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COMPREHENSIVE GERIATRIC ASSESSMENT FOR FALL RISK IDENTIFICATION IN NURSING HOME RESIDENTS: INSIGHTS AND IMPLICATIONS FOR MEDICAL PRACTITIONERS

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Abstract

Objectives: To assess the suitability of the Comprehensive Geriatric Assessment (CGA) in detecting fall risk among nursing home residents, identify its key components associated with high fall risk, and provide practical guidance for medical practitioners.

Materials and Methods: This cross-sectional study included adults aged ≥60 residing in a nursing home. All participants underwent a CGA by geriatricians, with the evaluation process taking two months. All participants' medical and fall histories were recorded, including height, weight, calf circumference, muscle strength, and gait speed measurements. The relationship between participants' fall history in the previous year (none vs. ≥1 fall) and the CGA components was assessed.

Results: This study includes a total of 104 nursing home residents. 40 individuals (38.5%) had a history of at least one fall and 40% of individuals who fell had fallen two or more times within the last year. In multivariate analysis, malnutrition risk and malnutrition (OR 3.52 [95% CI 1.22-10.12], p= 0.020), muscle strength (OR 5.91 [95% CI 1.02-34.16], p=0.047), and gait speed (OR 3.89 [95% CI 1.13-14.12], p=0.032) were independently associated with the risk of falls, regardless of age, Charlson Comorbidity Index, dependence in activities of daily living, and frailty.

Conclusion: This study suggests that low grip strength, reduced gait speed, and malnutrition or malnutrition risk are associated with falls among nursing home residents. Instead of the CGA, which requires significant time, assessing these three components of the CGA may be more effective for medical practitioners evaluating fall risk in time-limited outpatient clinics.

Keywords: Accidental falls, geriatric assessment, nursing homes, walking speed, hand strength, malnutrition.

Introduction

Older adults in nursing homes often have higher levels of comorbidities, increased medication use, functional decline, cognitive impairments, and greater dependency than their community-dwelling counterparts. Consequently, they are more prone to geriatric syndromes such as urinary incontinence, polypharmacy, dementia, depression, frailty, and sarcopenia, all of which heighten their fall risk. Nearly half of nursing home residents experience at least one fall annually, compared to about 30% of older adults living in the community.[1,2] Shared living spaces in nursing homes create unique hazards, such as uneven flooring, cluttered walkways, and inadequate handrails. Unlike hospitals, which provide continuous monitoring and medical supervision, nursing homes often have insufficient staff-to-resident ratios, limiting timely assistance and supervision. As a result, fall prevention in nursing homes presents major challenges.

Falls among older adults are a significant concern, leading to physical injuries, psychological consequences, and, in some cases, fatalities, with a rate of 78.0 deaths per 100,000 older adults reported in the United States in 2021.[3] In addition to the direct health impacts, falls lead to decreased independence, more hospital admissions, longer hospital stays, and increasing healthcare costs.[4] The economic burden of falls in older adults is substantial, with the annual cost of nonfatal falls estimated at approximately $80 billion in the United States in 2020.[5] Therefore, identifying and addressing the factors that contribute to falls, and regularly assessing residents' fall risk, is crucial to preventing these adverse outcomes.

Falling is not a disease but a symptom and often results from multiple causes. Therefore, evaluating fall risk in older adults requires a multidisciplinary approach. The Comprehensive Geriatric Assessment (CGA) enables a thorough evaluation of their physical, psychological, and social well-being. While geriatricians commonly use CGA for elderly patients seeking medical care in hospital settings, it is not routinely applied to nursing home residents. This study aims to evaluate the suitability of CGA for detecting fall risk among nursing home residents and to identify the key components of CGA associated with a high risk of falls. By doing so, it is hoped that medical practitioners, who often care for older adults in time-limited visits, will have practical guidance for assessing fall risk and implementing targeted interventions to improve outcomes.

Materials and Methods

Study Population and Design

A cross-sectional design was utilized for this study, which was conducted with adults residing in the Ankara Seyranbağları Nursing Home and Rehabilitation Center in July and August 2018. The geriatric physicians of Ankara University Faculty of Medicine assessed the nursing home residents. Individuals aged 60 and over who stated that they volunteered were included in the study. Individuals who declined to participate or who had communication problems (severe hearing impairment or inability to see), advanced dementia (MMSE score<10), inadequate comprehension skills, bedridden status, amputated limbs, or severe pretibial edema were excluded from the study due to their inability to complete the study tasks satisfactorily, and/or the potential for their current condition to distort the measurements obtained. A total of 104 nursing home residents who fulfilled the specified criteria were enrolled in the study out of a total of 143 residents.

