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Grip Strength, Fall Efficacy, and Balance Confidence as Associated Factors with Fall Risk in Middle-Aged and Older Adults Living in the Community

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Abstract

Background: Falls are a major public health concern among older adults, often resulting in injury, functional decline, and reduced quality of life. While handgrip strength (HGS), fall efficacy, and balance confidence have individually been associated with fall risk, their combined predictive value is still underexplored, particularly in physically active older adults. This study aimed to investigate the relationship between HGS, fall efficacy, and balance confidence and their association with fall risk in community-dwelling older adults engaged in regular exercise programs; A cross-sectional study was conducted with 280 participants aged 55 and over from community exercise programs near Lisbon, Portugal. Fall risk was assessed through self-reported falls in the past 12 months. HGS was measured with a dynamometer, fall efficacy using the Falls Efficacy Scale-International (FES-I), and balance confidence using the Activities-specific Balance Confidence (ABC) Scale. Statistical analyses included Spearman correlations and binary logistic regression. Results: Falls were reported by 26.4% of participants. Fall efficacy and balance confidence were significantly associated with fall history, while HGS was not. Fall efficacy was significantly associated with increased fall risk, as indicated by the odds ratio (OR = 3.37, $p < 0.001$), while balance confidence was negatively associated (OR = 0.95, $p < 0.001$). HGS was positively correlated with balance and confidence but not with fall incidence. Conclusions: Psychological factors, particularly fall efficacy and balance confidence, play a critical role in fall risk among physically active older adults. However, this study included physically active middle-aged and older adults living in the community, which should be considered when interpreting the generalizability of the results. These findings support the integration of simple, validated psychological assessments into fall prevention strategies in community settings.

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1. Introduction

During the aging process, numerous physiological changes occur that can significantly compromise the functionality of older adults [1]. Of particular concern are age-related alterations in the sensorimotor system, which includes the vestibular, visual, and proprioceptive components, each of which plays a crucial role in maintaining balance and mobility [2,3]. Simultaneously, the musculoskeletal system undergoes progressive degeneration, characterized by a decrease in muscle mass and strength, as well as a reduction in bone mineral density due to demineralization [4,5]. These cumulative physiological changes substantially increase the risk of falls among older adults.

Falls in older adults are a major global public health concern, as they are frequently associated with serious injuries, functional decline, and reduced quality of life. Approximately 30% of adults over the age of 65 experience at least one fall per year [6], corresponding to 17 million individuals living with fall-related disabilities annually [7]. Falls most often occur at home [8] and are significantly more prevalent among women than men [9]. Given the profound personal and societal consequences of falls, the identification and reduction of risk factors are essential in fall prevention strategies.

Multiple risk factors contribute to falls, which can be classified based on their origin into intrinsic (biological) and extrinsic (environmental) factors. Among the intrinsic factors, physical fitness is particularly relevant, with muscle strength emerging as the critical determinant in fall prevention [10]. In this context, handgrip strength (HGS) is widely recognized as a reliable indicator of overall muscular function and has been increasingly studied as a biomarker of healthy aging [11]. Evidence suggests that reduced HGS is associated with an increased risk of falls, making it a valuable tool in fall risk assessment and intervention planning.

Despite the growing evidence supporting the role of HGS, fall efficacy, and balance confidence in fall risk, few studies have examined these variables collectively as predictors in community-dwelling older adults [12,13]. Furthermore, data on older adults actively participating in structured exercise programs remain limited, even though such programs may influence both physical and psychological fall-related outcomes.

Beyond the physical consequences, psychological factors, such as fear of falling (FoF), play a significant role in limiting mobility and autonomy in older adults, even among those without a history of falls [14]. FoF can diminish older adults' confidence leading to further balance and muscle strength problems, and overall reduced quality of life [15]. Grounded in Bandura's self-efficacy theory [16], FoF reflects a reduction in perceived capability that can lead to activity restriction and avoidance behaviour. This is relevant even in physically active individuals, for whom fear may undermine engagement despite preserved physical function. In physically active individuals, self-efficacy remains a critical factor because fear of falling can still lead to activity restriction, avoidance behaviour, and increased fall risk despite preserved physical function. Therefore, psychological constructs such as fall efficacy and balance confidence provide essential insight beyond observable mobility or strength. Standardized instruments such as the Falls Efficacy Scale-International (FES-I) [17] and the Activities-specific Balance Confidence Scale [18] have been developed to assess fall-related efficacy, providing valuable insights into psychological determinants of fall risk.

