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Research Article

Emergency department perspective on geriatric patients presenting with fall complaints

Acil servise düşme şikâyeti ile başvuran geriatrik hastalara bakış

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Abstract

Aim: Geriatric falls represent a rapidly growing public health concern worldwide. This study aims to evaluate geriatric patients presenting to the emergency department (ED) due to falls.

Material and Methods: In this retrospective cross-sectional study, patients aged 65 and over who presented to the ED due to falls were evaluated in terms of age, gender, marital status, month of presentation, time of presentation, history of falls within the last year, manner of arrival, affected body region, departments consulted, radiological examinations conducted, previous history of falls, past medical history, hospitalization status, and mortality.

Results: Of the 1080 patients, 718 (66.48%) were female, with a median age of 77.00 (range 65-102). The patients were classified into two groups based on age; those between 65-74 years old as group 1, and those aged 75 and above as group 2. Group 1 comprised 435 patients (40.28%), while the group 2 included 645 patients (59.72%). 49.07% of the patients were married, and 47.87% were divorced/widowed. Among those divorced/widowed, 57.52% were above 75 years of age. Significant statistical associations were found between age groups and marital status, and between gender and marital status (p=0.000 for both). The most common complaints following a fall were related to the head-neck (21.35%) and leg-knee (16.64%) regions.

Conclusion: Our study indicates that age, gender, and marital status are significant risk factors in determining strategies related to falls in the elderly.

Keywords: Fall, geriatrics, gender, marital status

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Öz

Amaç: Geriatrik düşme dünya çapında hızla büyüyen bir halk sağlığı sorunudur. Bu çalışmanın amacı acil servise (AS) düşme nedeniyle başvuran geriatrik hastaları değerlendirmektir.

Gereç ve Yöntemler: Bu retrospektif kesitsel tipte çalışmada, AS e düşme nedeniyle başvuru yapan 65 yaş ve üstü hastaların yaşı, cinsiyeti, medeni hali, başvuru ayı, başvuru saati, son bir yıl içinde düşme hikayesi, geliş şekli, etkilenen vücut bölgesi, konsültasyon istenen birimler, yapılan radyolojik tetkikler, eski düşme öyküsü, özgeçmişindeki hastalıkları, yatış durumu ve mortalite değerlendirildi.

Bulgular: 1080 hastanın 718'i (%66,48) kadın, ortanca yaşı 77.00 (65-102) idi. Hastalar yaşlarına göre; 65-74 yaş aralığında olanlar grup 1 ve 75 yaş ve üstünde olanlar ise grup 2 olarak sınıflandırıldı. Grup 1 (65-74 yaş) hasta sayısı 435 (%40,28) iken grup 2 (75 yaş ve üstü) hasta sayısı 645 (%59.72) idi. Hastaların %49,07'si evli, %47.87'si ise boşanmış/dul idi. Boşanmış/dul olanların 75 yaş üstünde %57,52 oranındaydı. Yaş grupları ile medeni hal, cinsiyet ile medeni hal arasında istatistiksel olarak anlamlı sonuç bulundu (sırasıyla p=0.000, p=0.000). Hastaların düşme sonucunda şikayetleri en sık baş-boyun (%21,35) ve bacak-diz (%16,64) bölgelerinde idi.

Sonuç: Çalışmamız yaşlılarda düşme ile ilişkin stratejilerin belirlenmesi için yaş, cinsiyet ve medeni durumun risk faktörü olarak önemli olduğunu göstermektedir.

Anahtar Kelimeler: Düşme, geriatri, cinsiyet, medeni durum

Introduction

Falls among the elderly, and the subsequent demand for healthcare and support, constitute an escalating public health concern globally (1-3). Reports by the World Health Organization indicate that annually, about 28-35% of individuals aged 65 or above, and 32-42% of those older than 70, suffer from falls (4). Falls rank as a leading cause of mortality linked to accidental injuries after traffic incidents, falls significantly contribute to both morbidity and mortality. Although falls present a universal risk of injury, factors such as the patients's age, gender, and overall health, Alongside the type and severity of the injury incurred, significantly influence the risk level.

Accounting for 20-30% of minor and severe injuries falls also lead to 10-15% of all emergency department (ED) admissions. Notably, patients aged 65 and above represent over half of the hospitalizations due to such injuries (4).

