Journal of Health, Wellness and Community Research
ISSN: 3007, 0570

OPEN ACCESS

JHWCR

Type: Review Article
Published: 29 October 2025
Volume: III, **Issue**: XV
DOI: https://doi.org/10.61919/vb55yq65

Correspondence
✉ Tehreem Mukhtar,
Tehreemmukhtar01@gmail.com

Received 21, 09, 25 **Accepted** 20, 10, 2025

Authors' Contributions
Concept: MA; Design: TM; Literature Search: IT; Screening/Extraction: IR, AT; Analysis/Synthesis: MHS, NR; Drafting: MA, TM

Declarations
No funding was received for this study. The authors declare no conflict of interest. The study received ethical approval. All participants provided informed consent.

"Click to Cite"

Impact of Fall-Related Anxiety on Post-Stroke Balance and Functional Performance: A Review

Maryam Aslam[1], Tehreem Mukhtar[1], Imama Tahir[1], Iqra Rafiq[1], Aqsa Tabassum[1], Muhammad Hammad Saleem[1], Nimra Rehman[1]

1 The Superior University, Lahore, Pakistan

ABSTRACT

Background: Fear of falling is a frequent psychological consequence after stroke and may limit balance recovery, mobility, and functional independence. Objective: To synthesize contemporary evidence on the association between fall-related anxiety (fear of falling, reduced falls self-efficacy, or low balance confidence) and post-stroke balance and functional performance in adult stroke survivors. Methods: A systematic review without meta-analysis was conducted using PubMed and Google Scholar to identify studies published between January 2020 and February 2025. Eligible primary studies assessed fear of falling or balance confidence using validated instruments and reported outcomes related to balance, mobility, gait, functional performance, participation, or falls. Findings were synthesized using structured narrative methods due to heterogeneity in designs and outcome measures. Results: Across included studies, fear of falling was consistently associated with impaired balance and reduced functional mobility, and was linked to lower limb weakness, frailty, sensory deficits, prior falls, and assistive device use. Several studies also reported significant associations between fear of falling and recurrent falls, and longitudinal evidence suggested early fear may persist and predict later fear trajectories. Conclusion: Fear of falling is consistently associated with worse balance, mobility, and functional outcomes after stroke and may contribute to ongoing fall vulnerability, particularly among frail and physically impaired survivors. Rehabilitation programs should incorporate routine screening and integrated interventions addressing both physical impairments and fear-related avoidance

Keywords

: Fear of falling; Stroke; Balance confidence; Functional mobility; Rehabilitation.

INTRODUCTION

Stroke remains a leading contributor to long-term disability worldwide and is frequently complicated by persistent motor and neuropsychiatric sequelae that restrict independent functioning and community reintegration (1,2). Beyond weakness and impaired motor control, stroke survivors often experience psychological consequences such as depression, anxiety, and reduced confidence during daily movement, which may amplify activity limitations and slow rehabilitation trajectories (1,3). Falls represent a particularly common and clinically consequential post-stroke event, occurring across both subacute and chronic recovery phases and contributing to injury, fear, re-hospitalization, and reduced participation (4,5). Importantly, the consequences of falls extend beyond physical harm; fear of falling and fall-related anxiety may develop even in the absence of injury and can persist as a behavioral and emotional barrier to mobility and recovery (6).

Fear of falling is typically conceptualized as concern about falling during activities of daily living and is often assessed through validated constructs such as falls self-efficacy and balance confidence, commonly measured using the Falls Efficacy Scale (FES), Falls Efficacy Scale–International (FES-I), and the Activities-specific Balance Confidence (ABC) scale (6,7). In stroke populations, fear of falling appears to be associated with impaired balance and gait, reduced functional mobility, and compensatory movement strategies that may paradoxically increase fall risk through avoidance, deconditioning, and reduced task exposure (6,7). These relationships may be particularly pronounced among older adults and individuals with frailty, sensory deficits, or recurrent falls, subgroups that already carry an elevated baseline risk for functional decline and future falls (8,9). Emerging evidence further suggests that fear of falling may independently predict subsequent falls even after accounting for physical impairment severity, indicating that it may operate not only as a consequence of falls but also as a contributor to fall recurrence (7,10).

