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Risk factors for fear of falling in stroke patients: a systematic review and meta-analysis

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ABSTRACT

Objective Even though 32%–83% for fear of falling (FoF) in patients with stroke, very little is known about the predictors of the problems. Therefore, we systematically reviewed the literature on risk factors for FoF in patients with stroke.

Design A systematic review and meta-analysis

Data sources PubMed, Embase, Cochrane Library database, Web of Science, CINAHL, PsycINFO, Grey literature and other relevant databases for related publications were searched (from inception to 17 July 2021).

Results Eight studies involving 1597 participants were selected to analyse risk factors for patients with stroke with FoF. The quality of all included studies was assessed and categorised as medium or high quality. Review Manager V.5.3 merged the OR value and 95% CI of the potential risk factors. Meta-regression and Egger's test were performed by Stata V.15.1. The risk factors for FoF in patients with stroke were women (OR=2.13, 95% CI 1.47 to 3.09), impaired balance ability (OR=5.54; 95% CI 3.48 to 8.81), lower mobility (OR=1.12; 95% CI 1.05 to 1.19), history of falls (OR=2.33; 95% CI 1.54 to 3.53) and walking aid (OR=1.98; 95% CI 1.37 to 2.88), anxiety (OR=2.29; 95% CI 1.43 to 3.67), depression (OR=1.80; 95% CI 1.22 to 2.67), poor lower limb motor function (*OR*=1.14; 95% CI 1.00 to 1.29) and physically inactiveness (OR=2.04; 95% CI 1.01 to 4.12). Measurement of heterogeneity between studies was high for all outcomes (I^2=0%–93%), indicating that the substantial interstudy heterogeneity in estimated proportions was not attributed to the sampling error. Sensitivity analysis (leave-one-out method) showed that the pooled estimate was stable.

Conclusion This meta-analysis indicated that female population, impaired balance ability, lower mobility, history of falls and walking aid in patients with stroke might be at greater risk for FoF. Future studies are recommended to determine other risk factors specific to patients with stroke.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study has been reported per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses reporting checklist.
⇒ Reported risk factors of fear of falling in patients with stroke using validated screening tools.
⇒ Searches included published and unpublished sources of literature to reduce the risk of omitting potentially eligible data.
⇒ Many risk factors were examined by a single study, thereby limiting our ability to meta-analyse these potential risk factors.
⇒ The variability in methods of assessing risk and reporting the frequency of risk characteristics limited analyses.

INTRODUCTION

Stroke is the second leading cause of death worldwide,[1] creating a serious burden on caregivers.[2 3] In 2010, an estimated 16.9 million stroke incidents occurred, increasing the number of 33 million stroke survivors all over the world.[4] As a result, there were 5.9 million people who died, whereas 102 million people with disability-adjusted life years were lost because of the stroke.

On the other hand, it is well known that stroke can cause physical damage, such as weakness, paralysis, sensory disturbances, impaired postural control,[5] mental fatigue, depression and impaired cognitive function.[2 6] According to the WHO,[7] a fall is defined as 'an event which results in a person coming to rest inadvertently on the ground or floor or other lower level, with or without injury'. Both physical and mental impairments can contribute to a fall, a common complication after a stroke.[8] Among those who survived a stroke, 22%–48% have experienced at least one fall in the hospital[8–10] or the rehabilitation facility.[11–13] There is a reported prevalence of 32%–83% for fear of falling (FoF) between the first 6 months and just over 4 years after stroke onset.[14]

A high level of FoF psychology that limits the patient's active rehabilitation exercise behaviour reduces their mobility, flexibility and independence and increases their anxiety and depression.[15] The FoF psychology hinders the recovery of the adults' physical

and mental functions, thereby increasing the risk of falling and forming a vicious circle.[16]

In clinical practice, identifying FoF risk factors in patients with stroke is more helpful in guiding clinical practice. Many reports have mentioned that identifying the FoF status of patients with stroke and strengthening the comprehensive interventions in this field can plausibly help break the vicious circle, relieve anxiety,[17] promote community reintegration[18] and improve the quality of life.[19] Some previous studies have proposed the correlation between many potential risk factors and FoF, intervention measures to reduce FoF incidence during stroke and risk factors for falls in patients with stroke.[20] However, the risk factors identified for FoF in different studies are inconsistent. These reports have neither comprehensively explored sociodemographic, psychological and physical risk factors, nor included systematic reviews and meta-analyses of risk factors for FoF in patients with stroke.[21–23] Therefore, we conducted this systematic review and meta-analysis to identify risk factors for FoF in patients with stroke.

