vs. 3.3%), non-consumption of fruits (15.1% vs. 9.4%), and non-consumption of vegetables (6.8% vs. 3.6%) (all $p < 0.001$).

Effects of polypharmacy on sensory function

Table 5 presents the effects of polypharmacy on sensory function. In crude models, polypharmacy was significantly associated with poorer sensory outcomes. However, after adjusting for demographic variables (Model 1) and additionally for the number of chronic diseases (Model 2), the associations with vision difficulty and the use of visual aids were no longer statistically significant. In contrast, significant associations remained for hearing-related measures. Older adults with polypharmacy had 1.57 times higher odds of hearing difficulty (OR = 1.57, 95% CI = 1.27–1.93) in the fully adjusted model, although the association with the use of hearing aids was not significant after full adjustment ($p = 0.142$).

Table 5. Effects of polypharmacy on sensory function.

Variables	Crude OR (95% CI)	*p	Model 1 OR (95% CI)	*p	Model 2 OR (95% CI)	*p
Vision difficulty	2.24 (1.87–2.70)	< 0.001	1.88 (1.56–2.26)	< 0.001	1.11 (0.91–1.36)	0.902
Use of visual aids	1.33 (1.12–1.58)	0.002	1.33 (1.12–1.59)	0.002	0.96 (0.79–1.16)	0.650
Hearing difficulty	3.67 (3.06–4.40)	< 0.001	2.66 (2.18–3.23)	< 0.001	1.57 (1.27–1.93)	< 0.001
Use of hearing aids	2.28 (1.79–2.91)	< 0.001	1.68 (1.31–2.15)	< 0.001	1.22 (0.94–1.59)	0.142

OR and 95% CI were calculated using logistic regression analysis. Model 1 was adjusted for demographic variables (sex, age, education level, and employment status), and Model 2 was additionally adjusted for the number of chronic diseases. *p-values < 0.05 were considered statistically significant.

Effects of polypharmacy on oral function and dietary intake

Table 6 presents the effects of polypharmacy on oral function and dietary intake. In the fully adjusted model (Model 2), polypharmacy remained a significant predictor of several oral function impairments. Older adults with polypharmacy had 1.39 times higher odds of difficulty in chewing (OR = 1.39, 95% CI = 1.13–1.70), 1.67 times higher odds of using dentures (OR = 1.67, 95% CI = 1.37–2.03), and 1.48 times higher odds of difficulty in eating or swallowing (OR = 1.48, 95% CI = 1.16–1.90). Polypharmacy was also associated with unmet dental care needs (OR = 1.51, 95% CI = 1.06–2.14).

Table 6. Effects of polypharmacy on oral function and dietary intake.

Variables	Crude OR (95% CI)	*p	Model 1 OR (95% CI)	*p	Model 2 OR (95% CI)	*p
Difficulty in chewing	3.33 (2.78–4.01)	< 0.001	2.39 (1.97–2.90)	< 0.001	1.39 (1.13–1.70)	0.002
Use of dentures	3.24 (2.72–3.87)	< 0.001	2.42 (2.01–2.92)	< 0.001	1.67 (1.37–2.03)	< 0.001
Difficulty in eating or swallowing	3.69 (2.95–4.62)	< 0.001	2.61 (2.07–3.29)	< 0.001	1.48 (1.16–1.90)	0.002
Unmet dental care needs	3.39 (2.46–4.67)	< 0.001	2.73 (1.97–3.78)	< 0.001	1.51 (1.06–2.14)	0.021
Eating fewer than two meals/day	2.34 (1.65–3.31)	< 0.001	2.23 (1.57–3.17)	< 0.001	1.29 (0.88–1.88)	0.189
Non-consumption of fruits	1.71 (1.34–2.19)	< 0.001	1.69 (1.31–2.17)	< 0.001	1.10 (0.84–1.43)	0.502
Non-consumption of vegetables	1.93 (1.35–2.75)	< 0.001	2.01 (1.40–2.90)	< 0.001	1.32 (0.89–1.94)	0.168

OR and 95% CI were calculated using logistic regression analysis. Model 1 was adjusted for demographic variables (sex, age, education level, and employment status), and Model 2 was additionally adjusted for the number of chronic diseases. *p-values < 0.05 were considered statistically significant.

In contrast, polypharmacy was not significantly associated with dietary indicators after full adjustment, including eating fewer than two meals per day (p = 0.189), non-consumption of fruits (p = 0.502), and non-consumption of vegetables (p = 0.168).

Discussion

This study evaluated the associations between polypharmacy (≥ 5 medications, 5.3%) and sensory, oral, and dietary functions among older adults using data from the 2023 Korean Elderly Survey (10,078 participants). Older adults with polypharmacy exhibited a higher prevalence of functional impairments compared with those without polypharmacy, including vision difficulty (60.5% vs. 40.6%), hearing difficulty (48.7% vs. 20.6%), chewing difficulty (58.9% vs. 30.1%), and difficulty eating or swallowing (20.9% vs. 6.7%) (Tables 3 and 4; all p < 0.001). These patterns are consistent with previous literature reporting greater functional vulnerability among individuals with higher medication burden [1, 2].