The study was approved by the Ankara University Ethics Committee on 26.02.2018 (#04-248-18). All participants signed a consent form that was prepared following the principles of the Declaration of Helsinki.

Evaluation of Participants

All participants' medical histories were collected. All individuals underwent CGA. Charlson Comorbidity Index (CCI) scores were calculated and recorded. Individual physical activity levels and functional capacities were evaluated with Katz's activities of daily living (ADL) and Lawton's instrumental activities of daily living (IADL) scales. Individuals who exhibited limitations in at least one activity on the ADL and IADL scales were categorized as dependent. Polypharmacy was considered as the use of 5 or more drugs. The anticholinergic drug burden was calculated by assessing the medications used by each individual according to the anticholinergic burden (ACB) scoring list.[6] A score of three or more was considered to indicate a high ACB. The Mini-Mental State Examination (MMSE), the Yesavage Geriatric Depression Scale, the Mini Nutritional Assessment Test (MNA), the Hendrich II Fall Risk Assessment Scale, and the Fried Frailty Scale were administered and scored according to each test's cut-off points.[7-11]

For each individual, we measured the calf circumference by encircling the widest part of their left calf while they were seated with knees bent at a 90-degree angle and feet flat on the ground. Hand grip strength was evaluated using an electronic hand dynamometer (Takei Scientific Instruments, Niigata, Japan), which underwent calibration by technical service two weeks before the study.[12] Measurements were conducted with individuals seated, elbows flexed at a 90-degree angle, exerting maximum force while squeezing the device. Three measurements were taken for each hand, and the highest value was recorded. Dynapenia, indicating low muscle strength, was defined as hand grip strength <32 kg for men and <22 kg for women.[13] The physical performance of participants was assessed using the 4-meter usual gait speed test, where the time taken to walk the distance was recorded using a stopwatch. Gait speeds ≤0.8 m/sec were categorized as low physical performance.[13]

Sarcopenia was assessed using two scales: SARC-F and SARC-CalF. The SARC-F scale, comprising five items with a maximum score of 10 points, categorized individuals scoring 0-3 points as healthy and 4-10 points as sarcopenic.[14] The SARC-CalF scale, an additional tool, incorporates calf circumference measurement. If the calf

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circumference is <33 cm, 10 points are added to the SARC-F score; otherwise, no points are added. A SARC-CalF score ≥11 indicates sarcopenia.[15] Individuals scoring ≥4 points on the SARC-F scale and exhibiting low muscle strength (<32 kg in men, <22 kg in women) were classified as having probable sarcopenia.[16]

Statistical Analysis

Continuous variables were presented as median and range, while categorical variables were presented as numbers and percentages. The Wilcoxon rank-sum test was utilized to compare continuous variables, and either the chi-square test or Fisher's exact test was employed to compare categorical variables. Logistic regression analysis was conducted to assess factors associated with falls, deriving odds ratios. The presence of falls served as the dependent variable, with independent variables selected based on clinical correlation and significant association in univariate analysis. Statistical significance was set at a threshold of <0.05 for the p-value. Data analysis was performed using "PASW Statistics" software (Version 18.0, Chicago, SPSS Inc).

Results

The study enrolled 104 nursing home residents, comprising 32 females (30.8%) and 72 males (69.2%). Within this cohort, 40 individuals (38.5%) reported experiencing falls in the past year, with 60% experiencing a single fall and 40% reporting two or more falls. Table 1 outlines the basic characteristics of individuals based on their fall status. The median age of participants was 78 (range: 61-98). Among those who fell, the median age was 80 (range: 63-98), while among non-fallers, it was 75 (range: 61-90), demonstrating a significant age difference (p=0.004). Furthermore, individuals aged 75 and above were found to have a higher propensity for falls (p=0.003). Moreover, individuals with a history of falls exhibited a significantly higher median CCI score (5, range: 2-7) compared to those without falls (4, range: 2-9) (p=0.015).

Table 2 shows a significant association between antihypertensive (47.5%) and vasodilator (85.7%) use and increased fall risk in the past year (p=0.023 and p=0.008, respectively), while no such association was found for other medication groups.