METHODS

Search strategy

We searched PubMed, Embase, Cochrane Library, Web of Science, CINAHL, PsycINFO, Grey literature and other databases (from inception to July 2021) for studies that identified risk factors for FoF in patients with stroke.

Our search strategy used medical subject heading and natural language text words. The first author designed specific search strategies and peer-reviewed electronic search strategies. The specific search strategy for each database is mentioned in online supplemental file 1. References from relevant papers or reviews were handsearched for additional studies. For missing relevant data from studies, we contacted the study's authors via email. All studies that were classified as FoF studies were then screened. On 20 July 2021, another search was performed on the previously mentioned database to search the articles published since the initial examination date.

Inclusion and exclusion criteria

The inclusion criteria: (1) published case–control studies, cohort studies and cross-sectional studies; (2) all participants 18 years and above and clinically diagnosed with either first stroke or recurrent stroke; (3) studies published in the English or Chinese language; (4) reported risk factors of FoF in patients with stroke using validated screening tools, (5) the data can be extracted, including the spreadsheet of the pretest in the study.

The exclusion criteria: (1) review papers, case reports, meeting abstracts, qualitative studies; (2) duplicate literature or research with the same data; (3) research on quality evaluation results is low.

Endnote X V.9 software was used to remove duplicates and facilitate the screening process. All titles and abstracts were screened for inclusion/exclusion based on the eligibility criteria. The full texts were evaluated if the title and abstract could not accurately identify the possibly eligible studies (online supplemental file 2).

Data extraction and quality assessment

The literature extraction was independently conducted based on the search, reviewed and selected according to predefined criteria. The data were collected from studies: first author, year of publication, geographical location, the measured/collected tools, study type, research period, total sample size, sociodemographic data and risk factors. The odds ratio (OR) or the risk ratio (RR) and its 95% CI was directly extracted from the included studies. All the information was recorded in especially standardised forms. For the missing relevant data of studies, we contacted the study's authors via email; however, if the relevant data could not be obtained, the study was excluded (online supplemental file 3).

The methodologic quality assessment of case–control studies and cohort studies was assessed by the Newcastle Ottawa Scale (NOS)[24] for the study population (four items), comparability (one item) and outcome evaluation (three items). The scale's total score was kept as 9 points, where 0 to 3 were divided into low-quality research, 4 to 6 were divided into medium-quality research and 7–9 were divided into high-quality research. In addition, the risk of bias in a cross-sectional study was assessed using the instrument Agency for Healthcare Research and Quality (AHRQ).[25] The tool had a total of 11 items as follows: if the answer to an object was 'no' or 'UNCLEAR', the item's score was '0'; if the answer was 'yes', the item score '1', with a total score of 0–11 points, 0–3 points=low quality, 4–7 points=medium quality, 8–11 points=high quality.[26] The process of study selection, data extraction and quality assessment were all conducted in duplicate (Q Xie and JH Pei) with third-party adjudication (XM Dou) for disagreements.

Statistical analysis

To assess the risk factors of FoF, we conducted a meta-analysis by the RevMan V.5.3 software to pool the *OR/RR* value with 95% CI. Meta-regression and Egger's test were performed by the Stata V.15.1, whereas all other statistical analyses were conducted with the RevMan V.5.3 software. Statistical heterogeneity between studies was quantified by the I^2 statistics and formally tested by Cochran's Q statistic. A random-effects model for meta-analysis was an obvious conservative choice based on the heterogeneity of geographic settings and the variability of screening and diagnostic tools. However, when the number of studies was small (n<5), a fixed-effects model was used.[27–29] The findings were

