










SYSTEMATIC REVIEW

Does concern about falling predict future falls in older adults? A systematic review and meta-analysis

TOBY JACK ELLMERS¹ , JODI P. VENTRE², ELLEN FREIBERGER³ , KLAUS HAUER⁴, DAVID B. HOGAN⁵ ,
MEI LING LIM⁶ , LISA MCGARRIGLE⁷ , SAMUEL ROBERT NYMAN⁸ , CHRIS J. TODD⁹ , YUXIAO LI¹ ,
KIM DELBAERE¹⁰ 

¹Department of Brain Sciences, Faculty of Medicine, Imperial College London, London, UK

²National Institute for Health and Care Research, Applied Research Collaboration- Greater Manchester & School of Health Sciences, Faculty of Biology, Medicine and Health, The University of Manchester, Manchester, UK

³Geriatric Center, Medical Faculty Heidelberg, Heidelberg University, Rohrbacher Straße 149, 69126, Heidelberg, Germany

⁴Bethanien Hospital, Geriatric Centre at the Heidelberg University, Heidelberg 69126, Germany

⁵Professor Emeritus, Departments of Medicine and Community Health Sciences, Cumming School of Medicine, University of Calgary, Calgary, Canada

⁶Falls, Balance and Injury Research Centre, Neuroscience Research Australia, Sydney, Australia & School of Population Health, University of New South Wales, Sydney, Australia & Neurology, The George Institute for Global Health, Sydney, Australia

⁷School of Health Sciences, Faculty of Biology, Medicine and Health, The University of Manchester, Manchester, UK

⁸Department of Psychology, Faculty of Humanities & Social Sciences, University of Winchester, Winchester, UK

⁹National Institute for Health and Care Research, Applied Research Collaboration - Greater Manchester & School of Health Sciences, Faculty of Biology, Medicine and Health, The University of Manchester, Manchester, UK & Manchester Academic Health Science Centre, Manchester, UK & Manchester University NHS Foundation Trust

¹⁰Falls, Balance and Injury Research Centre, Neuroscience Research Australia, Randwick, NSW 2031, Australia & School of Population Health, University of New South Wales, Sydney, Australia

Address correspondence to: Toby Jack Ellmers, Department of Brain Sciences, Imperial College London, Charing Cross Hospital, Fulham Palace Road, London W6 8RF, UK. E-mail: t.ellmers@imperial.ac.uk

Abstract

Background: The 2022 World Falls Guidelines recommend assessing concerns (or ‘fears’) about falling in multifactorial fall risk assessments. However, the evidence base for this recommendation is limited. This review evaluated the evidence for concerns about falling as an independent predictor of future falls, applying the Bradford Hill criteria for causality.

Methods: Systematic review and meta-analyses were conducted (PROSPERO registration ID: CRD42023387212). MEDLINE, CINAHL Plus, Web of Science and PsycINFO were searched for studies examining associations between baseline concerns about falling and future falls in older adults (minimum 6-month follow-up). Meta-analyses examined associations between concerns about falling and future falls. Risk of bias was assessed using an adapted Newcastle Ottawa Scale for cohort studies, and evidence certainty was rated with GRADE.

Results: 53 studies, comprising 75,076 participants, were included. Meta-analysis showed significant independent association between baseline concerns and future falls when using the Falls Efficacy Scale-International to assess concerns (full scale version, pooled OR = 1.03 [95% CI = 1.02–1.05] per 1-point increase; short scale version, pooled OR = 1.08 [95% CI = 1.05–1.11]). Significant associations were also observed when using single-item measures of concerns (pooled OR = 1.60 [95% CI = 1.36–1.89] for high vs. low concerns). In contrast, balance confidence (Activities-Specific Balance Confidence Scale)

did not predict future falls (pooled OR = 0.97 [95% CI = 0.93–1.01]). Despite 26 studies rated as poor quality, associations were consistent across studies of different quality. The overall certainty of the evidence was rated as moderate.

Conclusions: Baseline concern about falling is a clear predictor of future falls in older adults, supporting its inclusion in fall risk assessments. Regular assessment of concerns about falling, along with targeted interventions, could help reduce the risk of falls in older adults.

Keywords: fear of falling; falls efficacy; balance confidence; fall risk assessment; systematic review; older people

Key Points

- This systematic review and meta-analysis examined the association between baseline concerns about falling and future falls.
- Concerns about falling were a clear independent predictor of future falls.
- Consistent results were observed across study designs, research settings and measurement tools.
- Balance confidence did not predict future falls.
- Clinicians should regularly screen for concerns about falling, as targeting them could reduce falls.

Introduction

Falls are a major global public health challenge and a leading cause of disability and mortality in older adults [1], costing the US healthcare system an estimated \$50 billion annually [2]. With an ageing population, falls demand urgent attention from healthcare providers and policymakers. Many older adults develop concerns (or ‘fears’) about falling [3, 4], which affect up to 50% of those aged 60 years and above depending on the population and assessment used [4].

The 2022 World Falls Guidelines recommend assessing concerns about falling in multifactorial fall risk assessments of older adults [5]. This was based on evidence linking these concerns to reduced quality-of-life and independence [6], poorer rehabilitation outcomes [7], and increased risk of future physical and social frailty, disability and institutionalisation [7, 8]. Concerns about falling may also increase the likelihood of future falls [9, 10]. However, existing reviews on this topic have primarily focused on cross-sectional studies rather than systematically examining if baseline concerns about falling predict future falls, which precludes causal inference. Further, recent conceptual frameworks [11–13] and epidemiological data [14] also suggest that some level of concern could have protective effects with respect to fall risk (e.g. reduced risk-taking behaviours). There is therefore the need to support or refine the recommendations presented in 2022 World Falls Guidelines surrounding concerns about falling and future falls.

The aim of this systematic review and meta-analysis is to evaluate whether baseline concerns about falling independently predict future falls in older adults. Using the Bradford Hill criteria [15] in our search strategy, we focus on the *Temporality* criterion by including only studies where concerns about falling were measured before the index incident falls. In our interpretation of results, we will focus on the *Strength*

of Association and its Consistency across studies. Furthermore, we will consider *Experimental Evidence* in our discussion to strengthen the causal inference.

Materials and methods

Registration and protocol

The study was prospectively registered in PROSPERO (registration ID: CRD42023387212) and followed the Updated Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines [16]. The primary research question was, ‘Does baseline concern about falling predict future falls and/or injurious falls, independent of other known fall risk factors?’

Search strategy and information sources

We systematically searched MEDLINE, CINAHL Plus, Web of Science and PsycINFO from inception to 6 March 2024 using MeSH terms and keywords related to concerns (and fear) about falling, falls, older people, risk or prospective studies. The detailed search strategy is provided in [Supplementary Appendix A](#).

Eligibility criteria and study selection

We included articles that explored the association between baseline concerns about falling (or related constructs, e.g. balance confidence) and future falls over a follow-up period of at least 6-months (to ensure sufficient follow-up duration). We included studies that recruited either community-dwelling and/or institutionalised older adults, aged 60 years or older. Validated questionnaires (e.g. variants of the Falls Efficacy Scale–International (FES-I) [17, 18]) and/or single-item measurements (e.g. ‘Are you afraid of falling?’ [19]) were accepted for assessing concern, fear or worries about falling. As there is little difference in fall rates recorded in

research using ongoing or recall assessment [20], future falls during the follow-up were either assessed on an ongoing basis (e.g. falls diaries/calendars, regular telephone calls etc.) or at the end of the follow-up period (via recall) [20]. No specific restrictions were applied based on the definition of a fall; studies could report associations between concerns about falling and either the occurrence of falls or the rate of falls. We excluded cross-sectional studies, intervention studies, case reports, reviews, qualitative studies, conference abstracts and letters to the editor, and those not published in the English language. Studies using measures of fear-related activity avoidance as a predictor variable, or those focusing exclusively on participants with specific diseases or conditions (e.g. dementia, Parkinson's Disease, stroke etc.), were also excluded. Titles, abstracts and full texts were reviewed by two independent reviewers (a combination of either T.J.E., J.V. or E.F.) with disagreements resolved following discussions with a third neutral reviewer. Covidence software was used for article management.

Data extraction

Data were extracted independently by two reviewers (T.J.E. and either J.V. or K.D.), with a third neutral reviewer resolving any discrepancies through discussion and consensus. Extracted data included study characteristics and sample details, methods and effect estimates. Critical information that remained missing following emails to the authors led to study exclusion (e.g. measurement of concerns), while non-critical missing data were noted as 'not reported'.

Concern about falling and balance confidence were treated as distinct constructs [11], and studies were classified accordingly based on the assessment tools used. Fall outcomes were categorised into any-type falls (occurrence of at least one fall, injurious or not, during follow-up), recurrent falls (≥ 2 falls) or injurious falls (see [Supplementary Appendix B](#) description of specific falls outcomes used in each study) [21].