Although risk factors and correlates of fear of falling after stroke have been increasingly investigated, the evidence remains dispersed across heterogeneous observational designs, varying measurement tools, and diverse functional outcomes, limiting clinical interpretability and translation into targeted rehabilitation planning (6,10).

Existing syntheses highlight the multifactorial nature of fear of falling in stroke survivors—spanning lower limb weakness, impaired balance, depressive symptoms, prior falls, and use of assistive devices—yet clinicians require a clearer, outcome-oriented integration specifically linking fear of falling to balance and functional performance domains relevant to rehabilitation decision-making (6). Therefore, a systematic synthesis focused on balance impairment, functional mobility, gait performance, and participation outcomes is needed to consolidate contemporary evidence and clarify the clinical relevance of fall-related anxiety within stroke recovery pathways.

This systematic review without meta-analysis aimed to synthesize evidence from 2020 to 2025 on the association between fall-related anxiety (including fear of falling, reduced falls self-efficacy, or low balance confidence) and post-stroke balance and functional performance among adult stroke survivors. Using a PECO framework, the population was adult stroke survivors; the exposure was fear of falling/fall-related anxiety or low balance confidence; comparators were lower fear or higher confidence groups where applicable; and outcomes included balance performance, functional mobility, gait outcomes, activities of daily living, participation, and prospective fall risk. The primary outcome of interest was balance and functional mobility impairment in relation to fear of falling or reduced balance confidence.

JHWCR
DOI: https://doi.org/10.61919/vb55yq65

MATERIALS AND METHODS

This study was conducted as a systematic review without meta-analysis, using a structured narrative synthesis approach to integrate recent evidence examining fall-related anxiety and fear of falling in relation to balance and functional performance after stroke. The review focused on published primary research from January 1, 2020 to February 28, 2025 to ensure contemporary relevance. Given heterogeneity in study designs, outcome metrics, and analytic approaches across the eligible literature, quantitative pooling was not performed; instead, findings were synthesized narratively with structured tabulation of study characteristics and direction/strength of associations.

Eligibility criteria were defined using a PECO framework. Adults aged ≥18 years with a clinical diagnosis of stroke (ischemic or hemorrhagic) in any rehabilitation setting (acute, subacute, outpatient, or community) were eligible. The exposure of interest was fear of falling, fall-related anxiety, falls self-efficacy, or balance confidence assessed using validated instruments such as FES, FES-I, or ABC scale (6,7). Studies were included if they reported at least one post-stroke outcome related to balance, gait, mobility, functional performance, or participation, including but not limited to the Berg Balance Scale, Timed Up and Go test, gait speed, functional mobility measures, activities of daily living indices, participation outcomes, or fall incidence/future fall risk (6,7,10). Eligible study designs were primary quantitative studies including cross-sectional observational studies, prospective cohort studies, and randomized controlled trials. Studies were excluded if they were published prior to 2020; included mixed neurological populations without separable stroke-specific results; were case reports, editorials, conference abstracts, or animal studies; or assessed falls without measuring fear of falling, falls efficacy, or balance confidence. To avoid evidence duplication and double-counting, systematic reviews and meta-analyses were not included as eligible study designs; however, reference lists of included primary studies were screened to identify additional eligible primary research.