Importantly, balance confidence has been identified as an independent predictor of falls in community-dwelling older adults, regardless of physical function and other covariates, highlighting its role in fall risk assessment and targeted interventions [19]. Research suggests that more than 70% of falls could be anticipated and potentially prevented through early identification of risk factors and timely intervention strategies [20]. As such, integrating clinical assessments—including physical function tests and validated questionnaires—is strongly recommended for better understanding of the risk factors associated with falls and how to prevent them more effectively.

Given the simplicity, low cost, and clinical applicability of the selected measures, their integration into primary care and community health settings may enhance early detection and intervention efforts aimed at reducing fall risk. Community-dwelling older adults, particularly those who engage in regular physical activity, may present distinct risk profiles compared to sedentary counterparts, justifying tailored assessment strategies. By simultaneously evaluating a physical (HGS) and two psychological constructs (fall efficacy and balance confidence), this study adopts a multidimensional approach that reflects the complex nature of fall risk in older populations. These three variables were selected based on their complementary roles in fall risk assessment: handgrip strength (HGS) serves as a widely used proxy of overall muscular strength and functional status; fall efficacy reflects the individual's perceived ability to avoid falls during daily activities; and balance confidence indicates the degree of assurance in performing tasks without losing balance. Evaluating both physical capacity and psychological perceptions allows for a more holistic understanding of fall risk—particularly in active older adults, whose functional limitations may not yet be evident through physical testing alone.

Based on prior literature, we hypothesized that lower grip strength, reduced balance confidence, and increased concern about falling (i.e., lower fall efficacy) will each be independently associated with higher fall risk among physically active, community-dwelling middle-aged and older adults.

In this context, the present study aims to explore how HGS, fall efficacy, and balance confidence are associated with fall risk in active older adults. These three measures were selected due to their ease of application in clinical settings and their potential for replication in community-based environments.

2. Materials and Methods

This is a cross-sectional study, conducted as part of the Stay Up–Falls Prevention Project, which evaluates variables related to fall risk in older adults. The project, which has been ongoing since 2021 involves community-based evaluations and interventions carried out in partnership with municipal programs. Its overarching goal is to generate evidence to inform public health strategies focused on fall prevention and healthy aging. The study received ethical approval from the Ethics Committee of the Piaget Institute (nº P02-S40-11/01/2023). All participants provided written informed consent before enrolment. The study ensures data anonymity and follows the ethical principles outlined in the Declaration of Helsinki, the Belmont Report, and the Ethics Standards in Research in Sport and Exercise Sciences. In compliance with the data protection guidelines established by the Ethics Committee, all data will be stored in paper format during the research period (five years). After this period, the paper records will be destroyed, and only the electronic database will be retained for potential use in future research.

2.1. Participants

Participants were recruited from a long-standing community exercise program organized by a municipal council near the Lisbon region, Portugal. All individuals enrolled in the program were informed about the study one week prior to data collection and invited to voluntarily participate. No pre-calculated sample size was used; rather, all eligible individuals who agreed to participate were included. To be eligible for the study, participants had to be 55 years or older, physically active in the community, and attend the community exercise program at least twice a week. Additionally, they needed to be able to move independently without assistance. Individuals with contraindications for physical exercise or those unable to perform the physical tests on the evaluation day were excluded. Data collection occurred over a one-week period, and all assessments were completed during that time.

2.2. Instruments and Variables

Anthropometric and demographic data including weight, height, sex, age, number of comorbidities, and number of medications were collected. Height was measured using a Seca GmbH & Co. KG dry stadiometer (337 × 2165 × 590 mm, Hamburg, Germany), while weight was assessed with a SECA 761 anthropometric scale (Bacelar & Irmão Lda, Porto, Portugal).

2.3. Assessment of Falls

Participants' fall history was assessed according to the American Geriatrics Society and British Geriatrics Society (2011) by answering the following questions. (1) In the past 12 months, how many times have you fallen? (2) If yes, the interview continued with the following question: Have you required medical attention? (3) Have you had any difficulty walking or balancing as a result? Participants were allowed to report more than one fall, and the total number of incidents was recorded.