Risk of bias and quality assessment

Following the registration of the protocol, we decided to change the risk of bias tool from ROBINS-E to an adapted version of the Newcastle-Ottawa Scale. This decision was made following pilot assessments conducted within the team, in which the ROBINS-E was deemed unsuitable for the types of studies included in this review (see also [22]). Risk of bias was assessed by two independent reviewers (a combination of J.V., M.L.L., S.N. and E.F.) using an adapted version of the Newcastle Ottawa Scale for cohort studies [23]. (See [Supplementary Appendix G](#) for the specific version of the scale used.) This scale assesses risk of bias due to cohort selection, confounding, measurement of exposure (concern about falling tool) and outcome (falls, including follow-up period), and incomplete or missing outcome data. Inter-rater agreement was 94.3%, and disagreements were resolved by consensus with a third neutral reviewer (T.J.E.). Studies were rated as 'good', 'fair' or 'poor' quality (see [Supplementary Appendix G](#)).

Grading of recommendations, assessment, development and evaluation

The certainty of the evidence was assessed by two independent reviewers (L.M and T.J.E.) using the GRADE approach (high, moderate, low, very low) [24] for prognostic factors and future outcomes [25, 26]. The following factors were considered in relation to downgrading the evidence: (i) risk of bias, (ii) inconsistency, (iii) imprecision (i.e. do 95% CIs overlap unity?), (iv) indirectness and (v) publication bias. No upgrades were applied. As this was a prognostic review, the starting point for assessment was an initial assumption of high certainty evidence [25, 26]. Initial inter-rater agreement was 85%; any disagreements were resolved by consensus with a third neutral reviewer (J.V.).

Statistical analysis

Meta-analyses were pre-planned to evaluate the effect of concerns about falling on future falls, with separate meta-analyses conducted for different assessment tools (concerns about falling: FES-I, Short FES-I and single-item assessments; balance confidence: Activities-Specific Balance Confidence Scale (ABC)). Due to insufficient data and substantial heterogeneity in defining recurrent or injurious falls, statistical analyses focused on studies reporting any-type falls only.

Two-tailed random effects models were used ($\alpha = 0.05$). To ensure consistency in the meta-analyses, we focused on odds ratio (OR) as this was the most commonly reported effect size, with 95% confidence intervals (CI) as the measure of association. Only studies reporting ORs and 95% CIs (or providing them upon request) were included in the meta-analyses. For FES-I and ABC, ORs were extracted when these variables were analysed continuously (with ORs reflecting one-point increase on these scales), while for single-item assessments, ORs were extracted for dichotomised groups (e.g. high vs. low concerns). As we wished to explore if concerns about falling independently predicted future falls, adjusted ORs were pooled when available; with adjustments for age, sex, previous falls at baseline and/or physical function (see [Supplementary Appendix C](#) for the full list of adjusted variables for each study). If a study presented multiple adjusted ORs (or both adjusted and unadjusted ORs), we selected the maximally adjusted model for pooling. Unadjusted ORs were included for studies without adjustment for confounding. Pre-planned subgroup and sensitivity analyses were conducted to explore the impact of confounding variables, excluding extreme outliers [27] and varying risk of bias [28]. Heterogeneity was assessed using the Cochrane's Q test and I^2 statistic, with τ^2 as an estimator of between-study variance. Publication bias was evaluated through Egger's asymmetry test and visual inspection of a funnel plot for meta-analyses with at least 10 studies [29]. All analyses were performed using R (version 4.3.1) and the 'metafor' package (version 4.2.0).

A narrative review was conducted for outcomes with substantial heterogeneity, such as recurrent and injurious falls, synthesising patterns and differences qualitatively without meta-analysis.

Results

Study selection and characteristics

The PRISMA flow diagram (Figure 1) shows the selection process. After removing duplicates, 11,835 articles were screened and 189 reviewed as full-text. Fifty-three articles met the inclusion criteria [9, 10, 14, 30–79], with 38 included in the meta-analyses [9, 10, 14, 32, 33, 35–45, 51–56, 58, 59, 62, 63, 65–68, 70–72, 74, 76, 77, 79]. If multiple articles used the same dataset, those with a higher risk of bias were excluded (e.g. Chen and Kim [80] excluded, with Okoye et al. [55] included).

Supplementary Appendix B shows the study characteristics of the included studies. The included studies involved 75,076 participants, with sample sizes ranging from 42 [59] to 22,533 [14], and a median of 461. The percentage of females ranged between 30% [54] and 100% [34, 61, 79], with a median of 60.3%. The mean age of participants in individual studies ranged between 65 and 80 years, with three studies reporting a mean age of 83 years [40, 59, 77]. The proportion of fallers (any-type falls) ranged from 9.0% [48] to 72.3% [75], with a median of 33.4% (see Supplementary Appendix D). Most participants were community-dwelling, with only four studies recruiting from residential care [59, 63, 67, 70]. Most of the studies took place in Europe ($N = 20$) or North America ($N = 14$), followed by Asia ($N = 8$), Australia ($N = 7$), and South America ($N = 3$), with one article studying participants in both Asia and Australia [43]. All studies adopted a prospective design to explore if baseline concerns predicted future falls. One study adopted a prospective case-controlled design [49], whilst all others were prospective cohort studies. Follow-up periods ranged from 6 months [38, 42, 45, 52, 61, 62, 67, 70, 77] to 11 years [78], with a median of 1 year.

Assessment of concerns about falling

The most common method to assess concerns about falling was a single-item question ($N = 24$), with the most common question being 'Are you afraid of falling?' ($N = 14$). These dichotomised participants into, e.g. 'high' vs. 'low' concerns (see Supplementary Appendix B). The FES-I was used in 23 studies, which included either the full ($N = 16$), short ($N = 6$), or iconographic versions (Icon-FES; $N = 1$). Balance confidence was assessed in 16 studies using either ABC ($N = 9$) or FES ($N = 7$).

Assessment of future falls

Thirty-eight studies assessed any-type falls, and 13 assessed recurrent falls ($N = 13$), comparing these to either non-fallers ($N = 6$ [10, 31, 37, 41, 60, 63]) or a combined group of non-fallers and single fallers ($N = 7$ [32, 43, 44, 47, 48, 57, 64]). Six papers studied injurious falls [49, 65, 69, 71, 73, 78] and 2 studied 'serious falls' (≥ 1 injurious fall and/or ≥ 2 non-injurious falls [32, 47]). One paper assessed the occurrence of a single fall [60].

Risk of bias and quality assessment

Twenty-five studies were rated good quality [9, 10, 14, 30, 34, 38, 40, 42, 44, 48, 50, 53–57, 63, 65, 68–71, 73–75], two as fair [58, 66], and 26 as poor [31–33, 35–37, 39, 41–43, 47, 49, 51, 52, 59–62, 64, 67, 72, 76–79, 81]. Poor quality was attributed to single-item questionnaires ($N = 19$), lack of controlling for important confounding variables ($N = 20$), fall assessments recorded through recall at the end of follow-up ($N = 18$), and inadequate follow-up of participants ($N = 16$). Only 17 studies were awarded the maximum 2 stars for the 'confounding variables' domain [14, 30, 36, 40–42, 44, 50, 55, 56, 63, 68–70, 72, 73, 81]. (See Supplementary Appendix H for risk of bias and quality assessment for individual studies.)

Associations with future any-type falls (combined single, recurrent and injurious falls)

Concerns about falling: multi-item assessments (FES-I)

Sixteen papers assessed the association between concerns about falling and future falls, using either the FES-I ($N = 10$) [43, 52, 53, 56, 62, 67, 68, 70, 71, 82], Short FES-I ($N = 5$) [35, 41, 42, 45, 76] or both ($N = 1$) [32]. Meta-analyses showed significant associations for both the FES-I (pooled OR = 1.03, 95% CI = 1.02–1.05, $Z = 2.79$, $P = .005$) and Short FES-I (pooled OR = 1.08, 95% CI = 1.05–1.11, $Z = 4.71$, $P < .001$). These results remained when removing an extreme outlier within the Short FES-I analysis (pooled OR = 1.07, 95% CI = 1.05–1.10, $Z = 4.44$, $P < .001$; see Supplementary Appendix F1). No evidence of publication bias (Supplementary Appendix E1; $Z = 0.99$, $P = .32$) or heterogeneity was found (FES-I, $I^2 = 4.1\%$, $P = .60$; Short FES-I (after adjusting for outlier), $I^2 = 0.1\%$, $P = .44$). Study quality varied, with no significant differences observed when analysing based on either risk of bias (FES-I, $P = .28$; Short FES-I, $P = .45$ (see Supplementary Appendix F3 and F4)) or adjustment for confounding variables (FES-I, $P = .13$ (see Figure 2); Short FES-I, $P = .84$ (see Figure 3)).