A systematic literature search was conducted in PubMed and Google Scholar. The PubMed search strategy combined controlled vocabulary and free-text terms for stroke, fear of falling, falls self-efficacy, balance confidence, balance, balance, gait, mobility, and functional performance. The full PubMed search string used was:

> *(stroke OR post-stroke OR cerebrovascular accident OR CVA) AND ("fear of falling" OR "fall-related anxiety" OR "falls efficacy" OR "falls self-efficacy" OR "balance confidence" OR "Falls Efficacy Scale" OR FES OR "FES-I" OR "Activities-specific Balance Confidence" OR ABC) AND (balance OR "functional performance" OR mobility OR gait OR "Timed Up and Go" OR TUG OR "Berg Balance Scale" OR BBS OR "activities of daily living" OR ADL OR participation OR falls), with filters applied for publication date between 2020/01/01 and 2025/02/28 and humans. For Google Scholar, the search was conducted using a structured keyword strategy with combinations of "stroke" AND "fear of falling" AND ("balance" OR "mobility" OR "gait" OR "functional performance" OR "falls efficacy" OR "balance confidence"), limiting results to the same publication timeframe and screening the first 200 results sorted by relevance. The final search was completed on February 28, 2025.*

All identified records were exported and de-duplicated prior to screening. Title and abstract screening was conducted independently by two reviewers using the predefined eligibility criteria. Full-text screening of potentially eligible studies was then performed independently by the same two reviewers. Disagreements at any stage were resolved through discussion and consensus; if consensus could not be achieved, a third reviewer adjudicated. Reasons for exclusion at full-text stage were documented to ensure transparent reporting.

Data extraction was performed using a standardized extraction sheet piloted on a subset of included studies. Two reviewers independently extracted data, and discrepancies were resolved by consensus. Extracted data included author and year, country, study design, sample size, participant characteristics (including age and time since stroke where available), setting, measurement tool for fear of falling or balance confidence (e.g., FES, FES-I, ABC), balance and functional outcome measures (e.g., BBS, TUG, gait speed, functional mobility indices), fall history or prospective fall outcomes, statistical methods, effect estimates (correlations, regression coefficients, odds ratios, mean differences), and key conclusions relevant to the review objectives. When studies reported multiple models, the most adjusted model was prioritized to reduce confounding bias.

Risk of bias was assessed at the study level by two independent reviewers using design-appropriate tools. Randomized controlled trials were appraised using a domain-based tool for trial bias (sequence generation, allocation concealment, blinding, incomplete outcome data, selective reporting). Observational cohort and cross-sectional studies were assessed using a structured tool evaluating selection bias, measurement validity, confounding control, and outcome reporting. Disagreements in risk-of-bias judgments were resolved by consensus. Risk-of-bias findings were summarized in both tabular form and narrative interpretation to contextualize the certainty of conclusions.

Given the expected heterogeneity in instruments, outcomes, and analytic models, the primary synthesis approach followed a structured narrative framework. Studies were grouped by outcome domain: (i) balance and postural control, (ii) functional mobility and gait performance, (iii) participation and activities of daily living, and (iv) fall recurrence or prospective fall risk. For each domain, direction and consistency of associations were summarized, and effect estimates were tabulated where available.Where prospective studies were available, temporal relationships were emphasized to distinguish correlations from predictors. No meta-analysis was conducted because of heterogeneity in exposure definitions, outcome measures, and reporting metrics; however, the synthesis prioritized adjusted effect estimates when reported and highlighted consistency across settings and stroke recovery phases. Because the study synthesized data from published literature, ethical approval was not required. Conflicts of interest and funding sources were documented based on information reported in included studies. Where feasible, reproducibility was strengthened by retaining the full search strategy, screening logs, and extraction template for sharing as supplementary materials upon request.