2.4. Grip Strength

The HGS was assessed using a Saehan SH5001 mechanical hand dynamometer (Saehan Corporation, Changwon-si, Republic of Korea). This is a widely used, non-digital spring-type device. Prior to testing, the instrument was inspected to ensure proper mechanical function and consistency of resistance. The protocol involved taking the best result from three attempts on the dominant hand after adjusting the dynamometer to the participant's hand size. The test was conducted in a seated position, with the shoulder in a neutral position, the arm alongside the body, forearm extended, and the wrist in a neutral position [21]. Participants were instructed to squeeze the manual dynamometer to 100% of their maximum force for 3 s, enough time to collect data on the dynamometer.

2.5. Balance Confidence

Balance confidence was assessed by the Activities-specific Balance Confidence (ABC) Scale [22]. The ABC Scale has shown strong psychometric properties, with Cronbach's alpha ranging from 0.91 to 0.96 and good construct validity when correlated with physical performance and balance-related measure. This scale was designed to evaluate balance in a range of daily living activities (ADLs), which include various challenges. It was administered through a personal interview aimed at characterizing the individual's confidence in performing 16 activities of daily living (ADL). For each ADL, confidence was measured by selecting a percentage value on the scale, ranging from 0% (no confidence) to 100% (complete confidence), yielding a total score between 0 (minimum) and 1600 (maximum). This total score was then divided by 16 to obtain the final score for each individual. A score greater than 80% indicates a high level of physical functioning; a score between 50–80% indicates moderate physical activity; and a score below 50% suggests low physical activity levels and a high risk of falling. This version was validated for the Portuguese language [22].

2.6. Fall Efficacy

The Fall Efficacy Scale-International (FES-I) was used to assess an individual's concern about the possibility of falling during 16 daily activities. For each activity, participants were asked to rate their level of concern using a scale that ranges from 1 (not concerned at all) to 4 (very concerned). The total score can range from 16 to 64, with a higher score indicating greater concern about falling. Scores above 40 indicate a high level of concern about falling, while scores below 20 suggest low concern, and scores between 20 and 40 reflect varying levels of fear or confidence. For analysis in this study, the mean value of the scale was used. This scale is commonly used to identify individuals at risk of falling and to guide interventions aimed at improving balance and confidence [17]. This version of the FES-I was validated for the Portuguese language [23]. The FES-I has demonstrated excellent internal consistency (Cronbach's alpha > 0.90) and test–retest reliability (ICC > 0.95) across multiple populations, including older adults living in the community.

2.7. Statistical Analysis

The data was analysed using IBM SPSS Statistics software version 28.0.1.0 (IBM, Armonk, NY, USA, 2023). According to the central limit theorem (N = 280), it was assumed that the distribution of the variables resembled a normal distribution. The data are presented as mean $\pm$ standard deviation and, where applicable, minimum and maximum values.

Data were tested for normality using the Shapiro–Wilk test. Parametric tests (Student's *t*-test) were applied to variables with normal distribution, while non-parametric methods (Spearman's correlation) were used when assumptions of normality were not met.

The "risk of falling" variable was determined based on the answer to the 1st question of the guidelines proposed by the American Geriatrics Society and British Geriatrics Society (2011) and was coded as 0—absence of falls, and 1—presence of at least one fall in the last 12 months. Differences between the two groups for the variables included in the study were analysed using Student's *t*-test. The association between the variables was analysed using Spearman's correlation. Following Cohen's guidelines, correlation coefficients were interpreted as follows: 0.10–0.29 (weak), 0.30–0.49 (moderate), and $\geq$0.50 (strong) Cohen (1988) [24]. Multivariable binary logistic regressions were carried out to verify the influence of grip strength, balance confidence, and fall efficacy on the risk of falling. Multicollinearity was assessed using VIF values, all of which were <5, indicating no serious multicollinearity among predictors. Statistical significance was set at 5% ($\alpha < 0.05$).

3. Results

The characteristics of the sample are presented in Table 1. Significant differences between sexes were observed for weight ($p < 0.001$) and height ($p < 0.001$), as expected, as well as for the number of medications ($p = 0.047$), with males consuming more medications than females.

Table 2 presents the characteristics related to fall risk. Among the 280 participants, 26.4% (n = 74) reported experiencing at least one fall in the past 12 months, with a higher proportion observed among females (28.9%) compared to males (18.8%).

The analysis of Table 3 reveals significant differences in HGS between males and females ($p < 0.001$), with males demonstrating stronger grip strength. No significant differences were found between sexes for balance confidence ($p = 0.27$) or fall efficacy ($p = 0.65$).