Concerns about falling: single-item assessments

Eighteen studies used single-item assessments to evaluate concerns about falling and future any-type falls [9, 10, 14, 30, 32, 36, 37, 39, 50, 51, 55, 58, 59, 63, 66, 72, 74, 81]. A meta-analysis based on 15 of these studies (adjusted, $N = 12$ [9, 10, 14, 32, 36, 51, 55, 58, 63, 66, 72, 74]; unadjusted, $N = 3$ [37, 39, 59]), comprising 43,912 participants (Figure 4), showed that concerns about falling were significantly associated with future falls (pooled OR = 1.60, 95% CI = 1.36–1.89, $Z = 3.91$, $P < .01$). Despite substantial heterogeneity ($I^2 = 82.9\%$, $P < .01$), results remained robust after outlier removal (pooled OR = 1.58, 95% CI = 1.34–1.86, $Z = 3.96$, $P < .001$; see Supplementary Appendix F2). There were no significant subgroup differences based on either risk of bias ($P = .22$ (see Supplementary Appendix F5)) or adjustment for confounding variables ($P = .11$).

Does concern about falling predict future falls in older adults?

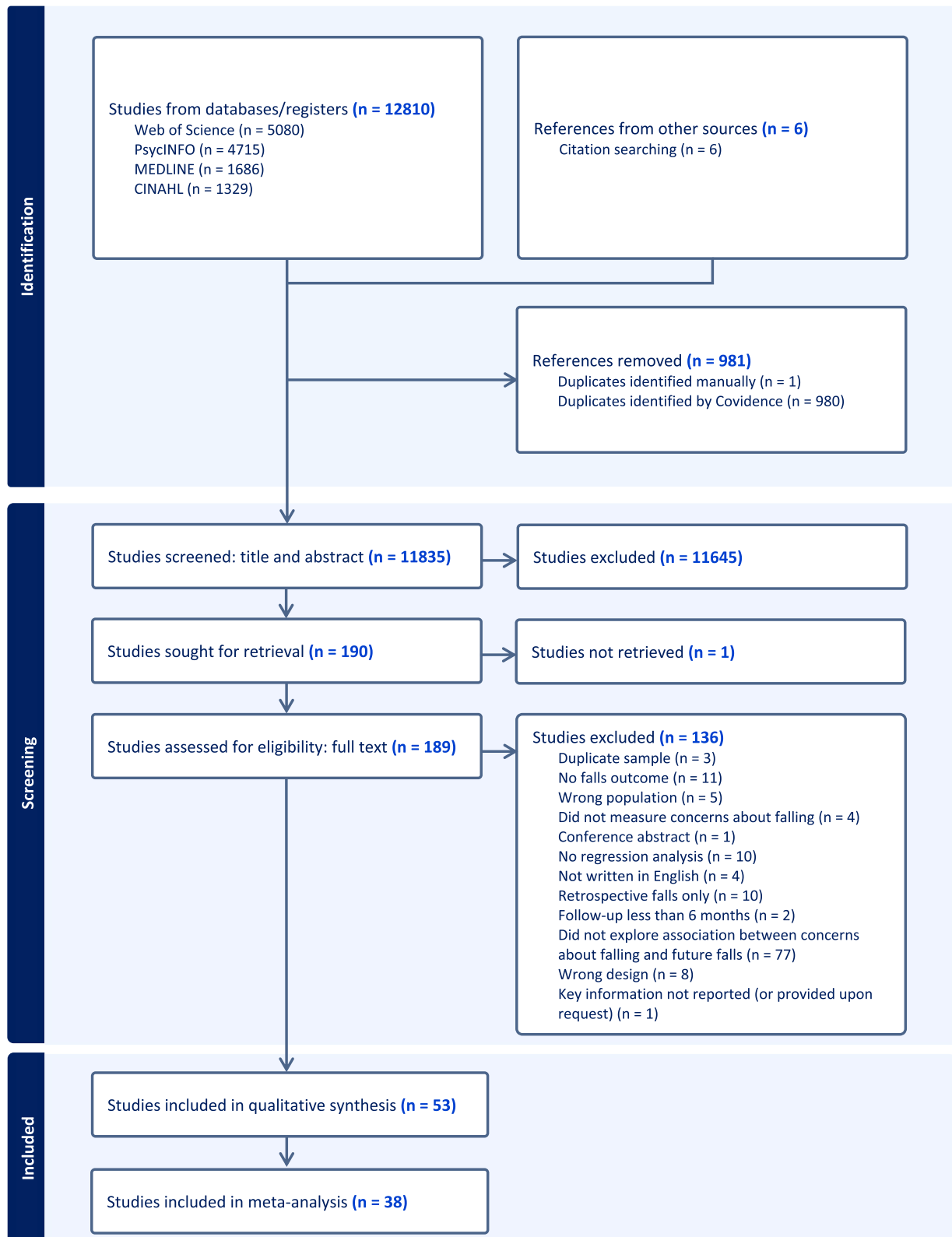


Figure 1. PRISMA flow diagram of the identification, screening and eligibility of included articles.

(see Figure 4)). According to the funnel plot (see [Supplementary Appendix E2](#)) and Egger test, there was no evidence for significant publication bias ($Z = 1.75$, $P = .08$).

Balance confidence

Thirteen papers assessed the association between balance confidence and future falls, using either the ABC scale

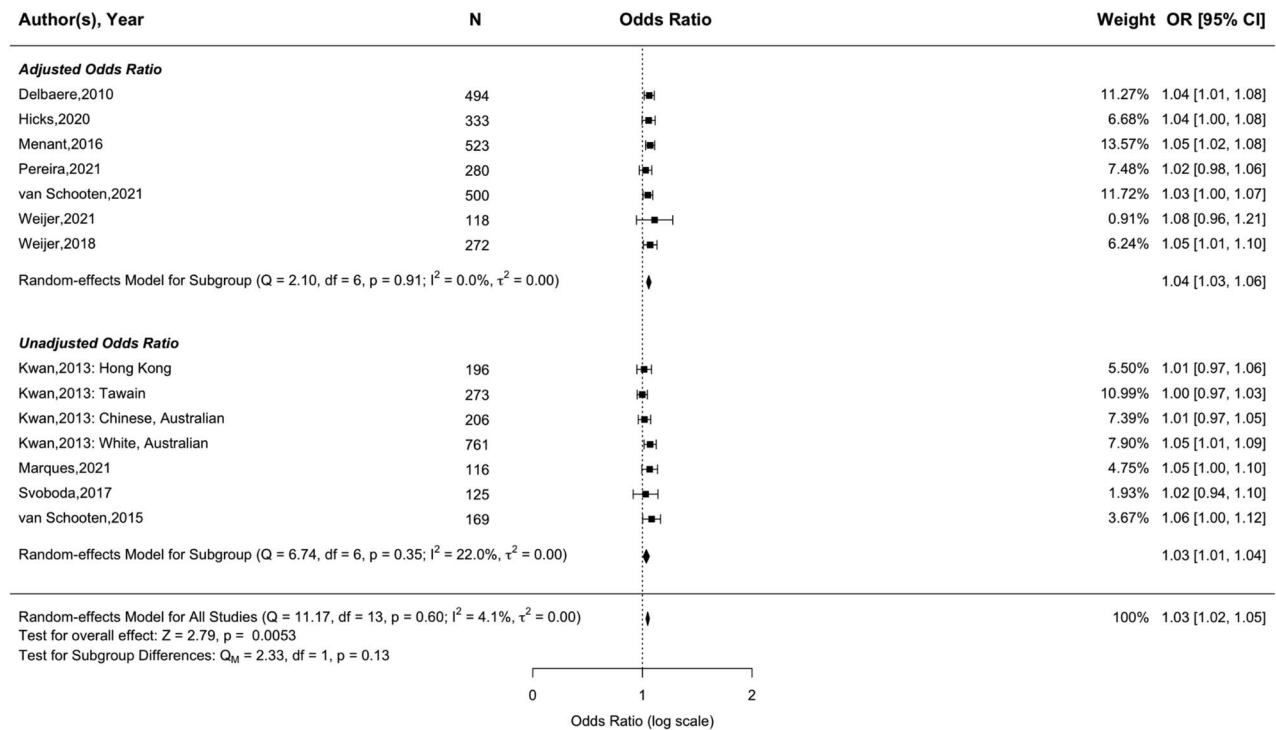


Figure 2. Forest plot of the association between the full 16-item Falls Efficacy Scale International (FES-I) and future any-type falls.