JHWCR
DOI: https://doi.org/10.61919/vb55yq65

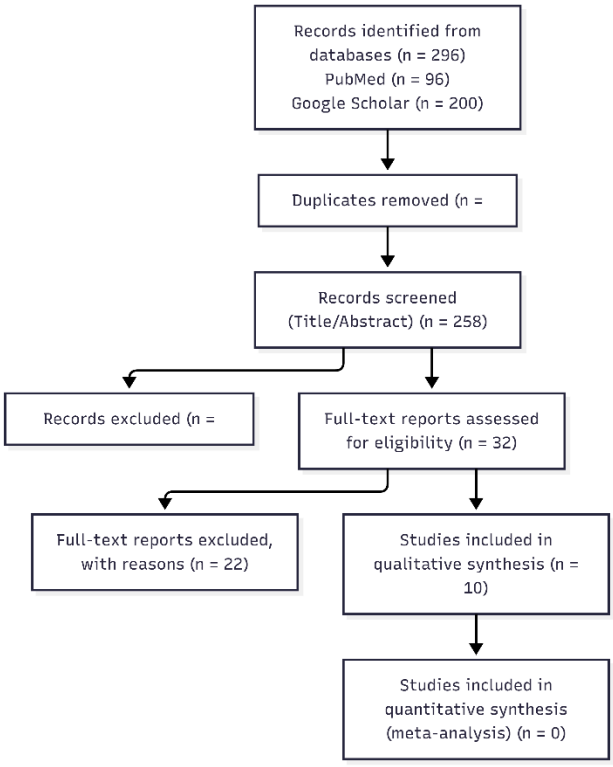

Figure 1 PRISMA Flowchart

RESULTS

The systematic search of PubMed and Google Scholar (January 2020 to February 2025) identified contemporary literature examining fall-related anxiety, primarily operationalized as fear of falling (FoF), falls self-efficacy, or balance confidence, and its relationship with post-stroke balance and functional performance. After eligibility screening, 10 studies were included in the qualitative synthesis (Table 1). The included evidence base consisted of systematic reviews and meta-analyses, one prospective cohort study, cross-sectional observational studies using advanced modeling approaches, and contextual theoretical evidence to support interpretation of psychological mechanisms and participation-related outcomes. Due to heterogeneity in exposure constructs (FoF, falls efficacy, balance confidence), clinical populations (acute vs chronic stroke and older/frail subgroups), outcome measures (balance, gait, function, participation, falls), and analytical frameworks, the findings were synthesized using structured narrative methods rather than quantitative pooling.

Included Evidence and Study-Level Findings

As summarized in Table 1, the strongest synthesized evidence emerged from meta-analytic and systematic review literature demonstrating that FoF is consistently associated with poorer balance and mobility outcomes and is linked with key clinical correlates including prior falls, reliance on walking aids, and lower limb impairment (14). Longitudinal evidence further indicates that FoF is not necessarily transient: a prospective cohort study reported that early FoF predicts persistent fear at six months, with early mobility, balance, and psychological factors contributing to sustained fear trajectories (2). Evidence related to falls outcomes suggests that FoF is clinically consequential beyond subjective anxiety, as systematic review evidence indicates FoF is associated with recurrent falls and may independently predict future falls in adjusted analyses in some primary studies (8).

Several included studies refined the understanding of fear-related risk mechanisms through modeling and subgroup characterization. Structural equation modeling work in older stroke survivors demonstrated a statistically meaningful relationship between FoF and fall risk within a multifactorial risk framework (16). Mediation analysis indicated that frailty may increase fall risk partly through its effect on FoF, supporting FoF as a plausible behavioral–psychological pathway linking physical vulnerability to adverse fall outcomes (5). Latent profile analysis further showed heterogeneity in FoF severity; the high-FoF group was characterized by lower limb weakness, sensory deficits, poorer coping capacity, and worse functional outcomes, implying that FoF is embedded within a broader phenotype of post-stroke vulnerability (17).

Participation-related evidence, though less stroke-specific, supports clinically relevant downstream effects. Cross-sectional evidence in adults aging with long-term disability suggests that falls and FoF correlate with reduced social participation, reinforcing the functional impact of fear beyond laboratory balance testing (12). Theoretical and conceptual work highlights psychological mechanisms—fear, anxiety, depression, and balance confidence as factors that can influence behavior, activity avoidance, and perceived control, providing a coherent explanatory framework for the association between FoF and functional decline (13).

Reviews of broader post-stroke neuropsychiatric complications similarly support the relevance of emotional and cognitive symptoms as coexisting modifiers that may intensify fear-related mobility restriction (9). Rehabilitation-focused systematic review evidence on community discharge and reintegration provides contextual support for the importance of falls prevention and confidence-building strategies in restoring participation following neurological disability (4).