The correlations presented in Table 4 show significant relationships between the variables. Specifically, falls are positively correlated with fall efficacy and negatively correlated with balance confidence and HGS. Notably, fall efficacy is strongly negatively correlated with balance confidence and grip strength, while balance confidence is positively correlated with HGS. All significant correlations are at the 0.01 level.

Table 1. Sample characteristics.

Variables	Total (n = 280)	Male (n = 69)	Female (n = 211)	*p*-Value
	***M* (*SD*)**	***M* (*SD*)**	***M* (*SD*)**	
Age (years)	71.88 ± 5.35	73.07 ± 6.10	71.49 ± 5.04	0.055
Weight (kg)	68.56 ± 11.32	75.19 ± 10.84	66.40 ± 10.64	<0.001 *
Height (m)	1.58 ± 7.54	1.67 ± 6.65	1.55 ± 5.69	<0.001 *
BMI (kg/m^2)	27.29 ± 4.02	27.21 ± 3.93	27.32 ± 4.06	0.084
Nº Medications	3.38 ± 2.66	3.93 ± 2.99	3.20 ± 2.53	0.047 *
Nº Comorbidities	2.45 ± 1.90	2.81 ± 2.56	2.33 ± 1.62	0.147

M—mean; *SD*—standard deviation; BMI—body mass index. * Differences between sexes ($p < 0.05$).

Table 2. Characteristics of the fall risk.

Variables	Total (N = 280)	Male (N = 69)	Female (N = 211)
	***M* (*SD*) Min–Max**	***M* (*SD*) Min–Max**	***M* (*SD*) Min–Max**
Nº Falls in the last 12 months	0.52 ± 1.25 0–10	0.26 ± 0.61 0–3	0.61 ± 1.38 0–10
Falls in the last 12 months F (%)			
Yes	74 (26.4%)	13 (18.8%)	61 (28.9%)
No	206 (73.6%)	56 (81.2%)	150 (71.1%)
Require intervention F (%)			
Yes	21 (7.5%)	6 (8.7%)	15 (7.1%)
No	259 (92.5%)	63 (91.3%)	196 (92.9%)
Have balance/gait problems F (%)			
Yes	116 (41.4%)	21 (30.4%)	95 (45%)
No	164 (58.6%)	48 (69.6%)	116 (55%)

F (%)—frequency (percentage).

Table 3. Descriptive analysis of grip strength, balance confidence, and fall efficacy.

Variables	Total (N = 280)		Male (N = 69)		Female (N = 211)		*p*
	***M* (*SD*)**	**Min–Max**	***M* (*SD*)**	**Min–Max**	***M* (*SD*)**	**Min–Max**	
Grip Strength	24.80 ± 7.19	10.40–50.60	33.43 ± 7.38	12.40–50.60	21.98 ± 4.30	10.40–35.70	<0.001 *
Balance Confidence	85.00 ± 13.54	17.5–100.0	88.76 ± 12.29	41.25–100.0	82.99 ± 14.65	17.50–100.0	0.27
Fall Efficacy	1.41 ± 0.40	1.00–3.5	1.33 ± 0.36	1.00–3.3	1.42 ± 0.36	1.00–3.4	0.65

* Statistically significant differences between males and females.

Table 4. Spearman's correlation coefficients matrix between the variables.

	Falls in the Last 12 Month	Fall Eficacy	Balance Confidence	Grip Strength
Falls in the last 12 month	1	0.222 **	−0.276 **	−0.157 **
Fall Efficacy	0.222 **	1	−0.645 **	−0.261 **
Balance Confidence	−0.276 **	−0.645 **	1	0.304 **
Grip Strength	−0.157 **	−0.261 **	0.304 **	1

** Spearman's correlation coefficients significant at the 1% level ($p < 0.01$).

The correlation analysis (Table 5) revealed statistically significant associations between the variables of interest. Specifically, falls were weakly positively correlated with fall efficacy ($\rho = 0.222$, $p < 0.01$), and weakly negatively correlated with both balance confidence ($\rho = -0.276$, $p < 0.01$) and grip strength ($\rho = -0.157$, $p < 0.01$).

Table 5. L < Multivariable logistic regression analysis of variables associated with fall risk.