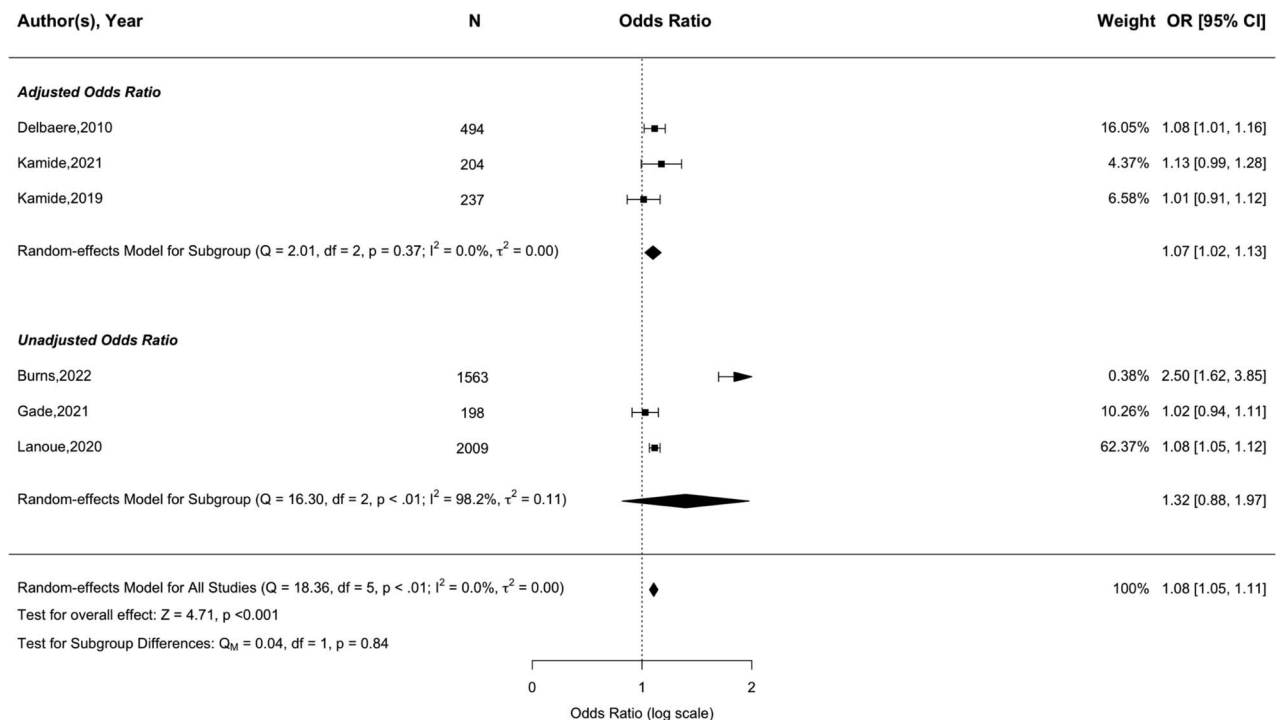


Figure 3. Forest plot of the association between short 7-item Falls Efficacy Scale International (FES-I) and future any-type falls.

($N = 9$) [33, 38, 44, 50, 54, 62, 65, 77, 79] or FES ($N = 6$) [30, 38, 44, 61, 64, 75]. Meta-analysis of nine studies using the ABC (five adjusted [33, 38, 44, 54, 65] and three unadjusted studies [62, 77, 79]), comprising 1728 participants, found no significant association with

future falls (pooled $OR = 0.97$, 95% $CI = 0.93-1.01$, $Z = -0.46$, $P = .65$; Figure 5). There was evidence of substantial heterogeneity ($I^2 = 83.9\%$, $P = .01$). No significant differences emerged when analysing by risk of bias ($P = .89$ (see Supplementary Appendix F6)) or adjustment for

Does concern about falling predict future falls in older adults?

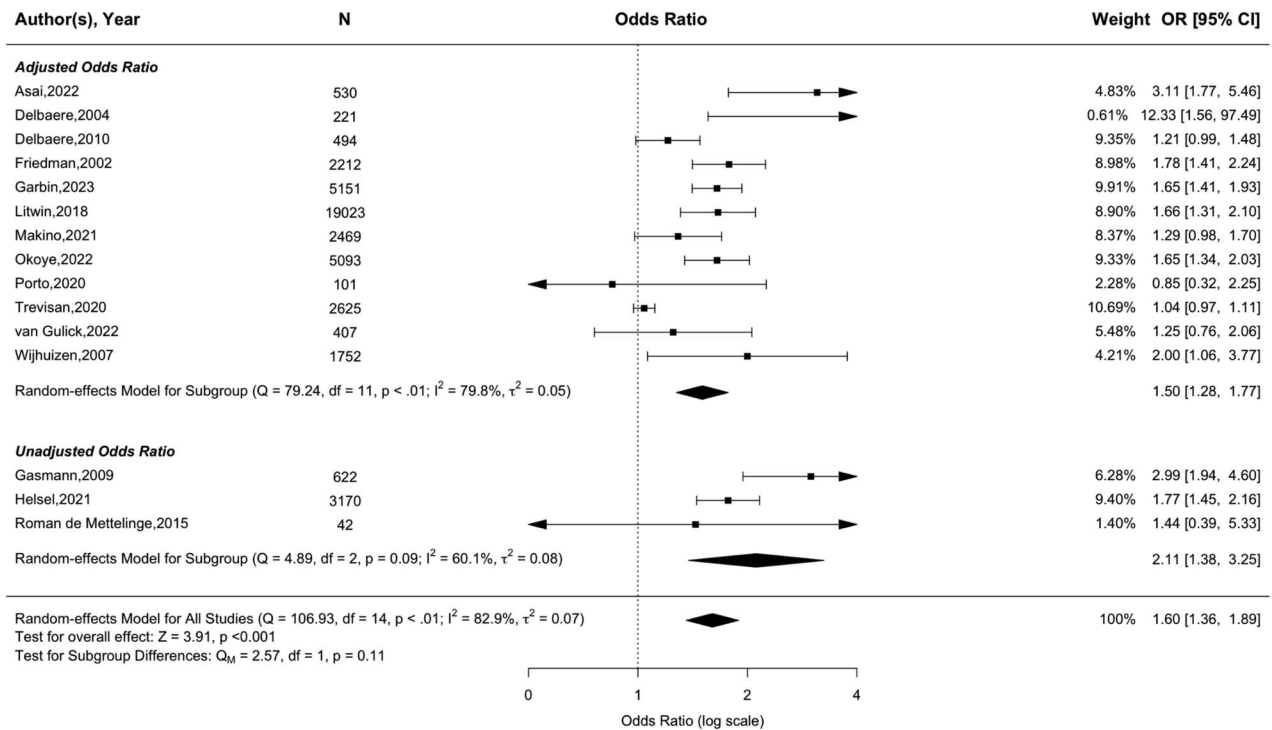


Figure 4. Forest plot of the association between single-item measures of concerns about falling and future any-type falls.

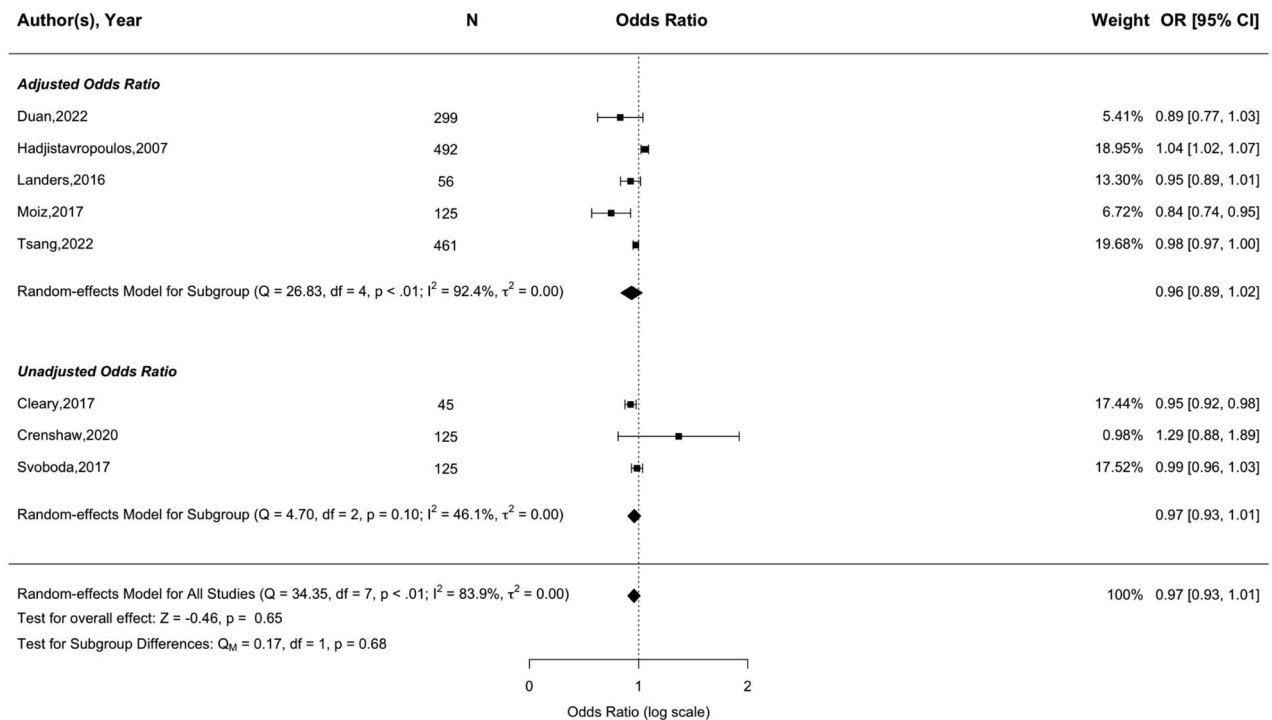


Figure 5. Forest plot of the association between balance confidence (Activities-Specific Balance Confidence Scale [ABC]) and future any-type falls.