This study's objective is to assess geriatric patients who visit the ED following a fall.

Material and Methods

This study adhered to the Helsinki Declaration guidelines, securing approval from the ethical committee (2023/485). The study retrospectively reviewed geriatric patients aged 65 and above who presented to ED care due to falls between September 1, 2022, and August 15, 2023. Patients were evaluated regarding to their age, gender, marital status, month of presentation, time of presentation, history of falls within the last year, manner of arrival, affected body region, departments consulted, radiological examinations conducted, previous history of falls, past medical history, hospitalization status, and mortality. Exclusions were made for falls resulting from intentional trauma, during hospitalization, or with unclear histories.

Patients were categorized into two age groups: those between 65-74 years old (group 1) and those 75 years of age or older (group 2).

Statistical analysis

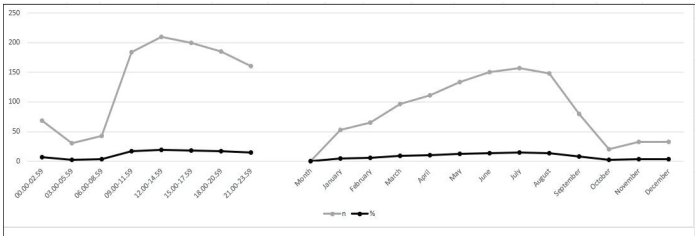
Data analysis was performed using IBM Statistical Package for the Social Sciences (SPSS) Version 25.0. The Kolmogorov-Smirnov Test assessed data distribution. Descriptive statistics included the number of cases (n), percentages (%), means ± standard deviations (±), medians, and range (minimum-maximum). Tables presented categorical and demographic data in terms of case numbers (n) and percentages (%). Group comparisons of categorical data utilized the Pearson Chi-Square test, considering p-values <0.05 as statistically significant.

Results

Of the 1.080 patients, 718 (66.48%) were female. The median age of 77.00 years (range 65-102). There were 435 patients

(40.28%) in group 1 (aged 65-74) and 645 patients (59.72%) in group 2 (aged 75 and above). Among these, 34.71% of the males were classified in group 1, while 67.29% of females were categorized in group 2, indicating a higher prevalence of females aged over 75 in group 2. The data revealed that 36.35% of all females and 74.31% of males were married (Table 1). A statistically significant association was observed between age groups and marital status, as well as between gender and marital status, with p-values of 0.000 for both comparisons.

The highest incidence of patient presentations due to falls was observed in the months of July (14.54%) and June (13.89%). Upon examining the distribution of presentation times, a noticeable increase in the number of patients presenting from 09:00 (n=43, 17.04%), reaching a peak between the hours of 12:00 and 17:59 (n=410, 37.96%). Furthermore, the time span from 09:00 to 23:59 comprised 86.94% of the total presentations (Figure 1).



	Hour	00.00-02.59	03.00-05.59	06.00-08.59	09.00-11.59	12.00-14.59		15.00-17.59		18.00-20.59		21.00-23.59	
Admission Time	n	68	30	43	184	210		200		185		160	
	%	6,30	2,78	3,98	17,04	19,44		18,52		17,13		14,81	
	Month	January	February	March	April	May	June	July	August	September	October	November	December
	n	53	65	96	111	134	150	157	148	80	20	33	33
	%	4,91	6,02	8,89	10,28	12,41	13,89	14,54	13,70	7,41	1,85	3,06	3,06

Figure 1. Patient Admission Times (month and hour).

*Represents time intervals within a day. n: number %: percentage.

In the year preceding their most recent visit to the ED 32 patients experienced a fall, with 2.6% of these patients reporting at least one additional fall within this timeframe. An analysis of the patients' historical accounts revealed that, excluding the last year, 13.61% of patients had experienced between one and three falls after reaching the age of 65 (Table 1).

Upon evaluating the state upon entry to the Emergency Department, a substantial number of individuals, 52.13% (n=563), arrived using their means of transportation, followed by those transported by ambulance services, 52.13% (n=507). An assessment of the reasons for falls identified 1,702 instances, with mechanical falls from the same level (n=865) and simple falls (n=370) being the most commonly reported types. It was noted that patients could be associated with one or multiple types and causes of falls (Table 2).

Table 1. The status and number of falls in the patients' history.