Variable	ß	Sig	OR	95% CI		*p*-Value
				Inf.	Sup.	
Grip Strength (female)	−0.05	0.13	0.94	0.88	1.01	0.436
Constant	0.30					
Grip Strength (male)	−0.03	0.438	0.96	0.89	1.05	0.125
Constant	−0.38					
Fall Efficacy	1.21	<0.001	3.37	1.70	6.67	<0.001
Constant	−2.77					
Balance Confidence	−0.05	<0.001	0.95	0.93	0.97	<0.001
Constant	3.130					

Legend: OR = odds ratio, CI = 95% confidence interval, Sig = significance, β = regression coefficient.

4. Discussion

This study aimed to understand how HGS, fall efficacy, and balance confidence are associated with fall risk in physically active older adults living in the community and regularly participating in structured exercise programs. Although HGS showed a positive correlation with balance confidence, it was not independently associated with fall risk. In contrast, both fall efficacy and balance confidence were significantly associated with previous falls, highlighting the critical role of psychological factors in fall risk assessment, even in physically active older adults.

These findings reinforce what numerous studies have already emphasized: psychological factors play a critical role in fall risk. For example, a recent study found that a score of 20 or higher on the FES-I scale was a strong indicator of fall risk in pre-frail older adults, with a specificity above 70% [25]. Our data support these results as well; participants with higher concern about falling (or lower perceived efficacy) were more likely to have reported a fall in the previous year.

Another noteworthy aspect was balance confidence, assessed using the ABC Scale, which also proved to be a significant predictor. This aligns with previous studies [19], which identified low confidence as an independent risk factor for falls, even when controlling physical variables. This is especially relevant, as it shows that older adults' perception of their abilities directly influences motor behaviour, task safety, and ultimately fall risk.

Although HGS is widely recognized as a functional marker and a proxy of healthy aging, it was not statistically associated with fall risk in our sample. This lack of a direct effect may be explained by the specific characteristics of our participants, who were all physically active and regularly engaged in structured exercise programs. As suggested by another study [26], muscular strength alone may not be enough to predict falls unless it is accompanied by agility and functional confidence. In their path model, strength influenced fall risk indirectly through agility and fear of falling. This suggests that it is more than just strength in isolation; it is how it is applied in dynamic tasks, alongside perceived safety, that truly matters.

The literature also shows that HGS is more consistently associated with fall risk in frailer populations [27]. In more active populations like ours, a ceiling effect has been proposed as a possible explanation, since many participants may have adequate strength levels, making it harder to detect significant differences. However, the variability observed in our sample—particularly the presence of lower grip strength values—suggests that this explanation may be limited. Moreover, other studies highlight that in active older adults, other factors, such as polypharmacy, comorbidities, and psychological conditions, play a more prominent role in fall risk than muscular strength alone [28].

The fall rate observed in this study (26.4%) is substantial and aligns with previous studies reporting fall rates (24.4%) among physically active older adults [29]. While physical activity is generally protective, it does not fully eliminate fall risk. Active individuals may be more exposed to challenging environments or engage in higher-risk activities, despite preserved physical function. This highlights the importance of assessing psychological factors even in active older populations, as they may influence behaviour and decision-making during movement.

It is also important to remember that fall risk is multifactorial. From other classical work [30] to more recent systematic reviews [31], it has been established that falls result from a combination of physical, environmental, sensory, and psychological factors [28,30]. Our findings support this notion, showing that even among active individuals, psychological variables are crucial to understanding fall risk.

In this sense, the use of simple tools like the FES-I and ABC Scale proves extremely useful. These are easy-to-administer, low-cost instruments that are sensitive to changes in psychological status. This is particularly relevant in community settings, where quick and effective assessments are essential to identify vulnerable individuals and direct them to appropriate interventions.

It is also worth emphasizing that the multidimensional approach suggested in this study aligns with international recommendations, such as those from the Cochrane Review [32], which emphasizes the effectiveness of multifactorial fall prevention strategies. The integration of physical strategies with psychological components, such as enhancing confidence, reducing fear, and promoting self-efficacy, may be the key to more effective and sustainable interventions [7].

Additionally, although descriptive analysis revealed a higher prevalence of falls among women (28.9%) compared to men (18.8%), sex did not emerge as a significant independent factor in the multivariable logistic regression model when psychological variables such as fall efficacy and balance confidence were included. This suggests that perceived confidence and concern about falling may mediate fall risk regardless of sex in physically active older adults. Nevertheless, future studies employing stratified analyses by sex could help clarify whether specific patterns or interactions exist between sex and fall-related psychological factors.