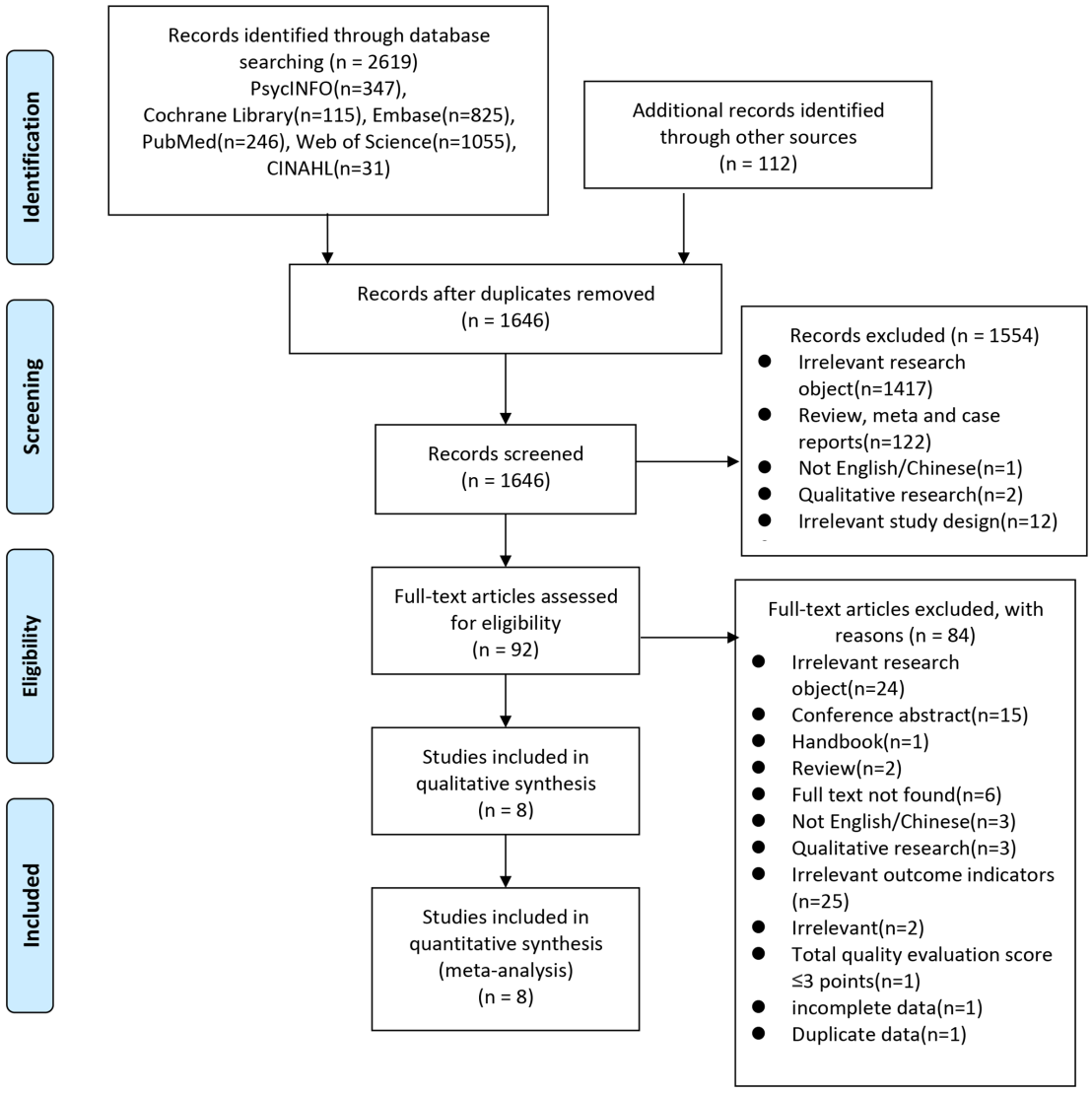

Figure 1 Flow diagram of study selection in the meta-analysis.

illustrated in the form of forest plots. Publication bias was identified using a funnel plot and Egger's test.[30] We planned to conduct subgroup and meta-regression analyses based on sample size and proportion of women.[31] As previous studies have shown that SwePASS scores and age were influencing factors, we performed the post hoc subgroup and meta-regression analyses on these two factors when the number of studies >2.[31–33] Statistical significance was set at p value <0.05. Sensitivity analyses were performed using the leave-one-out method.

Patient and public involvement

No patient was involved in the study.

RESULTS

Literature selection

Initially, 2731 records were searched from the six databases and other resources (figure 1). After the exclusion of duplicates, the remaining 1646 records were screened. After analysing the title and abstract, ultimately, 92 publications were selected for the full-text assessment. Finally, eight full-text studies with 1597 participants were found eligible and included in this meta-analysis.

Study characteristics and methodologic quality

The included eight studies were conducted in three regions, that is, Asia (n=4), North America (n=1) and Europe (n=3). Among these eight studies, two were cross-sectional, four were case–control and two were prospective cohort studies. A summary of literature characteristics used in the analysis is shown in table 1.

The NOS assessed the quality of the case–control studies and prospective cohort studies. The NOS scores ranged from 7 to 9, indicating a high level of studies quality. In the two cross-sectional studies, the AHRQ scores ranged from 4 to 6, indicating a moderate level of quality. The overall score indicated the relatively high quality of the literature included in this study.