confounding variables ($P = .68$ (see Figure 5)). Six papers assessed balance confidence using the original FES. It was not possible to conduct a meta-analysis for this data due to substantial heterogeneity with scoring systems used. Four

papers reported a significant association (adjusted, $N = 3$ [30, 38, 75]; unadjusted, $N = 1$ [64]), whilst two reported a lack of association (adjusted, $N = 1$ [44]; unadjusted, $N = 1$ [61]).

GRADE certainty of the evidence

The GRADE summary of findings is presented in Appendix H. For all analyses, the overall certainty of the evidence was moderate. Meta-analysis for FES-I, Short FES-I and single item assessments was downgraded due to the risk of bias (primarily due to a lack of controlling for confounding variables and issues with fall assessment and data completeness). Results for balance confidence (ABC) were downgraded due to imprecision.

Associations with future recurrent and injurious falls

Due to substantial heterogeneity with respect to assessing both predictor and outcome variables, recurrent and injurious falls are analysed via narrative review only. Nine studies assessed the association between concerns about falling and recurrent falls with mixed results. Two studies found a significant association between the FES-I and future recurrent falls in adjusted models [32, 83]. Another study found a significant association in unadjusted models for White Australians but not for those from Asian backgrounds [43]. In adjusted models, one study found that Short FES-I scores predicted future recurrent falls [32], whereas another study reported a non-significant association [41]. When using single-item measures, two adjusted [48, 63] and two unadjusted studies [37, 64] found significant associations, but one adjusted study did not [32]. Regarding balance confidence, the ABC showed a significant association with recurrent falls [44], as did a modified version of the FES [57]. However, the original FES did not [44].

Similar mixed results were observed for the four studies investigating the association with future injurious falls. Using a single-item measure, one study found a significant association in an unadjusted analysis [78], while another [73] observed a lack of significant association in an adjusted analysis. Using a case-controlled design, a study found that a single-item measure independently predicted more serious injuries following a fall (fractures vs. soft-tissue damage) [49]. In contrast, another reported a non-significant association when using the FES-I in an adjusted model [71]. Two studies investigated the association between balance confidence (ABC, $N = 1$ [65]; FES, $N = 1$ [69]) and found no significant association with future injurious falls in adjusted models.

Discussion

The 2022 World Falls Guidelines recommended assessing concerns about falling as part of a multifactorial falls risk assessment [5], based on intermediate evidence (GRADE 1B). By applying the Bradford Hill criteria [15], we provide stronger causal evidence, upgrading the evidence to strong (GRADE 1A—using the same modified GRADE approach as used in the World Falls Guidelines [5]). These findings emphasise the clinical importance of assessing concerns about falling.

Significant associations between concerns about falling and future falls were consistently found across all measures

(short/full FES-I and single-item measures), supporting a causal relationship (Bradford Hill criteria [15]). Concerns about falling may reflect a sensitive self-perception of fall risk, complementing objective markers like prior falls or gait speed. Pooled ORs were 1.03 (95% CI = 1.02–1.05) for the FES-I and 1.08 (95% CI = 1.05–1.11) for the Short FES-I, per point increase. Whilst the strength of these associations depends on scale used and the points accrued, scoring 40 points higher on the FES-I or 15 points higher on the Short FES-I corresponds to a 120% increase in the odds of falling, emphasising the *Strength of the Association* [15]. Although formal comparisons of diagnostic accuracy between measures are beyond the scope of this study, it is worth noting that this would be double the strength of the association observed with dichotomised single-item measures (pooled OR = 1.60 [95% CI = 1.36–1.89]), which also showed considerable heterogeneity ($I^2 = 82.9\%$). In contrast, the FES-I or short FES-I showed low heterogeneity in predicting future falls, and can also provide additional insights into an individual's concerns about falling not afforded when using single-item measures (i.e. magnitude and specificity rather than mere presence). These findings therefore support the use of the FES-I (full or short) for assessing concerns about falling, in line with the 2022 Guidelines [5, 12]. However, single-item measures remain a practical alternative for time-constrained clinical settings [84].

Experimental Evidence (in-line with the Bradford Hill criteria [15]) further supports a causal association, showing that greater concerns predict more falls during lab-based testing [85, 86], and lead to overly-cautious and potentially unsafe walking behaviours [87, 88]. There is also some evidence that psychological interventions targeting concerns about falling can reduce incidence of falls [89]. While previous reviews have identified prior falls as a risk factor for developing concerns about falling [4], our findings reveal a bidirectional relationship: concerns about falling can be both a cause and consequence of falls. Interestingly, our review found that concerns about falling specifically, rather than balance confidence, were associated with future falls. This distinction indicates that balance confidence should not be part of standardised fall risk assessments. While related, balance confidence and concerns about falling are distinct constructs [11]. Our findings emphasise this distinction, revealing that people with low confidence, but no concerns, are not necessarily at higher risk of falling.

We used a comprehensive search strategy, incorporating data from 53 studies with 75,076 participants across multiple regions, enhancing the *Consistency* of our findings [15]. We minimised bias by focusing on prospective studies with follow-up periods of 6 months or longer, stratifying our meta-analysis by assessment tools, risk of bias and confounding variables. Despite these strengths, our review has several limitations. There was substantial heterogeneity existed across studies, particularly in the confounding variables, participant inclusion/exclusion criteria, and fall assessment. Most studies excluded people with significant cognitive or neurological impairments, limiting generalisability.

It should, however, be noted that *Consistent* evidence of a relationship between baseline concerns and future falls has been reported across different populations, including people with Stroke [90], Parkinson's Disease [91] and Multiple Sclerosis [68, 92]. Most included studies also focused exclusively on people living in the community, with only four studies recruiting participants from residential care [59, 63, 67, 70]. While three of these studies reported significant associations between concerns and future falls, further research is required to explore how concerns about falling affect fall risk in older adults residing in long-term care. Finally, the small number of studies on recurrent or injurious falls and the heterogeneity in their assessment precluded meta-analysis for these outcomes. More prospective research is needed to evaluate the relationship between concerns about falling and future recurrent or injurious falls.

There are also methodological limitations of the studies reviewed. Many studies ($N = 37$) did not control for crucial confounding factors, which could impact the *Strength of Association* and the validity of causal inferences (Bradford Hill criteria [15]). To address this limitation, we separated our meta-analyses into adjusted and unadjusted results, observing statistically comparable results when doing so. Other limitations included high attrition rates (14 studies lost >20% of participants) and non-gold standard approaches to assessing falls (17 studies used recall at the end of the follow-up). Despite these issues, no significant differences were observed when grouping studies by overall quality, which considered statistical power, data missingness and fall assessment methods, suggesting a robust underlying association between concerns about falling and future falls.

Our findings fill a gap in evidence, supporting the inclusion of concerns about falling in fall risk assessments in national [93, 94] and international [5] guidelines. We recommend using the short 7-item FES-I in clinical settings, in line with the 2022 World Falls Guidelines [5], due to its brevity (<3 min to complete), excellent psychometric properties [18], and validated cut-off points for identifying high concerns ($\geq 11/28$) [95]. Our pooled results indicate that people scoring above this cut-off have between 32% and 168% greater odds of falling (depending on their specific score) compared to an individual scoring the minimum points (7/28), reflecting a substantial *Strength of Association* between concerns about falling and future falls.

Conclusions

Concerns about falling in older adults are highly prevalent [4] and have been linked to reduced quality of life and independence [6], poorer rehabilitation outcomes [7] and increased risk of frailty, disability and institutionalisation [7, 8]. Our review identifies that concerns about falling can lead to a further negative outcome: increased future falls. We therefore recommend that clinicians regularly assess concerns about falling in all community-dwelling older adults. Identified concerns should be managed with a multidisciplinary approach including exercise, cognitive behavioural therapy

and/or occupational therapy, as recommended in the 2022 World Falls Guidelines [5].

Supplementary Data: Supplementary data is available at *Age and Ageing* online.