The status and number of falls within the last year?	Fall Status and number	n	%
	Yes	32	2.96
	No	1048	97.04
	Total	1080	100.00
Number of emergency department visits due to falls within the last year*		n	%
	1 time	25	2.31
	2 times	4	0.37
	3 times	3	0.28
	Total	32	2.96
Number of falls recalled in the medical history**		n	%
	1 time	94	8.70
	2 times	38	3.52
	3 times	15	1.39
	4 times	8	0.74
	5 times	1	0.09
	6 times	2	0.19
	10 times	1	0.09
	Total	159	14.72

*The number of falls in the year prior to the patients' last visit to the emergency department, **The number of falls that can be recalled in the medical history since the age of 65, excluding the last year, n: number, %: percentage

Regarding the timing of ED presentations post-fall, 90.09% of patients received medical attention on the same day as the fall, while 9.91% did so in the following days: 50.47% within 1-3 days, 47.66% between 4-15 days, and 1.87% after more than 15 days. An extensive data review of injuries sustained from falls, including pain, bruising, swelling, lacerations, superficial wounds, and deformities, revealed indicating that injuries frequently involved the cranial-cervical region (21.35%) and leg-knee (16.64%) areas (Figure 2).

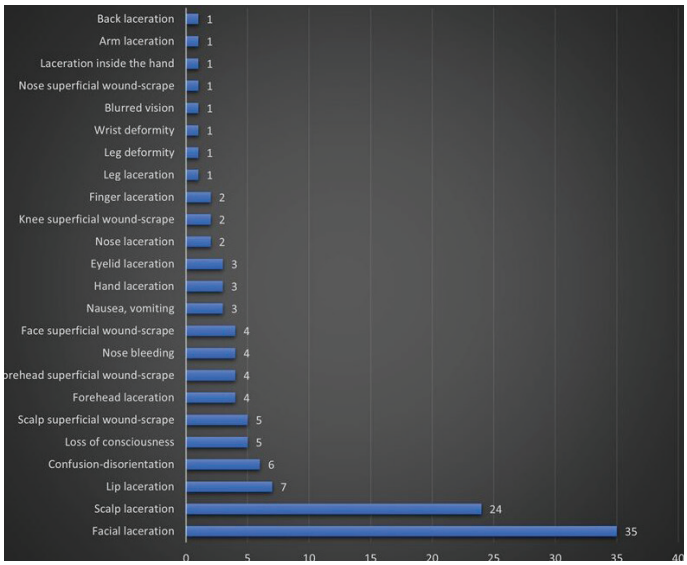


Figure 2. Distribution of complaints reported as injury by patients.

Table 2. Distribution of patient's types of falls and the specified causes.

Type of Fall	n	Cause (Specified)* Number of Causes	Cause (Specified)* Number of Causes
Mechanical fall - falling from the same level	865		865
Simple fall	370	Simple fall	298
		Fall - Found on the ground by a relative	24
		In the dark	5
		Cramping	1
		Falling while walking	37
		Alcohol	5
Slipping tripping	127	Tripping over objects-animals	93
		Walker-cane slipping	4
		While getting on and off vehicles - not a traffic accident	9
		Falling from a height (unintentionally - from heights ranging between 80 cm and 7 meters)	21
Falling downstairs	61		61
Loss of balance	54	Falling face-first	22
		Inability to maintain balance	21
		Falling backward	7
		When bending over	4
Falling out of bed	47		47
Illness	38	Orthostatic hypotension	13
		Pain (in the back, knee, chest)	12
		Leg pain-swelling-weakness	7
		Nausea-vomiting-fatigue	3
		Pain (in the back, knee, chest)	2
		High blood pressure	1
In the bathroom - on the toilet	36	Slipping-cleaning	28
		While performing ablution	8
Falling while sitting	34	Falling from a chair-sofa-couch	30
		Falling from a wheelchair	2
		Falling off a bicycle	1
		Falling off a donkey	1
Dizziness	30		30
Fainting	24		24
Falling from an escalator	11		11
Falling due to overturning or bumping into objects	5		5

*Multiple causes of falls are found in patients, n: number of fall types.