From a practical perspective, our findings suggest that both healthcare and exercise professionals should incorporate psychological assessments in fall risk screening protocols, even for older adults who appear robust. Strategies such as dual-task training, balance-challenging exercises in safe environments, and psychological techniques like cognitive restructuring or confidence-building workshops may help boost confidence and reduce fall-related anxiety. These approaches align with a growing emphasis on multidimensional fall prevention and may help translate research findings into actionable strategies for clinical and community health professionals.

An interesting contribution of this study is its focus on a population that is often underrepresented in fall risk research, active older adults. Most research focuses on frail or institutionalized populations, but it is increasingly clear that even the most active are not immune to falls. Functional independence may mask latent vulnerabilities that only become apparent under more challenging circumstances [7].

Naturally, this study has limitations. Its cross-sectional design prevents us from establishing causal relationships, only associations can be inferred. It is also important to note that the fall outcome was assessed retrospectively, based on the participants' report of past events, while the psychological variables were measured at the time of the study. This introduces the possibility of reverse causality—individuals who had recently experienced a fall may have developed increased concern or reduced confidence as a result, rather than these psychological factors being antecedents of the fall. Therefore, the observed associations should be interpreted with caution, and the clinical implications discussed in this study should be considered as hypotheses to be further tested in prospective designs. Furthermore, using self-report to assess fall history may introduce recall bias or underreporting, especially in cases where no injury occurred. It is also important to consider the potential for selection bias in our sample. As all participants were physically active and voluntarily engaged in structured exercise programs, they may represent a healthier and more motivated segment of the older adult population. This may limit the generalizability of our findings to more sedentary or clinically vulnerable groups. Therefore, caution should be exercised when extrapolating these findings to populations with lower functional capacity, including frail or homebound older adults. Also, while grip strength was selected for its practicality and predictive validity, we acknowledge that including additional performance-based measures such as the Timed Up and Go or other gait and balance assessments could have provided a more comprehensive evaluation of physical ability. Future studies should consider combining multiple functional tests to strengthen the interpretation of fall risk profiles.

Additionally, contextual factors such as home environment, lighting, footwear, or social support were not assessed but may interact with individual risk factors in determining fall risk [7].

While falls were dichotomized for analysis, this approach may overlook important differences between individuals with a single fall and those with recurrent falls. Future studies should consider multinomial or ordinal modelling strategies to reflect the complexity of fall events.

Additionally, although we discussed the possibility of a ceiling effect in handgrip strength among physically active individuals, we did not perform stratified analyses (e.g., by HGS tertiles) to explore this in more detail. We recognize this as a limitation and suggest that future studies consider such approaches to better understand strength-related variability in fall risk.

Future research should aim to develop more comprehensive models that integrate physical, psychological, and environmental variables to better understand and estimate fall risk—potentially using motion sensor-based algorithms for real-time risk assessment. Also, future research could explore whether the associations between psychological factors (such as fall efficacy and balance confidence) and fall risk differ by sex or other key variables, through stratified analyses or interaction models. Another possibility is to explore interventions specifically focused on improving confidence and self-efficacy and assess whether these psychological changes translate into fewer falls in the medium term.

5. Conclusions

This study highlights the importance of adopting a multidimensional approach to fall risk assessment among community-dwelling older adults. Although handgrip strength is widely recognized as an indicator of general health and functional capacity, our findings suggest that it may not be independently associated with fall risk in this population. In contrast, psychological variables—specifically fall efficacy and balance confidence—demonstrated significant associations with reported falls.

These results highlight the relevance of perceived confidence and fear-related constructs in understanding fall risk, even among individuals who maintain regular physical activity. Consequently, the integration of validated psychological screening tools, such as the FES-I and ABC Scale into fall risk assessments, may improve the identification of at-risk individuals who might otherwise go unnoticed in physically capable populations.

Future studies should explore these associations longitudinally and assess the effectiveness of interventions focused on enhancing psychological resilience and confidence in reducing falls over time. Moreover, the findings support international recommendations that advocate for multifactorial fall prevention strategies, which combine physical, psychological, and behavioural components. By doing so, interventions can be better tailored to the specific profiles of older adults, increasing their effectiveness and promoting healthier, safer aging in the community.

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