Declaration of Conflicts of Interest: C.T. was the principal investigator on the EC grant used in the development of the FES-I and Short FES-I. The University of Manchester hosts the FES-I website (www.fes-i.org), administered under C.T.'s control. FES-I/Short FES-I are published and distributed free of charge.

Declaration of Sources of Funding: T.J.E. is supported by a Wellcome Trust Sir Henry Wellcome Postdoctoral Fellowship (Grant Number: 222747/Z/21/Z). K.D. is supported by the National Health and Medical Research Council (Grant Number: 1193766). L.M. is funded through the National Institute for Health and Care Research (NIHR) Policy Research Unit in Older People and Frailty (funding reference PR-PRU-1217-2150). As of January 01 2024, the unit has been renamed to the NIHR Policy Research Unit in Healthy Ageing (funding reference NIHR206119). J.P.V. is funded by, and C.T. is co-investigator on NIHR, Applied Research Collaboration-Greater Manchester (NIHR200174) and NIHR National Priority Programme in Healthy Ageing, Dementia and Frailty (NIHR201887). C.T. holds NIHR Senior Investigator Awards (NIHR200299 & NIHR205156). The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care. Y.L. is supported through a Lee Family Scholarship.

The funders played no role in the design, conduct or reporting of this study.

Research Data Transparency and Availability: All extracted data from included studies (including all data analysed within the meta-analysis) is available within the Supplementary Materials. Code used to analyse the data is available from the corresponding author upon reasonable request.

References

1. James SL, Lucchesi LR, Bisignano C *et al*. The global burden of falls: global, regional and national estimates of morbidity and mortality from the global burden of disease study 2017. *Inj Prev*. 2020;**26**:i3–11. <https://doi.org/10.1136/INJURYPREV-2019-043286>.
2. Florence CS, Bergen G, Atherly A *et al*. The medical costs of fatal falls and fall injuries among older adults. *J Am Geriatr Soc*. 2018;**66**:693–8. <https://doi.org/10.1111/jgs.15304>.
3. Tinetti ME, Powell L. Fear of falling and low self-efficacy: a case of dependence in elderly persons. *J Gerontol*. 1993;**48**:35–8. https://doi.org/10.1093/geronj/48.Special_Issue.35.
4. Scheffer AC, Schuurmans MJ, van Dijk N *et al*. Fear of falling: measurement strategy, prevalence, risk factors and

- consequences among older persons. *Age Ageing*. 2008;**37**: 19–24. <https://doi.org/10.1093/ageing/afm169>.
5. Montero-Odasso M, van der Velde N, Martin FC *et al*. World guidelines for falls prevention and management for older adults: a global initiative. *Age Ageing*. 2022;**51**:1–36. <https://doi.org/10.1093/ageing/afac205>.
6. Schoene D, Heller C, Aung YN *et al*. A systematic review on the influence of fear of falling on quality of life in older people: is there a role for falls? *Clin Interv Aging*. 2019;**14**:701. <https://doi.org/10.2147/CIA.S197857>.
7. Denlinger MD, Igl W, Lukas A *et al*. Relationship between fear of falling and outcomes of an inpatient geriatric rehabilitation population—fear of the fear of falling. *J Am Geriatr Soc*. 2010;**58**:664–73. <https://doi.org/10.1111/j.1532-5415.2010.02759.x>.
8. Mo C, Peng W, Luo Y *et al*. Bidirectional relationship between fear of falling and frailty among community-dwelling older adults: a longitudinal study. *Geriatr Nurs*. 2023;**51**:286–92. <https://doi.org/10.1016/j.gerinurse.2023.03.022>.
9. Friedman SM, Munoz B, West SK *et al*. Falls and fear of falling: which comes first? A longitudinal prediction model suggests strategies for primary and secondary prevention. *J Am Geriatr Soc*. 2002;**50**:1329–35. <https://doi.org/10.1046/j.1532-5415.2002.50352.x>.
10. Delbaere K, Crombez G, Vanderstraeten G *et al*. Fear-related avoidance of activities, falls and physical frailty. A prospective community-based cohort study. *Age Ageing*. 2004;**33**:368–73. <https://doi.org/10.1093/ageing/afh106>.
11. Ellmers TJ, Wilson MR, Kal EC *et al*. The perceived control model of falling: developing a unified framework to understand and assess maladaptive fear of falling. *Age Ageing*. 2023;**52**:1–12.
12. Ellmers TJ, Freiburger E, Hauer K *et al*. Why should clinical practitioners ask about their patients' concerns about falling? *Age Ageing*. 2023;**52**:afad057. <https://doi.org/10.1093/AGEING/AFAD057>.
13. Adamczewska N, Nyman SR. A new approach to fear of falls from connections with the Posttraumatic Stress disorder literature. *Gerontol Geriatr Med*. 2018;**4**:233372141879623. <https://doi.org/10.1177/2333721418796238>.
14. Litwin H, Erlich B, Dunsky A. The complex association between fear of falling and mobility limitation in relation to late-life falls: a SHARE-based analysis. *J Aging Health*. 2018;**30**:987–1008. <https://doi.org/10.1177/0898264317704096>.
15. Hill AB. The environment and disease: association or causation? *Proc R Soc Med*. 1965;**58**:295. <https://doi.org/10.1177/003591576505800503>.
16. Page MJ, McKenzie JE, Bossuyt PM *et al*. Statement: an updated guideline for reporting systematic reviews. *BMJ*. 2020;**2021**:372. <https://doi.org/10.1136/BMJ.N71>.
17. Yardley L, Beyer N, Hauer K *et al*. Development and initial validation of the falls efficacy scale-international (FES-I). *Age Ageing*. 2005;**34**:614–9. <https://doi.org/10.1093/ageing/afi196>.
18. McGarrigle L, Yang Y, Lasrado R *et al*. A systematic review and meta-analysis of the measurement properties of concerns-about-falling instruments in older people and people at increased risk of falls. *Age Ageing*. 2023;**52**:1–11. <https://doi.org/10.1093/ageing/afad055>.
19. Jørstad EC, Hauer K, Becker C *et al*. Measuring the psychological outcomes of falling: a systematic review. *J Am Geriatr Soc*. 2005;**53**:501–10. <https://doi.org/10.1111/j.1532-5415.2005.53172.x>.
20. Rapp K, Freiburger E, Todd C *et al*. Fall incidence in Germany: results of two population-based studies, and comparison of retrospective and prospective falls data collection methods. *BMC Geriatr*. 2014;**14**:105. <https://doi.org/10.1186/1471-2318-14-105>.
21. Jehu DA, Skelton DA. The measurement and reporting of falls: recommendations for research and practice on defining faller types. *J Frailty Sarcopenia Falls*. 2023;**8**:200–3. <https://doi.org/10.22540/JFSF-08-200>.
22. Bero L, Chartres N, Diong J *et al*. The risk of bias in observational studies of exposures (ROBINS-E) tool: concerns arising from application to observational studies of exposures. *Syst Rev*. 2018;**7**:1–203, 203.
23. Wells G, Shea B, O'Connell D *et al*. *The Newcastle-Ottawa Scale (NOS) for Assessing the Quality of Nonrandomised Studies in Meta-Analyses*. 2013. http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp.
24. Guyatt GH, Oxman AD, Vist GE *et al*. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ*. 2008;**336**:924–6. <https://doi.org/10.1136/bmj.39489.470347.AD>.
25. Iorio A, Spencer FA, Falavigna M *et al*. Use of GRADE for assessment of evidence about prognosis: rating confidence in estimates of event rates in broad categories of patients. *BMJ*. 2015;**350**:h870. <https://doi.org/10.1136/BMJ.H870>.
26. Foroutan F, Guyatt G, Zuk V *et al*. GRADE guidelines 28: use of GRADE for the assessment of evidence about prognostic factors: rating certainty in identification of groups of patients with different absolute risks. *J Clin Epidemiol*. 2020;**121**:62–70. <https://doi.org/10.1016/j.jclinepi.2019.12.023>.
27. Egger M, Smith GD, Phillips AN. Meta-analysis: principles and procedures. *BMJ*. 1997;**315**:1533–7. <https://doi.org/10.1136/bmj.315.7121.1533>.
28. Higgins JPT, Altman DG, Gøtzsche PC *et al*. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ*. 2011;**343**:d5928. <https://doi.org/10.1136/BMJ.D5928>.
29. Sterne JAC, Sutton AJ, Ioannidis JPA *et al*. Recommendations for examining and interpreting funnel plot asymmetry in meta-analyses of randomised controlled trials. *BMJ*. 2011;**343**:d4002. <https://doi.org/10.1136/BMJ.D4002>.
30. Cumming RG, Salkeld G, Thomas M *et al*. Prospective study of the impact of fear of falling on activities of daily living, SF-36 scores, and nursing home admission. *J Gerontol A Biol Sci Med Sci*. 2000;**55**:M299–305. <https://doi.org/10.1093/GERONA/55.5.M299>.
31. Delbaere K, van den Noortgate N, Bourgois J *et al*. The physical performance test as a predictor of frequent fallers: a prospective community-based cohort study. *Clin Rehabil*. 2006;**20**:83–90.
32. Delbaere K, Close JCT, Brodaty H *et al*. Determinants of disparities between perceived and physiological risk of falling among elderly people: cohort study. *BMJ*. 2010;**341**:c4165. <https://doi.org/10.1136/bmj.c4165>.
33. Duan H, Wang H, Bai Y *et al*. Health-related physical fitness as a risk factor for falls in elderly people living in the community: a prospective study in China. *Front public Heal*. 2022;**10**:874993. <https://doi.org/10.3389/FPUH.2022.874993>.