Consultation services were requisitioned for 63.06% (n=681) of the study patients involving 1,609 instances of consultation across 29 diverse medical specialties. The discipline of orthopedics and traumatology received the highest number of consultations, accounting for 435 requests (Figure 3). An examination of patient histories identified existing medical conditions in 24.62% (266) of cases, predominantly featuring hypertension and cardiovascular issues (22.14%), muscle pains or myalgia (15.21%), and diabetes mellitus (9.39%) (Figure 4). Admission to the hospital was necessitated for 21.20% (299) of the cohort, with females constituting 65.93% (151) of these admissions. The study noted a mortality rate of 1.57% (17 patients).

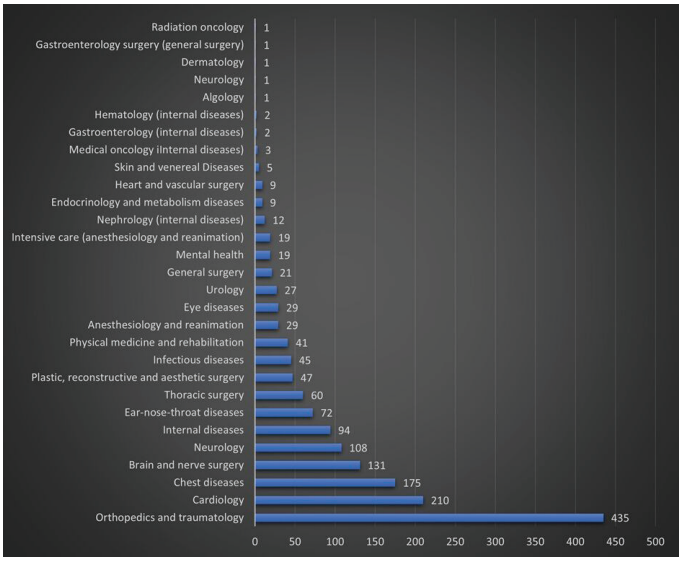


Figure 3. Distribution of consultations number requested from patients by medical specialty.

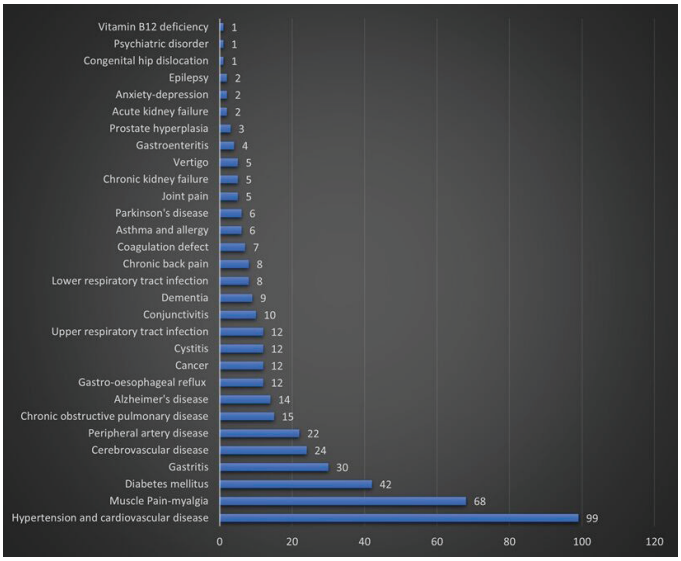


Figure 4. Distribution of patients' self-reported medical history of diseases, with multiple diseases present in a single patient.

Discussion

In patients aged 65 years and older, falls represent the predominant category of accidents, serving as a key element influencing injury-related hospital visits in this demographic. The importance of addressing falls lies in their capacity to deteriorate The assessment of the elderly's quality of life and to precipitate a reliance on others for the performance of daily activities. Our research aimed at analyzing the geriatric patients who sought care at the ED following falls, underscoring the profound consequences falls have on the self-support and health status of the elderly population.

In their study of 123 elderly patients (aged 65 and over) attending the ED, Çelik et al. identified that 19.5% were admitted due to falls, with these with an average age among these individuals of 75.2±6.53 (6). Ulusoy et al., in their study of patients aged 60 and over with fall incidents, observed that 55% were predominantly over 75 years old of which 71.7% represented females in the cohort (7). Similarly, Gökçek et al. analyzed elderly patients (65 and over) presenting to the ED for fall-related reasons and reported a mean age of 79.0±8.5, with 60.8% being female (8). These studies collectively highlight the prevalence of fall-induced ED visits among the elderly, particularly noting a higher average age and a significant proportion of female patients.