Sensory function showed distinct patterns after adjustment. In Model 2, vision difficulty (OR = 1.11, 95% CI = 0.91–1.36, p = 0.902), use of visual aids (OR = 0.96, p = 0.650), and use of hearing aids (OR = 1.22, p = 0.142) were no longer statistically significant, whereas hearing difficulty remained independently associated with polypharmacy (OR = 1.57, 95% CI = 1.27–1.93, p < 0.001) (Table 5). These findings suggest that sensory decline among older adults may be driven more by underlying multimorbidity than by direct pharmacologic effects of polypharmacy, aligning with earlier evidence on medication-related auditory and visual disturbances [9, 10].

In contrast, oral function remained significantly associated with polypharmacy even after adjusting for chronic diseases. Chewing difficulty (OR = 1.39, p = 0.002), denture use (OR = 1.67, p < 0.001), swallowing difficulty (OR = 1.48, p = 0.002), and unmet dental care needs (OR = 1.51, p = 0.021) all remained significant in Model 2 (Table 6). These findings are consistent with previous evidence showing that xerogenic medications such as antihypertensives, antidepressants, anticholinergics, and diuretics contribute to hyposalivation [12–15], which can translate into measurable declines in oral function. Reduced salivary flow interferes with bolus formation, lubrication, and swallowing efficiency [24], and similar mechanisms were reflected in the present study.

Dietary function showed significant differences in the crude analysis, including higher rates of non-consumption of fruits, non-consumption of vegetables, and eating fewer than two meals per day among adults with polypharmacy. However, these associations were no longer statistically significant after adjusting for chronic disease burden in Model 2, suggesting that the relationship between polypharmacy and dietary behaviors may be indirectly mediated through oral functional decline and multimorbidity rather than representing a direct pharmacologic effect. Reduced masticatory capacity often leads older adults to avoid fibrous and protein-rich foods, resulting in inadequate nutrient intake, a pattern consistent with previous evidence linking oral frailty with nutritional and functional decline [25, 26]. Dietary diversity has also been identified as an important determinant of cognitive and overall health status in older adults [27]. Furthermore, certain medications commonly prescribed in this population have been shown to influence appetite regulation and physiological functioning, thereby negatively affecting dietary behaviors [28].

The concurrent decline in sensory and oral function identified in this study also aligns with emerging concepts of oral frailty and frailty trajectories among older adults [29, 30]. Oral function decline is considered an early marker of systemic frailty, and the observed association between hearing impairment and declines in cognitive and physical functioning is consistent with previous evidence [31, 32]. These findings indicate that multisystem functional vulnerabilities tend to co-occur among older adults with polypharmacy, underscoring the need for clinical intervention.

Furthermore, polypharmacy has been described not merely as a numerical count of medications but as an indicator of underlying systemic vulnerability and multimorbidity [33, 34]. In the present study, oral functional impairments remained independently associated with polypharmacy even after adjustment for chronic disease burden, reinforcing the clinical relevance of this relationship. These findings emphasize the importance of comprehensive geriatric strategies that integrate deprescribing, xerostomia management, improved access to dental care, and nutritional counseling [35, 36]. Such approaches may help disrupt the cycle between polypharmacy and functional decline and promote healthy aging.

This study has several limitations. First, the cross-sectional design precludes causal inference regarding whether polypharmacy directly contributes to functional decline. Second, all sensory, oral, and dietary measures were based on self-report, which may introduce recall or social desirability bias. Third, detailed information on medication classes, dosages, and pharmacologic interaction burden, including cumulative anticholinergic load, was not available, which limits mechanistic interpretation. Future research that incorporates longitudinal designs and medication-specific analyses is warranted.

This study demonstrates that polypharmacy is closely linked to functional vulnerability in older adults, with oral function showing persistent independent associations even after adjusting for multimorbidity. These results highlight the need for integrated geriatric care that combines medication review, oral function management, and nutritional support to mitigate the adverse functional impacts of polypharmacy and promote healthy aging.

Abbreviations

ADRs: adverse drug reactions

CIs: confidence intervals

ORs: odds ratios

Declarations

Author contributions

DHL: Conceptualization, Investigation, Writing—original draft, Writing—review & editing. BRK: Investigation, Writing—original draft. MKJ: Validation, Writing—review & editing, Supervision. All authors read and approved the submitted version.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical approval

This study used anonymized data from the 2023 Korean Elderly Survey conducted by the Korea Institute for Health and Social Affairs (KIHASA) under the Ministry of Health and Welfare, Republic of Korea. According to national research ethics guidelines, secondary analyses of de-identified public data are exempt from Institutional Review Board (IRB) review.

Consent to participate

Not applicable.

Consent to publication

Not applicable.

Availability of data and materials

Data from the 2023 Korean Elderly Survey are publicly available from the KIHASA data portal [https://data.kihasa.re.kr].

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