34. Faulkner KA, Cauley JA, Studenski SA *et al.* Lifestyle predicts falls independent of physical risk factors. *Osteoporos Int.* 2009;**20**:2025. <https://doi.org/10.1007/s00198-009-0909-y>.
35. Gade GV, Jørgensen MG, Ryg J *et al.* Development of a multivariable prognostic PREDiction model for 1-year risk of FALLing in a cohort of community-dwelling older adults aged 75 years and above (PREFALL). *BMC Geriatr.* 2021;**21**:1–12. <https://doi.org/10.1186/s12877-021-02346-z>.
36. Garbin AJ, Fisher BE. The interplay between fear of falling, balance performance, and future falls: data from the National Health and aging trends study. *J Geriatr Phys Ther.* 2023;**46**:110–5. <https://doi.org/10.1519/JPT.0000000000000324>.
37. Gaßmann KG, Rupprecht R, Freiburger E. Predictors for occasional and recurrent falls in community-dwelling older people. *Z Gerontol Geriatr.* 2009;**42**:3–10. <https://doi.org/10.1007/s00391-008-0506-2>.
38. Hadjistavropoulos T, Martin RR, Sharpe D *et al.* A longitudinal investigation of fear of falling, fear of pain, and activity avoidance in community-dwelling older adults. *J Aging Health.* 2007;**19**:965–84. <https://doi.org/10.1177/0898264307308611>.
39. Helsel BC, Kemper KA, Williams JE *et al.* Multidimensional risk score to stratify community-dwelling older adults by future fall risk using the stopping elderly accidents, deaths and injuries (STEADI) framework. *Inj Prev.* 2021;**27**:461–6. <https://doi.org/10.1136/injuryprev-2020-044014>.
40. Hicks C, Levinger P, Menant JC *et al.* Reduced strength, poor balance and concern about falls mediate the relationship between knee pain and fall risk in older people. *BMC Geriatr.* 2020;**20**:94. <https://doi.org/10.1186/s12877-020-1487-2>.
41. Kamide N, Shiba Y, Sakamoto M *et al.* Fall-related efficacy is a useful and independent index to detect fall risk in Japanese community-dwelling older people: a 1-year longitudinal study. *BMC Geriatr.* 2019;**19**:293. <https://doi.org/10.1186/s12877-019-1318-5>.
42. Kamide N, Sato H, Sakamoto M *et al.* The effect of the interaction between fall-related self-efficacy and gait function on the occurrence of falls in community-dwelling older people. *Aging Clin Exp Res.* 2021;**33**:2715–22. <https://doi.org/10.1007/s40520-021-01807-0>.
43. Kwan MMS, Tsang WWN, Lin SI *et al.* Increased concern is protective for falls in Chinese older people: the chopstix fall risk study. *J Gerontol A Biol Sci Med Sci.* 2013;**68**:946–53.
44. Landers MR, Oscar S, Sasaoka J *et al.* Balance confidence and fear of falling avoidance behavior are most predictive of falling in older adults: prospective analysis. *Phys Ther.* 2016;**96**:433–42. <https://doi.org/10.2522/ptj.20150184>.
45. Lanoue MP, Sirois MJ, Perry JJ *et al.* Fear of falling in community-dwelling older adults presenting to the emergency department for minor injuries: impact on return to the ED and future falls. *CJEM.* 2020;**22**:692–700. <https://doi.org/10.1017/cem.2020.383>.
46. Lavedan A, Viladrosa M, Jurschik P *et al.* Fear of falling in community-dwelling older adults: a cause of falls, a consequence, or both? *PLoS One.* 2018;**13**:e0194967. <https://doi.org/10.1371/journal.pone.0197792>.
47. Lim ML, van Schooten KS, Radford KA *et al.* The iconographical falls efficacy scale (IconFES) in community-dwelling older people—a longitudinal validation study. *Age Ageing.* 2021;**50**:822–9. <https://doi.org/10.1093/ageing/afaa213>.
48. Luukinen H, Koski K, Kivela SL *et al.* Social status, life changes, housing conditions, health, functional abilities and life-style as risk factors for recurrent falls among the home-dwelling elderly. *Public Health.* 1996;**110**:115–8. [https://doi.org/10.1016/S0033-3506\(96\)80057-6](https://doi.org/10.1016/S0033-3506(96)80057-6).
49. Luukinen H, Koski K, Laippala P *et al.* Factors predicting fractures during falling impacts among home-dwelling older adults. *J Am Geriatr Soc.* 1997;**45**:1302–9. <https://doi.org/10.1111/j.1532-5415.1997.tb02928.x>.
50. Allali G, Ayers EI, Holtzer R *et al.* The role of postural instability/gait difficulty and fear of falling in predicting falls in non-demented older adults. *Arch Gerontol Geriatr.* 2017;**69**:15–20. <https://doi.org/10.1016/j.archger.2016.09.008>.
51. Makino K, Lee S, Bae S *et al.* Prospective associations of physical frailty with future falls and fear of falling: a 48-month cohort study. *Phys Ther.* 2021;**101**:pzab059. <https://doi.org/10.1093/PTJ/PZAB059>.
52. Marques LBF, de Souza Moreira B, de Melo Ocarino J. *et al.* Construct and criterion validity of the functional gait assessment-Brazil in community-dwelling older adults. *Braz J Phys Ther* 2021;**25**:186–93. <https://doi.org/10.1016/j.bjpt.2020.05.008>.
53. Menant JC, Wong AKW, Trolor JN *et al.* Depressive symptoms and orthostatic hypotension are risk factors for unexplained falls in community-living older people. *J Am Geriatr Soc.* 2016;**64**:1073–8. <https://doi.org/10.1111/jgs.14104>.
54. Moiz JA, Bansal V, Noohu MM *et al.* Activities-specific balance confidence scale for predicting future falls in Indian older adults. *Clin Interv Aging.* 2017;**12**:645–51. <https://doi.org/10.2147/CIA.S133523>.
55. Okoye SM, Fabius CD, Reider L *et al.* Predictors of falls in older adults with and without dementia. *Alzheimers Dement.* 2023;**19**:2888–97. <https://doi.org/10.1002/alz.12916>.
56. Pereira C, Bravo J, Reis G *et al.* Aging safely in Alentejo – understanding for action - preventing falls and violence against older people: study rationale, aims, design, and preliminary results. *BMC Public Health.* 2021;**21**:1–11.
57. Pluijm SMF, Smit JH, Tromp EAM *et al.* A risk profile for identifying community-dwelling elderly with a high risk of recurrent falling: results of a 3-year prospective study. *Osteoporos Int.* 2006;**17**:417–25. <https://doi.org/10.1007/s00198-005-0002-0>.
58. Porto JM, Iosimuta NCR, Freire Júnior RC *et al.* Risk factors for future falls among community-dwelling older adults without a fall in the previous year: a prospective one-year longitudinal study. *Arch Gerontol Geriatr.* 2020;**91**:104161. <https://doi.org/10.1016/J.ARCHGER.2020.104161>.
59. Roman De Mettelinge T, Cambier D. Understanding the relationship between walking aids and falls in older adults: a prospective cohort study. *J Geriatr Phys Ther.* 2015;**38**:127–32. <https://doi.org/10.1519/JPT.00000000000000031>.
60. de Souza AQ, Pegorari MS, Nascimento JS *et al.* Incidence and predictive factors of falls in community-dwelling elderly: a longitudinal study. *Cien Saude Colet.* 2019;**24**:3507–16. <https://doi.org/10.1590/1413-81232018249.30512017>.
61. Aoyama M, Suzuki Y, Onishi J *et al.* Physical and functional factors in activities of daily living that predict falls in community-dwelling older women. *Geriatr Gerontol Int.* 2011;**11**:348–57. <https://doi.org/10.1111/j.1447-0594.2010.00685.x>.