Kamel et al. assessed the risk factors contributing to falls in individuals over 60 at two distinct primary care facilities (9). The findings indicated that, of the 205 elderly patients surveyed, each recalled experiencing at least one fall incident in the preceding year. Although the body of research on fall risk factors in the elderly is extensive, the focus on gender-specific analyses remains relatively sparse (10, 11). Chang et al. scrutinized the distinct correlations between various potential risk factors and falls along gender lines (11). Among men, the study highlighted an independent association of higher fall risks with conditions and factors like stroke, nutritional risk, having education beyond high school, visual impairments, and being widowed, separated, or divorced, in addition to arthritis. Conversely, for women, the identified risk factors included stroke, being 85 years of age or older, nutritional challenges, and the weekly consumption of alcohol. These findings emphasize the critical need to incorporate gender considerations into the development of effective fall prevention measures. Our analysis revealed a gender ratio of 0.50, which is consistent with outcomes observed in previous studies, highlighting a balanced representation in our sample (8,12).

Ulusoy et al., within their research of older adults over 60 who experienced falls, revealed a marital status distribution where 51.7% were married, 3.7% divorced, and 1.7% single (7). Our analysis, however, demonstrated a distinct marital status pattern; among women, 59.89% were found to be divorced/widowed, and 36.35% were married, whereas 74.31% of men were married, and 24.03% were divorced/widowed.

Gökçek et al. identified that the autumn season and the time span from 06:00 to 11:59 were the periods with the highest incidences of falls (8). Moreover, it was noted that approximately half of the individuals (49.6%) had experienced falls previously. The resultant injuries predominantly comprised fractures (55.2%) and soft tissue damages (45.6%). The causes of indoor falls varied, with stumbling (26.4%), dizziness leading to falls (10.8%), difficulties in moving from sitting to standing positions (10%), slipping (9.2%), incidents during ablution (3.6%), reaching for high objects (2.8%), manoeuvring around the toilet (2%), and other miscellaneous indoor activities (7.6%) being reported. During our investigation, we noted that the bulk of the admissions (86.94%) took place between 09:00 and 23:59, reaching a peak between 12:00 and 17:59, likely reflecting the increase in daily activities during these intervals.

As individuals age, a distinct alteration in gait emerges, marked by diminished walking speed, reduced stride length, and decreased strength in the lower extremities, often resulting in a broad-based walking pattern. The decline in muscular strength and stamina in the elderly can precipitate falls through mechanisms such as slips or trips, compounded by challenges in standing up from seated positions, existing impairments, and foot-related complications including deformities of nails or toes, and corns, each of which could play a role in destabilizing balance and elevate fall risk (5). Our analysis indicates that falls predominantly occurred due to slipping or tripping, with subsequent causes including descending stairs, loss of balance, and tumbling out of bed.

With advancing age and the consequent rise in multimorbidity, evaluating and managing each comorbid condition becomes imperative in the care of geriatric trauma patients. Research conducted by Ulusoy et al. indicated a significant correlation between fall history in patients and various comorbidities, including hypertension (observed in 70% of patients), osteoporosis (30.4%), type 2 diabetes mellitus (27.3%), thyroid disorders (23%), congestive heart failure (7.3%), peripheral artery disease (7.3%), chronic obstructive pulmonary disease (10.3%), and cerebrovascular incidents (7%) (7). Furthermore, the study by Erdem et al. elucidated factors such as age, gender, chronic disease presence, sensory impairments, prior falls, ongoing medication intake, and cognitive status were statistically associated with increased fall risks (13). The phenomena of vertigo and urinary incontinence were notably prevalent in populations experiencing falls. (5,14) In our analysis, the most common chronic ailments, ranked by frequency, were hypertension and cardiovascular diseases, with muscle pains/myalgia and diabetes mellitus also prominently featured.