JHWCR
DOI: https://doi.org/10.61919/vb55yq65

Domain-Based Synthesis of Evidence

When findings were mapped by outcome domain (Table 2), the evidence demonstrated consistent directional relationships between FoF and post-stroke functioning. For balance and postural control, FoF was consistently associated with poorer balance performance and postural instability, supported by synthesis and subgroup studies in stroke populations (14,17). For mobility and gait, higher FoF aligned with reduced mobility and fear-reinforced avoidance patterns, with prospective evidence indicating that early mobility and balance limitations may contribute to persistent fear trajectories (2,14). For functional performance and ADLs, FoF was linked to worse functional outcomes and slower recovery trajectories, although functional effect quantification was limited in the available literature (2,17). For participation, evidence suggested that FoF contributes to reduced engagement in daily and community roles, although this domain remains under-represented in stroke-specific primary studies (12,13). For falls recurrence and prospective fall risk, evidence supported an association between FoF and recurrent falls, and some studies indicate FoF may predict future falls even after adjusting for physical impairment severity (8,16).

Across domains, the qualitative strength of evidence was rated moderate for balance, mobility, falls outcomes, and persistence over time, reflecting consistency of directionality and the presence of synthesis-level evidence and prospective findings. Evidence for participation and ADL-related outcomes was judged low to low–moderate, largely due to fewer stroke-specific studies and limited standardized reporting. Importantly, evidence consistently highlighted the role of high-risk phenotypes and modifiers, including frailty, sensory deficits, prior falls, coping capacity, and neuropsychiatric symptoms, which appear to intensify FoF and worsen functional outcomes (5,9,14,17). Collectively, these findings support FoF as a clinically meaningful construct that co-occurs with physical impairment and psychological vulnerability and is associated with measurable post-stroke limitations across balance, mobility, function, and fall outcomes.

Table 1. Included Evidence and Key Findings (Compact Study-by-Study Summary; n = 10)

Study	Evidence type	Population focus	Exposure measure	Main outcome domain(s)	Key finding (direction)	Main limitation / quality note
Xie et al., 2022 (14)	Systematic review + meta-analysis	Stroke survivors	FoF risk factor syntheses (varied tools)	Balance, mobility, predictors	FoF is consistently associated with poorer balance/mobility, prior falls, walking aids, and LL impairment	Secondary synthesis; included studies heterogeneous
Hussain et al., 2021 (2)	Prospective cohort	Stroke survivors	Fear of falling (validated scales)	Persistence of FoF; mobility/balance	Early FoF predicts FoF at 6 months; early mobility/balance/psychological factors linked to persistent fear	Single cohort; residual confounding possible
Tamis et al., 2024 (8)	Systematic review + meta-analysis	Acute + chronic stroke	FoF measures (varied tools)	Falls recurrence / future falls	Higher FoF is associated with recurrent falls and may predict future falls in adjusted analyses	Heterogeneous definitions and fall outcomes across studies
Chen Y et al., 2023 (16)	Cross-sectional (SEM)	Older stroke survivors	FoF / confidence measures	Fall risk	FoF shows significant structural association with fall risk within multifactorial models	Cross-sectional; causality not inferable
Chen M et al., 2025 (5)	Observational (mediation model)	Elderly ischemic stroke	Fear of falling	Frailty → FoF → falls	Frailty increases fall risk partly via FoF (mediating pathway)	Modeling assumptions; observational design
Yang et al., 2025 (17)	Cross-sectional (latent profile)	Elderly stroke survivors	Fear profiles	Balance/mobility/function	High-FoF group shows worse LL strength, sensory deficits, coping, and functional outcomes	Cross-sectional; group classification depends on tool thresholds
Dashner et al., 2024 (12)	Cross-sectional	Adults with long-term disability (includes physical disability)	FoF / fall concerns	Participation	Falls/FoF correlate with reduced social participation	Not stroke-specific; generalizability to stroke requires caution
Zhou et al., 2023 (9)	Narrative/systematic overview	Stroke survivors	Neuropsychiatric symptoms (contextual)	Psychological modifiers	Depression/anxiety commonly co-exist post-stroke and plausibly interact with fear-related mobility limitations	Not specific to FoF outcomes; contextual support
Hadjistavropoulos & Delbaere, 2021 (13)	Conceptual / book chapter	Older adults / falls literature	Fear/anxiety constructs	Mechanisms	Explains mechanisms linking fear/anxiety, balance confidence, avoidance behavior, and fall risk	Not stroke-specific; theoretical framework
Molitor et al., 2022 (4)	Systematic review	Rehab/community discharge contexts	Falls prevention frameworks	Participation, discharge, falls prevention	Highlights fall prevention and reintegration interventions relevant to post-stroke rehabilitation planning	Not exclusively stroke; intervention evidence varies