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Table 1. Basic characteristics of individuals according to their fall status

Basic Characteristics		Falls in a year		
		None	**≥1 time**	**p-value**
Age (median)		75 (61-90)	80 (63-98)	0.004**
Age groups	<75 age	33 (78.6%)	9 (21.4%)	0.003**
	≥75 age	31 (50%)	31(50%)	
Gender	Female	16 (50%)	16 (50%)	0.107
	Male	48 (66.7%)	24 (33.3%)	
Number of falls*	Once	0 (0%)	24 (60%)	
	≥2 times	0 (0%)	16 (40%)	
Marital Status	Married	13 (76.5%)	4 (23.5%)	0.147
	Single	23 (67.6%)	11 (32.4%)	
	Widowed	28 (52.8%)	25 (47.2%)	
Length of stay in nursing home (month)(median)		16 (0-180)	29.5 (2-192)	0.392
Use of Assistive Devices	Yes	11 (44%)	14 (56%)	0.040**
	No	51 (67.1%)	25 (32.9%)	
BMI (kg/m^2) (median)		26.63 (19-52)	26.16 (18-40)	0.960
CCI (median)		4 (2-9)	5 (2-7)	0.015**

Abbreviations: BMI; Body Mass Index, CCI; Charlson Comorbidity Index

Values are median (range) or frequency (percent).

*Column percentage is given for the number of falls.

** indicates statistically significant values with p<0.05.

Table 2. Habits and medication groups of individuals according to their fall status

Habits and medication groups		Falls in a year		
		None	≥1 time	p-value
Smoking	Non-smoker	33 (54.1%)	28 (45.9%)	0.063
	Active smoker	31 (72.1%)	12 (27.9%)	
Alcohol	None	48 (58.5%)	34 (41.5%)	0.445
	1 or 2 days a week	12 (70.6%)	5 (29.4%)	
	≥3 days per week	4 (80%)	1 (20%)	
Antihypertensive	Yes	32 (52.5%)	29 (47.5%)	0.023**
	No	32 (74.4%)	11 (25.6%)	
Diuretics	Yes	18 (54.5%)	15 (45.5%)	0.318
	No	46 (64.8%)	25 (35.2%)	
Vasodilators	Yes	1 (14.3%)	6 (85.7%)	0.008**
	No	63 (64.9%)	34 (35.1%)	
Antipsychotics	Yes	4 (66.7%)	2 (33.3%)	0.790
	No	60 (61.2%)	38 (38.8%)	
Antiepileptics	Yes	11 (64.7%)	6 (35.3%)	0.769
	No	53 (60.9%)	34 (39.1%)	
SSRIs	Yes	7 (46.7%)	8 (53.3%)	0.201
	No	57 (64%)	32 (36%)	
Benzodiazepines	Yes	0 (0%)	1 (100%)	0.204
	No	64 (62.1%)	39 (37.9%)	

Abbreviations: SSRIs; Selective Serotonin Receptor Inhibitors

Values are median (range) or frequency (percent).

** indicates statistically significant values with p<0.05.

Tables 3 and 4 outline CGA results by fall status over the past year. Among participants with ADL dependence, 52.9% reported falls, compared to 28% with IADL dependence. ADL dependence was significantly associated with falls (p=0.034), while IADL dependence was not (p=0.243). The fall rate in the past year was 60% among individuals identified as a high fall risk and 34.8% among those classified as low fall risk according to the Hendrich fall risk scale. However, when considering frailty and fall status, 29.2% of robust individuals, 38.5% of prefrail individuals, and 64.7% of frail individuals experienced falls in the past year, although this difference was not statistically significant (p=0.064). Frail and prefrail individuals exhibited significantly more falls (p=0.035). Additionally, the fall rate in the past year was 29.4% among individuals with normal nutritional status, 51.6% among those at risk of malnutrition, and 80% among those with malnutrition. Individuals at risk of malnutrition and those with malnutrition experienced significantly more falls (p=0.016).

Table 3. CGA results of individuals according to their fall status

CGA Parameters		**Falls in a year**		
		None	**≥1 time**	**p-value**
Polypharmacy	Yes	34 (54.8%)	28 (45.2%)	0.088
	No	30 (71.4%)	12 (28.6%)	
Anticholinergic Drug Burden	High	24 (57.1%)	18 (42.9%)	0.448
	Low	40 (64.5%)	22 (35.5%)	
ADL	Dependent	16 (47.1%)	18 (52.9%)	0.034**
	Independent	48 (68.6%)	22 (31.4%)	
IADL	Dependent	46 (59%)	32 (41%)	0.243
	Independent	18 (72%)	7 (28%)	
Malnutrition	No Malnutrition	48 (70.6%)	20 (29.4%)	0.016**
	Malnutrition risk	15 (48.4%)	16 (51.6%)	
	Malnutrition	1 (20%)	4 (80%)	
Depression	Yes	29 (56.9%)	22 (43.1%)	0.375
	No	34 (65.4%)	18 (34.6%)	
Cognitive Dysfunction	Yes	8 (38.1%)	13 (61.9%)	0.015**
	No	55 (67.1%)	27 (32.9%)	
Urinary Incontinence	Yes	22 (56.4%)	17 (43.6%)	0.405
	No	42 (64.6%)	23 (35.4%)	