62. Svoboda Z, Bizovska L, Janura M *et al.* Variability of spatial temporal gait parameters and center of pressure displacements during gait in elderly fallers and nonfallers: a 6-month prospective study. *PLoS One*. 2017;**12**:e0171997. <https://doi.org/10.1371/JOURNAL.PONE.0171997>.
63. Trevisan C, Zanforlini BM, Maggi S *et al.* Judgment capacity, fear of falling, and the risk of falls in community-dwelling older adults: the Progetto Veneto anziani longitudinal study. *Rejuvenation Res*. 2020;**23**:237–44.
64. Tromp A, Pluijm SM, Smit J *et al.* Fall-risk screening test: a prospective study on predictors for falls in community-dwelling elderly. *J Clin Epidemiol*. 2001;**54**:837–44. [https://doi.org/10.1016/S0895-4356\(01\)00349-3](https://doi.org/10.1016/S0895-4356(01)00349-3).
65. Tsang C, Leung J, Kwok T. Self-perceived balance confidence is independently associated with any subsequent falls and injurious falls among community-dwelling older fallers: a prospective cohort study. *Arch Gerontol Geriatr*. 2022;**103**:104776. <https://doi.org/10.1016/J.ARCHGER.2022.104776>.
66. Van Gulick DJJ, Perry SIB, Van Der Leeden M *et al.* A prediction model for falls in community-dwelling older adults in podiatry practices. *Gerontology*. 2022;**68**:1214–23. <https://doi.org/10.1159/000520962>.
67. Van Schooten KS, Pijnappels M, Rispens SM *et al.* Ambulatory fall-risk assessment: Amount and quality of daily-life gait predict falls in older adults. *J Gerontol A Biol Sci Med Sci*. 2015;**70**:608–15. <https://doi.org/10.1093/gerona/glu225>.
68. van Schooten KS, Taylor ME, Close JCT *et al.* Sensorimotor, cognitive, and affective functions contribute to the prediction of falls in old age and neurologic disorders: an observational study. *Arch Phys Med Rehabil*. 2021;**102**:874–80. <https://doi.org/10.1016/j.apmr.2020.10.134>.
69. Ward RE, Leveille SG, Beauchamp MK *et al.* Functional performance as a predictor of injurious falls in older adults. *J Am Geriatr Soc*. 2015;**63**:315–20. <https://doi.org/10.1111/jgs.13203>.
70. Weijer RHA, Hoozemans MJM, van Dieën JH *et al.* Self-perceived gait stability modulates the effect of daily life gait quality on prospective falls in older adults. *Gait Posture*. 2018;**62**:475–9. <https://doi.org/10.1016/j.gaitpost.2018.04.002>.
71. Weijer RHA, Hoozemans MJM, Meijer OG *et al.* The short- and long-term temporal relation between falls and concern about falling in older adults without a recent history of falling. *PLoS One*. 2021;**16**:e0253374. <https://doi.org/10.1371/journal.pone.0253374>.
72. Asai T, Oshima K, Fukumoto Y *et al.* The association between fear of falling and occurrence of falls: a one-year cohort study. *BMC Geriatr*. 2022;**22**:1–7. <https://doi.org/10.1186/s12877-022-03018-2>.
73. Welmer AK, Frisendahl N, Beridze G *et al.* Association between concerns about falling and risk of injurious falls in older adults: the role of balance impairment. *J Am Med Dir Assoc*. 2023;**24**:1984–1989.e2. <https://doi.org/10.1016/j.jamda.2023.07.015>.
74. Wijlhuizen GJ, de Jong R, Hopman-Rock M. Older persons afraid of falling reduce physical activity to prevent outdoor falls. *Prev Med*. 2007;**44**:260–4. <https://doi.org/10.1016/j.ypmed.2006.11.003>.
75. Yang R, Pepper GA. Is fall self-efficacy an independent predictor of recurrent fall events in older adults? Evidence from a 1-year prospective study. *Res Nurs Health*. 2020;**43**:602–9. <https://doi.org/10.1002/nur.22084>.
76. Burns ER, Lee R, Hodge SE *et al.* Validation and comparison of fall screening tools for predicting future falls among older adults. *Arch Gerontol Geriatr*. 2022;**101**:104713. <https://doi.org/10.1016/J.ARCHGER.2022.104713>.
77. Cleary K, Skorniyakov E. Predicting falls in community dwelling older adults using the activities-specific balance confidence scale. *Arch Gerontol Geriatr*. 2017;**72**:142–5. <https://doi.org/10.1016/j.archger.2017.06.007>.
78. Clemson L, Kendig H, Mackenzie L *et al.* Predictors of injurious falls and fear of falling differ: an 11-year longitudinal study of incident events in older people. *J Aging Health*. 2015;**27**:239–56. <https://doi.org/10.1177/0898264314546716>.
79. Crenshaw JR, Bernhardt KA, Atkinson EJ *et al.* Posterior single-stepping thresholds are prospectively related to falls in older women. *Aging Clin Exp Res*. 2020;**32**:2507–15. <https://doi.org/10.1007/s40520-020-01480-9>.
80. Chen TY, Kim G. Racial/ethnic differences in the longitudinal effects of fear of falling on falls. *Gerontology*. 2021;**67**:482–92. <https://doi.org/10.1159/000514448>.
81. Lavedán A, Viladrosa M, Jürschik P *et al.* Fear of falling in community-dwelling older adults: a cause of falls, a consequence, or both? *PLoS One*. 2018;**13**:e0194967. <https://doi.org/10.1371/JOURNAL.PONE.0194967>.
82. Choi NG, DiNitto DM, Marti CN *et al.* Poisoning deaths among late-middle aged and older adults: comparison between suicides and deaths of undetermined intent. *Int Psychogeriatr*. 2019;**31**:1159–69. <https://doi.org/10.1017/S1041610218001540>.
83. de Souza LF, Canevar JB, Moreira BS *et al.* Association between fear of falling and frailty in community-dwelling older adults: a systematic review. *Clin Interv Aging*. 2022;**17**:129–40.
84. Nicklen B, Delbaere K, Ellmers TJ. Exploring how falls prevention practitioners assess and manage concerns about falling. *Eur Geriatr Med*. 2024;**16**:1–9. <https://doi.org/10.1007/s41999-024-01127-2>.
85. Tashiro H, Sato Y, Fukumoto K *et al.* Effects of fear of falling on the single-step threshold for lateral balance recovery in older women. *J Geriatr Phys Ther*. 2023;**46**:116–21. <https://doi.org/10.1519/JPT.0000000000000333>.
86. Okubo Y, Duran L, Delbaere K *et al.* Rapid inhibition accuracy and leg strength are required for community-dwelling older people to recover balance from induced trips and slips: an experimental prospective study. *J Geriatr Phys Ther*. 2022;**45**:160–6. <https://doi.org/10.1519/JPT.0000000000000312>.
87. Ellmers TJ, Cocks AJ, Young WR. Evidence of a link between fall-related anxiety and high-risk patterns of visual search in older adults during adaptive locomotion. *J Gerontol A Biol Sci Med Sci*. 2020;**75**:961–7. <https://doi.org/10.1093/gerona/glz176>.
88. Delbaere K, Sturnieks DL, Crombez G *et al.* Concern about falls elicits changes in gait parameters in conditions of postural threat in older people. *J Gerontol A Biol Sci Med Sci*. 2009;**64A**:237–42. <https://doi.org/10.1093/gerona/gln014>.
89. Zijlstra GAR, Van Haastregt JCM, Ambergen T *et al.* Effects of a multicomponent cognitive behavioral group intervention on fear of falling and activity avoidance in community-dwelling older adults: results of a randomized controlled trial. *J Am Geriatr Soc*. 2009;**57**:2020–8. <https://doi.org/10.1111/j.1532-5415.2009.02489.x>.

90. Pin TW, Winser SJ, Chan WLS *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. <https://doi.org/10.2340/JRM.V56.18650>.
91. Allen NE, Schwarzel AK, Canning CG. Recurrent falls in Parkinson's disease: a systematic review. *Parkinsons Dis.* 2013;2013:906274. <https://doi.org/10.1155/2013/906274>.
92. Mazumder R, Lambert WE, Nguyen T *et al.* Fear of falling is associated with recurrent falls in people with multiple sclerosis: a longitudinal cohort study. *Int J MS Care.* 2015;17:164–70. <https://doi.org/10.7224/1537-2073.2014-042>.
93. Stevens JA, Phelan EA. Development of STEADI: a fall prevention resource for health care providers. *Health Promot Pract.* 2013;14:706–14. <https://doi.org/10.1177/1524839912463576>.
94. NICE. *Falls in Older People: Assessing Risk and Prevention.* London: National Institute for Clinical Excellence, 2013. <https://www.nice.org.uk/guidance/cg161>.
95. Delbaere K, Close JCT, Mikolaizak AS *et al.* The falls efficacy scale international (FES-I). A comprehensive longitudinal validation study. *Age Ageing.* 2010;39:210–6. <https://doi.org/10.1093/ageing/afp225>.

Received 24 September 2024; editorial decision 14 January 2025