In older adults, falls may culminate in an array of physical complications, such as fractures, injuries to solid organs, issues related to joints, damage to soft tissues, cuts, and skin lesions. Komisar et al., a significant proportion (85.9%) of falls entailed direct impacts on different bodily regions, with the likelihood of impact being highest for the hip/pelvis area, subsequently followed by the trunk/shoulder, the elbow/forearm and hand/wrist, the knee, and lastly the head (16). The findings also delineated that injuries were confined to a single body part in 28.4% of falls, to two parts in 7.0%, and to three or more parts in 2.8% of cases. Notably, the most severe injuries were predominantly observed in the hip/pelvis region, with the head being the next most frequently affected area. The investigation underlined the critical necessity for crafting fall prevention strategies that exploit the instinctual inclination of patients to protect the most durable sections of their body, alongside augmenting the defensive actions of the upper extremities against falls. Our research outcomes further reveal a tendency towards injuries predominantly affecting the head-neck, leg-knee, and hip regions, with facial and scalp lacerations emerging as notably common, thereby suggesting a tendency towards falls occurring face-first, potentially highlighting factors contributing to balance instability.

Previous incidences of falls among older adults are likely to act as precursors and predictors for subsequent falls (2). Ahmedov et al. analyzed 295 patients, covering ages of 18 to 89, who were under surveillance for trauma and/or urgent surgical needs, discovering that falls were the leading diagnosis for a significant portion (23.1%) of these patients (17). Additionally, 39% of the patients acknowledged at least one fall within the year preceding the study. Our findings indicate that 32 patients had experienced falls within a year before their latest ED presentation, with 2.6% reporting an additional fall within this timeframe. When delving into the patient's fall history

beyond the last year but after reaching the age of 65, it was noted that 13.61% had fallen one to three times. The presence of fall phobia in older individuals invariably impacts their quality of life negatively (2). Research highlights numerous elements linked to an increased likelihood of falling in this demographic, encompassing prior falls, diminished muscle power, disturbances in gait and balance, visual impairments, the use of multiple medications or psychoactive substances, depression, episodes of dizziness, female gender, urinary incontinence, cognitive alterations, various chronic conditions, discomfort, and being older than 80 years (2, 5). The literature underscores the adjustable aspects of certain fall risk factors, especially emphasizing the roles of balance disorders, muscular weakness, and the utilization of medications, in highlighting the effectiveness of proactive and preventative interventions (18). An increase in the count of risk factors is consistently linked to an escalated fall risk (5,15). Furthermore, the literature indicates that with each added risk determinant the yearly likelihood of experiencing a fall is potentially doubles (5). Consequently, it is advised for everyone aged 65 and older to partake in annual fall risk assessments. These evaluations should examine challenges related to walking and balance, past incidents of falls or fall-induced injuries, and the existence of fall phobia (18,19). In the case of older adults with records of histories indicating multiple falls or injuries due to falling, it is imperative to implement physical therapy or exercise regimens emphasizing balance, strength training, and walking techniques (18,20). The recommendation for calcium and/or vitamin D intake and the judicious management of current medications, particularly those that are psychoactive, should be prioritized. Attention must be directed towards mitigating postural hypotension, alleviating vision and hearing impairments, and resolving issues related to foot health (18,21).

This study's retrospective nature. Critical factors such as the patients' susceptibility to environmental influences and their functional capacity were not directly observed. We did not do a detailed review of the patient's pharmacological treatments. Initiatives should include support via suitable footwear or assistive technologies, the implementation of an environment conducive to the elderly within the home, comprehensive intervention strategies, and the provision of care services that meet specific requirements (18,22). The propensity for falls among the elderly may be exacerbated by a spectrum of risk factors, underscoring the importance of conducting thorough risk assessments. Such evaluations ought to adopt a proactive approach, considering the individual's health history, current clinical condition, and any previous experiences of falls (2,23). The importance of perpetuating healthy living practices throughout one's lifetime, focusing on measures that foster the ability of older adults to lead lives with minimal dependence on others, and the embrace of enduring health policies concerning these preventative strategies are increasingly crucial for the safeguarding of public health.

Conclusion

This study's retrospective nature imposed certain constraints that merit consideration. Specifically, it did not facilitate a comprehensive evaluation of the elderly participants' day-to-day functioning, including both basic and instrumental activities of daily living. Critical factors such as the participants' susceptibility to environmental influences, their functional capacity, and potential issues with balance and mobility were not directly observed. Moreover, the research methodology did not encompass a detailed review of the participants' pharmacological treatments, which could have a significant bearing on the incidence and consequences of falls.

Conflict of Interest/ Funding

The study received no financial support from any individual or organization, and the authors declare no conflict of interest.

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