Abbreviations: ADL; Activities of Daily Living, IADL; Instrumental Activities of Daily Living

Values are median (range) or frequency (percent).

** indicates statistically significant values with p<0.05.

Individuals identified as sarcopenic using either the SARC-F or SARC-CalF scale exhibited a significantly higher incidence of falls in the past year compared to those without sarcopenia. Among those classified as sarcopenic using the SARC-F scale, the fall rate was 81.3%, while for those classified using the SARC-CalF scale, it was 70%. The incidence of falls was significantly higher among individuals identified as sarcopenic using either scale (p<0.001 and p=0.001, respectively). Additionally, individuals evaluated as "possible sarcopenic" had a significantly higher fall rate (81.3%, p<0.001).

Individuals without a fall history had a median muscle strength of 25.6 kg (range: 8-47), while those with a fall history had 19.1 kg (range: 9-42), with muscle strength significantly lower in fallers (p=0.006). Among participants, 43.2% with dynapenia and 10.5% without dynapenia reported falls, with a significantly higher fall incidence in those with dynapenia (p=0.008).

Table 4. CGA results of individuals according to their fall status (continued from Table 3)

CGA Parameters		**Falls in a year**		
		None	**≥1 time**	**p-value**
Fall Risk (Hendrich II)	High	6 (40%)	9 (60%)	0.064
	Low	58 (65.2%)	31 (34.8%)	
Frailty	Robust	34 (70.8%)	14 (29.2%)	0.035**
	Prefrail	24 (61.5%)	15 (38.5%)	
	Frail	6 (35.3%)	11 (64.7%)	
SARC-F	Healthy	61 (69.3%)	27 (30.7%)	<0.001**
	Sarcopenic	3 (18.8%)	13 (81.3%)	
SARC-CalF	Healthy	58 (69%)	26 (31%)	0.001**
	Sarcopenic	6 (30%)	14 (70%)	
Probable Sarcopenia	Yes	3 (18.8%)	13 (81.3%)	<0.001**
	No	61 (69.3%)	27 (30.7%)	
Muscle Strength (kg)	**(median)**	25.6 (8-47)	19.1 (9-42)	0.006**
Dynapenia	Yes	46 (56.8%)	35 (43.2%)	0.008**
	No	17 (89.5%)	2 (10.5%)	
Gait Speed (sec)	**(median)**	5.06 (3-23)	6.38 (3-38)	0.005**
Physical Performance	Low	33 (52.4%)	30 (47.6%)	0.003**
	Normal	31 (81.6%)	7 (18.4%)	
Calf Circumference (cm)	**(median)**	35 (29-42)	34 (25-44)	0.215

Values are median (range) or frequency (percent).

** indicates statistically significant values with p<0.05.

Individuals who fell had a slower median gait speed of 6.38 seconds (range: 3-38), compared to 5.06 seconds (range: 3-23) in those who did not fall (p=0.005). In the past year, 47.6% of individuals with low physical performance and 18.4% of individuals with normal physical performance experienced falls, with a significantly higher fall incidence in those with low physical performance (p=0.003).

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Logistic regression analysis was conducted to evaluate the factors associated with falls (Table 5). In univariate analysis, age (odds ratio [OR] 1.08 (95% confidence interval [CI] 1.03-1.15, p=0.004), CCI (OR 1.39 [95% CI 1.02-1.89], p=0.036), ADL (OR 2.46 [95% CI 1.06-5.69], p=0.036), malnutrition risk and malnutrition (OR 3.0 [95% CI 1.30-6.94], p=0.010), frailty (OR 4.45 [95% CI 1.38-14.39], p=0.013), muscle strength (OR 6.46 [95% CI 1.40-29.86], p=0.017), and gait speed (OR 4.03 [95% CI 1.54-10.49], p=0.004) were significantly associated with the risk of falls. In multivariate analysis, malnutrition risk and malnutrition (OR 3.52 [95% CI 1.22-10.12], p=0.020), muscle strength (OR 5.91 [95% CI 1.02-34.16], p=0.047), and gait speed (OR 3.89 [95% CI 1.13-14.12], p=0.032) were found to be significantly associated with the risk of falls.