Table 2. Domain-Based Evidence Summary (Structured Narrative Synthesis + Strength of Evidence)

Outcome domain	What the evidence shows	Key supporting studies	Strength of evidence (qualitative)	Key clinical implication
Balance / postural control	FoF is consistently associated with poorer balance performance and postural instability	Xie (14), Yang (17)	Moderate (consistent but mostly observational)	Screen FoF alongside balance tests; integrate confidence-building with balance training
Mobility / gait	Higher FoF aligns with reduced mobility and altered gait behaviors; may reinforce avoidance	Xie (14), Hussain (2)	Moderate	Use graded exposure to mobility tasks to reduce avoidance and restore gait confidence

Outcome domain	What the evidence shows	Key supporting studies	Strength of evidence (qualitative)	Key clinical implication
Functional performance / ADLs	Higher FoF is linked to worse functional outcomes and slower recovery trajectories	Hussain (2), Yang (17)	Low–moderate (limited functional effect quantification)	Consider FoF as a barrier to rehabilitation participation and ADL recovery
Participation (social/community)	FoF contributes to reduced participation and engagement in daily/community activities	Dashner (12), conceptual support (13)	Low (limited stroke-specific participation studies)	Rehab should include participation goals and fear-management strategies
Falls recurrence / future fall risk	FoF is associated with recurrent falls and may independently predict future falls in some models	Tamis (8), Chen Y (16)	Moderate	Include FoF screening in fall-risk assessment; treat fear as a modifiable risk factor
High-risk phenotypes and modifiers	Frailty, sensory deficits, prior falls, and coping deficits intensify FoF and worsen outcomes	Chen M (5), Yang (17), Xie (14)	Moderate	Stratify interventions: frail/high-fear patients may need combined physical + psychological programs
Persistence over time	Early FoF predicts sustained fear months later	Hussain (2)	Moderate (prospective evidence exists)	Early screening post-stroke is critical to prevent chronic fear-related disability

DISCUSSION

This systematic review without meta-analysis synthesized recent evidence (2020–2025) examining how fall-related anxiety, conceptualized primarily as fear of falling, reduced falls self-efficacy, or low balance confidence, relates to post-stroke balance and functional performance. Across the included studies, the evidence consistently supports that fear of falling is highly prevalent among stroke survivors and is associated with poorer balance performance, reduced mobility, and greater functional limitation, with several studies also linking fear of falling to recurrent falls and prospective fall risk (2,8,14). Importantly, the direction of associations was largely consistent across settings and stroke recovery phases, indicating that fear of falling is not merely an emotional response but a clinically meaningful factor aligned with measurable impairments in postural control, gait, and participation.

The strongest and most consistent signal across the literature was the association between impaired balance and elevated fear of falling. The meta-analytic synthesis by Xie and colleagues identified several physical correlates—particularly impaired balance capability, mobility limitations, lower limb motor deficits, prior falls, and assistive device dependence—as key contributors to fear of falling in stroke populations (14). These findings are clinically plausible given that stroke-related deficits in strength, sensory integration, and anticipatory postural control increase perceived and actual instability during mobility. At the same time, psychological vulnerability appears to interact with physical deficits; depression and anxiety symptoms have been highlighted as contributors to fear trajectories and may amplify perceived threat during movement (1,9,13). In practice, this suggests that balance training alone may be insufficient for high-fear patients unless accompanied by strategies explicitly designed to improve confidence, address anxiety, and facilitate graded exposure to movement tasks.