Table 5. Results of univariate and multivariate analyses of predictors of falls

		Univariate analysis		**Multivariate analysis**	
		OR (95%CI)	**p-value**	**OR (95%CI)**	**p-value**
Age	**Continuous**	1.08 (1.03-1.15)	0.004**	1.07 (0.99-1.16)	0.092
CCI	**Continuous**	1.39 (1.02-1.89)	0.036**	0.96 (0.61-1.49)	0.851
ADL	**Independent**	Reference		Reference	
	Dependent	2.46 (1.06-5.69)	0.036**	0.69 (0.22-2.16)	0.522
Malnutrition	**Normal**	Reference		Reference	
	Malnutrition and MR	3.0 (1.30-6.94)	0.010**	3.52 (1.22-10.12)	0.020**
Frailty	**Robust**	Reference		Reference	
	Prefrail	1.52 (0.62-3.72)	0.362	0.39 (0.12-1.27)	0.119
	Frail	4.45 (1.38-14.39)	0.013**	0.82 (0.16-4.11)	0.805
Muscle Strength	**Normal**	Reference		Reference	
	Dynapenia	6.46 (1.40-29.86)	0.017**	5.91 (1.02-34.16)	0.047**
Gait Speed	**Normal**	Reference		Reference	
	Low Physical Performance	4.03 (1.54-10.49)	0.004**	3.89 (1.13-14.12)	0.032**

Abbreviations: ADL; Activities of Daily Living, CCI; Charlson Comorbidity Index,

MR; Malnutrition Risk, OR; Odds Ratio

** indicates statistically significant values with p<0.05.

Discussion

In this study, low muscle strength, low physical performance, malnutrition risk, and malnutrition were found to be associated with falls in nursing home residents, independently of parameters such as age, CCI, dependence on ADL, and frailty.

The annual rate of falls among individuals aged 65 and over residing in nursing homes ranged from 30% to 50% in previous studies.[17,18] A history of falls is considered one of the most significant predictors of future falls, with 50% of individuals who may fall experiencing a repeat fall.[19] In this study it was found that 38.5% of individuals fell within the last year and 40% of individuals who fell had fallen two or more times which is comparable to literature data.

In our study, we utilized the Hendrich II fall risk assessment scale, chosen for its broad applicability across various settings and populations, including hospitalized patients, nursing home residents, and outpatient clinic attendees, to evaluate fall risk in elderly individuals. However, we did not find a significant difference in fall occurrence between those classified as low-risk and high-risk falls according to the scale's criteria. The scale assigns a higher score for fall risk to factors such as confusion/disorientation, symptomatic depression, and use of antiepileptic drugs and benzodiazepines. However, the specific criteria for confusion/disorientation and symptomatic depression are not well-defined, which may limit the scale's applicability in certain populations. Our exclusion criteria, which ruled out individuals with advanced dementia (MMSE scores <10) and severe communication issues, may have contributed to the scale's inability to accurately predict fall risk. Although participants with mild to moderate dementia and depression were included, the Hendrich II scale still failed to accurately predict those with a history of falls. Additionally, factors not captured by the Hendrich II scale, such as environmental influences and individual health conditions beyond its scope, may limit its predictive accuracy. Based on our results, the Hendrich II scale does not appear to be an appropriate tool for assessing fall risk among nursing home residents. For this population, a more comprehensive and multidimensional fall risk assessment tool is needed.

Frailty, resulting from decreasing physiological reserves due to aging, is a geriatric syndrome that renders individuals vulnerable to diseases and other stresses, leading to negative health outcomes. Falls are one of the main negative outcomes of frailty, and frailty has been found to increase the risk of falls.[20] In our study, individuals who were prefrail or frail fell more often. However, frailty and falls are part of a vicious cycle. Frail individuals fall frequently, and falls can further exacerbate their frailty, leading to even more falls. The reverse is also true. Therefore, unfortunately, it was not possible to establish a cause-and-effect relationship between these in this study.

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Malnutrition and sarcopenia are frequently observed together in elderly individuals and share common physiological mechanisms. In older adults, both conditions may lead to adverse consequences, including reduced functionality, decreased quality of life, heightened fall risk, hospitalization, morbidity, and mortality. [21]. In this study, both malnutrition and malnutrition risk were found to increase the risk of falls in elderly individuals. Due to vitamin and mineral deficiencies, malnutrition can result in various health conditions such as anemia, cognitive dysfunction, and reduced proprioception. These conditions, in turn, may contribute to an elevated risk of falls. It has been demonstrated that muscle loss may occur even when there is no calorie restriction or weight loss but only inadequate protein intake.[22] Loss of muscle mass can be caused by an imbalance between protein synthesis and breakdown due to insufficient protein intake in the body. Additionally, inadequate protein intake can decrease the body's capacity to create and repair muscle tissue by reducing the levels of anabolic hormones such as insulin-like growth factor-1 (IGF-1) and testosterone.[23]

Sarcopenia is a skeletal muscle disease characterized by a decrease in muscle mass, muscle strength, and physical performance.[16] Aging is known to diminish hormone levels such as testosterone, estrogen, and GH, as well as increase the levels of pro-inflammatory cytokines (TNF-a, IL-1, IL-6) linked to inflammaging. These conditions and malnutrition, can disrupt the anabolic impact on muscle and cause muscle catabolism, ultimately resulting in sarcopenia.[24,25] Apart from its impact on muscle tissue, inflammaging can heighten the risk of falls through its association with age-related vision disorders such as macular degeneration and cataracts.[26,27] The decrease in physical activity and increase in sedentary lifestyle in elderly individuals can lead to loss of muscle mass and strength, resulting in an increased risk of falls.[28] In our study, it was found that individuals identified as sarcopenic according to SARC-F and SARC-CalF scales and possible sarcopenia diagnosis fell more frequently. As falls are already included in the questions of these scales related to the individual's fall status within the last year, the result may be an anticipated outcome. To further investigate, we evaluated the associations of muscle strength and gait speed with falls and found that individuals with low grip strength and slow gait speed had a higher incidence of falls.

Muscle strength is the most reliable way to measure muscle function, and it can better predict adverse outcomes than muscle mass.[16] The presence of low muscle strength serves as a robust predictor of cardiovascular and all-cause mortality, alongside functional decline and an increased risk of falls. [29] Another way to assess the physical performance of older individuals is to measure their gait speed. It has been shown that gait speed predicts adverse outcomes such as disability, cognitive impairment, hospitalization, falls, and death.[30]

Our study has several limitations. First, due to its cross-sectional design, it cannot establish causality between falls and the parameters assessed by CGA. Second, it excluded individuals with advanced dementia, who are more vulnerable to falls. The diagnosis of sarcopenia did not include muscle mass assessment, and visual and hearing impairments, known fall risk factors, were not evaluated. The sample size was relatively small, and although participants lived in similar conditions, the study did not fully assess the social and environmental factors contributing to falls. However, a notable strength of our study lies in its ability to provide valuable data on the prevalence of falls and other geriatric syndromes among nursing home residents, in addition to identifying the CGA components most associated with falls—an area where research on nursing home populations in Turkiye is limited. Future research could benefit from longitudinal designs and larger, multi-center cohorts to explore environmental, social, and behavioral factors, providing deeper insights into fall risks and prevention strategies.

In conclusion, the risk of falls in elderly individuals is influenced by a multitude of factors beyond the physiological changes associated with aging, and even a fall risk assessment scale may not be adequate to precisely determine fall risk. Therefore, a holistic assessment is necessary to identify fall risk more accurately. CGA can be an appropriate tool for determining fall risk by evaluating an individual's functional, physical, cognitive, and social aspects, and can also be used to assess fall risk in elderly individuals living in nursing homes. However, it's essential to acknowledge that implementing CGA requires time and experience, and in many regions, including our country, there is a shortage of geriatricians, particularly in smaller cities. Hence, healthcare providers, especially general practitioners and family medicine physicians who often care for older adults, can greatly benefit from the insights provided by our study. Given these constraints, these healthcare providers can play a crucial role in fall risk assessment by screening for malnutrition and measuring grip strength and gait speed. This approach may offer greater accuracy in identifying fall risk compared to other parameters of CGA. To establish a clear causality between CGA and falls, prospective studies are warranted.

Ethical Considerations: The study was approved by the Ankara University Ethics Committee on 26.02.2018 (#04-248-18). All participants signed a consent form that was prepared following the principles of the Declaration of Helsinki.

Conflict of Interest: The authors declare no conflict of interest.

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