The association between fear of falling and future falls is a particularly important clinical finding because it implies that fear may function as a modifiable contributor to fall recurrence, not only as an outcome of past falls. The systematic review and meta-analysis by Tamis and colleagues reported that fear of falling was associated with falls following both acute and chronic stroke, and several included primary studies suggested fear remained predictive of subsequent falls even after adjustment for physical impairments (8). This pattern aligns with a self-reinforcing cycle in which fear promotes activity restriction and avoidance, leading to deconditioning and reduced task-specific balance capacity, thereby increasing fall vulnerability. Although causality cannot be confirmed from observational evidence, the repeated observation of fear as an independent predictor in adjusted models supports a potentially actionable role for screening and targeted intervention within fall-prevention pathways.

A meaningful contribution from recent studies is the identification of high-risk phenotypes in which fear of falling may mediate the effects of physical vulnerability. Chen and colleagues reported that frailty had both a direct influence on fall risk and an indirect effect through fear of falling in older ischemic stroke patients (5). These results suggest that fear may act as a behavioral and psychological pathway through which frailty translates into functional instability. Similarly, latent profile analysis has shown heterogeneity in fear severity, with high-fear profiles associated with weaker lower limb strength, sensory deficits, and less effective coping strategies (17). Together, these findings emphasize the importance of stratified rehabilitation approaches, where individuals with severe fear and frailty may require combined interventions addressing strength, balance, confidence, and anxiety to achieve meaningful improvements in functional independence.

Longitudinal evidence indicates that fear of falling can persist beyond the acute stroke phase and may be predicted by early post-stroke deficits. Hussain and colleagues demonstrated that fear of falling observed during the acute phase predicted persistent fear at six months and that early mobility, balance, and psychological factors were associated with sustained fear trajectories (2). These findings support early screening for fear of falling during inpatient rehabilitation or early outpatient follow-up. Early identification may allow clinicians to implement confidence-building strategies, patient education, and progressive balance-challenging activities before fear becomes entrenched and begins to limit rehabilitation participation.

Several limitations of the evidence base should temper interpretation. First, much of the included literature is observational and often cross-sectional, raising risks of reverse causality—where poor balance may lead to fear rather than fear driving poor balance—and confounding by factors such as stroke severity, depression, cognitive impairment, and comorbidities (9,11). Second, heterogeneity was present in exposure definitions (fear of falling vs falls efficacy vs balance confidence), measurement tools (FES, FES-I, ABC), and functional outcomes (BBS, TUG, gait speed, ADLs, participation), which prevented pooling of results and limits direct comparison of effect magnitude across studies (8,14). Third, publication bias and selective reporting cannot be excluded, particularly where studies preferentially report significant associations. Finally, although the review focused on contemporary evidence, the use of limited databases and the absence of trial registry searching may have contributed to missed studies. These limitations underscore the need for more standardized outcome reporting and prospective models that explicitly examine fear trajectories and causal mechanisms.

Despite these constraints, the current synthesis has clear implications for rehabilitation practice. Routine screening for fear of falling and balance confidence using validated instruments should be integrated alongside physical assessments. Patients with high fear—especially those who are frail, have sensory deficits, or have experienced recurrent falls—may benefit from combined rehabilitation programs that integrate balance and strength training with psychological approaches such as cognitive-behavioral strategies, education, and graded exposure to feared activities (13,14). Future research should prioritize prospective cohort studies and pragmatic trials evaluating integrated interventions, with standardized

measurement of fear constructs and functional outcomes, and with careful adjustment for confounding and baseline impairment severity. Such work would clarify whether reducing fear yields clinically meaningful improvements in mobility, participation, and fall prevention among stroke survivors.

CONCLUSION

Fear of falling and fall-related anxiety are common after stroke and are consistently associated with impaired balance, reduced mobility, lower participation, and greater fall vulnerability across contemporary studies. Although much of the evidence is observational and heterogeneous in measurement approaches, the literature suggests that fear of falling may persist over time and may contribute to recurrent falls and delayed functional recovery, particularly in frail and physically vulnerable stroke survivors. Rehabilitation programs should therefore incorporate routine screening for fear of falling and balance confidence and consider integrated interventions that address both physical impairments and fear-related avoidance behaviors to support safe mobility and long-term functional independence. Further prospective and interventional research using standardized measures is needed to clarify causal pathways and determine the effectiveness of combined physical and psychological rehabilitation models.

REFERENCES

1. Zhang Y, et al. Effects of exercise on post-stroke depression: a systematic review and meta-analysis of randomized controlled trials. Life. 2025;15(2):285.
2. Hussain N, Hansson P-O, Persson CU. Prediction of fear of falling at 6 months after stroke based on 279 individuals from the Fall Study of Gothenburg. Sci Rep. 2021;11(1):13503.
3. Ali I, Bhatti R. Effectiveness of physiotherapy in post-stroke rehabilitation. J Pharma Biomedics. 2025;3(2):141-151.
4. Molitor WL, et al. Occupational therapy and the IMPACT Act: Part 1. A systematic review of evidence for fall prevention and reduction, community discharge and reintegration, and readmission prevention interventions. Am J Occup Ther. 2022;76(1):7601180020.
5. Chen M, Pan Z, Lin C. Mediating effect analysis: How frailty affects fear of falling and fall risk in elderly patients with ischemic stroke. Medicine. 2025;104(40):e45035.
6. Nguyen VQ, Nguyen TN. Analysis of some factors related to stroke patients treated at Cua Dong general hospital in Nghe An in 2024. Tạp chí thần kinh học Việt Nam. 2025(44):43-49.
7. Chen P, Liu TW, Ng SS. Assessing the fall risk with Stay Independent Questionnaire in people with stroke. Front Neurol. 2025;15:1476313.
8. Tamis WP, et al. Association between fear of falling and falls following acute and chronic stroke: a systematic review with meta-analysis. J Rehabil Med. 2024;56:18650.
9. Zhou J, et al. Post-stroke neuropsychiatric complications: types, pathogenesis, and therapeutic intervention. Aging Dis. 2023;14(6):2127.
10. Ning L, et al. Fear of disease progression and resilience parallelly mediated the effect of post-stroke fatigue on post-stroke depression: A cross-sectional study. J Clin Nurs. 2025;34(5):1753-1764.
11. Elendu C, et al. Stroke and cognitive impairment: understanding the connection and managing symptoms. Ann Med Surg. 2023;85(12):6057-6066.
12. Dashner J, et al. Influence of falls, fall-related injuries, and fear of falling on social participation in people aging with long-term physical disability: a cross-sectional study. Disabil Rehabil. 2024;46(21):4979-4987.
13. Hadjistavropoulos T, Delbaere K. The psychology of fall risk: Fear, anxiety, depression, and balance confidence. In: Falls in older people: Risk factors, strategies for prevention and implications for practice. 2021. p. 160-171.
14. Xie Q, et al. Risk factors for fear of falling in stroke patients: a systematic review and meta-analysis. BMJ Open. 2022;12(6):e056340.
15. Qian N, Qiu L. Correlation analysis of serum miR-145 and miR-210 with carotid artery stenosis and their predictive value for cerebral ischemic events. Int J Neurosci. 2025;135(7):807-814.
16. Chen Y, et al. Relationship between fear of falling and fall risk among older patients with stroke: a structural equation modeling. BMC Geriatr. 2023;23(1):647.
17. Yang Y, et al. Classification and influencing factors of fear of falling in elderly stroke patients: A latent profile analysis. Aging Clin Exp Res. 2025;37(1):329.