Table 1 Characteristics of the included studies

Author, year,* country	Study design	Sample size (N)	Age, years (mean±SD)	Female N (%)	Outcome ascertainment	Research period	Stroke reference period	Adjusted risk factors†	NOS‡/ AHRQ scores§
Zhang Qin *et al* 2020, China[36]	Cross-sectional study	221	6 0.13±8.72†	88 (39.8)†	The self-made questionnaire, ADL, SAS, SDS, SFES-I	May 2017–January 2019	The first-onset stroke recovery period	1. Age 2. Marital status 3. History of falls 4. Anxiety 5. Depression	4
Li Ying *et al* 2014, China[34]	Case-control study	170	73.54† Male: 73.0±8.4 Female: 74.2±7.6	76 (44.70)†	The self-made questionnaire, MMSE, The single-item question, MFES, BBS, TUGT	March 2013–August 2013	Medically diagnosed	1. Berg balance force (min) 2. TUG mobile capability(s) 3. History of falls within six metres	9
Yadav *et al* 2020, India[40]	Case–control study	82	51.6±12.13†	22 (26.8)	TUGT, FM, PHQ-9, the single-item question	23 August-10 February 2019.	Patients with cerebral stroke for more than 3 months	1. Fugl-Meyer Scale score 2. Timed Up and Go score	8
Amanda Larén *et al* 2018, Sweden[14]	Prospective cohort study	462	74.8±12	226 (48.9)	The single-item question, the SwePASS, SGPALS, using a walking aid and/ or a wheelchair, NIHSS	1 October 2014–30 June 2016.	Patients aged 18 years or older with a diagnosis of a first-ever or recurrent clinical stroke, acute stroke	1. Female 2. SwePASS total score < 24 3. Using a walking aid	8
Schinkel-Ivy *et al* 2016, Canada[41]	Case-control study	208	FoF: 68.6±11.6 No FoF: 65.3±13.6	FoF:52 (61.9) No FoF: 43 (34.7)	The single-item question, ABC	October 2009 and September 2012	In-patient stroke rehabilitation	1. Grasp reactions 2. Assists	7
Goh *et al* 2016, China[64]	Case-control study	125	66.6±6.9	26 (35)	FAC, FM, BBS, MoCA, PHQ-9, FES-I, FSS	NR	Aged 60 years or older, had stroke onset more than 3 months ago	FAC ≤4	7
Beliz Belgen *et al* 2006, Sweden[37]	Cross-sectional study	50	59.9±11.9	19 (38)	The single-item question, FES-S, STS, FMA, BBS, TUGT, SIS mood and emotion	NR	They had a stroke onset more than 1 month prior	History of falls	6

Continued

Table 1 Continued

Author, year,* country	Study design	Sample size (N)	Age, years (mean±SD)	Female N (%)	Outcome ascertainment	Research period	Stroke reference period	Adjusted risk factors†	NOS‡/ AHRQ scores§
Netha Hussain *et al* 2021 Sweden[35]	Prospective cohort study	279	75.83±11.17 FoF: 78.05±11.13 No FoF: 74.22±10.95	Total:143 (51.3) FoF:71 (60.7) No FoF: 72 (44.4)	NIHSS, MoCA, the single-item question, SwePASS, SGPALS	Between 1 October 2014 and 30 June 2016	All the Falls GOT cohort participants were still alive 6 months after a stroke.	1. Age 2. Female 3. History of falls 4. Use of walking aid 5. SwePASS score (0–24) 6. SGPALS score--Physically inactive	8

*Year of publication of the study.
†Data as reported by the authors.
‡The Newcastle-Ottawa Scale.
§The instrument Agency for Healthcare Research and Quality.
ABC, The Activities-Specific Balance Confidence Scale; ADL, The modified Barthel Index; BBS, The Berg Balance Scale; FAC, The Functional Ambulation Category; FES-I, Fall Efficacy Scale International; FES-S, Falls Efficacy Scale–Swedish Version; FM/FMA, The Fugl-Meyer Scale; FoF, fear of falling; FSS, The Fatigue Severity Scale; MFES, The Modified Fall Efficacy Scale; MMSE, The mini-mental state examination; MoCA, The Montreal Cognitive Assessment; NIHSS, The National Institutes of Health Stroke Scale ; NR, not reported; PHQ-9, Patient Health Questionnaire–9; S-AI, State Anxiety Inventory ; SAS, The Self-rating Anxiety Scale; CES-D Scale, Centre for Epidemiologic Studies Depression Scale; SDS, The Self-rating Depression Scale; SFES-I, Short Falls Efficacy Scale International; SGPALS, the Saltin-Grimby Physical Activity Level Scale; SIS, Stroke Impact Scale; SSRS, Social Support Rating Scale; STS, timed sit-to-stand test; The SwePASS, the Swedish modified version of the Postural Assessment Scale for Stroke; T-AI, Trait Anxiety Inventory; TUGT, The Timed Up and Go test.

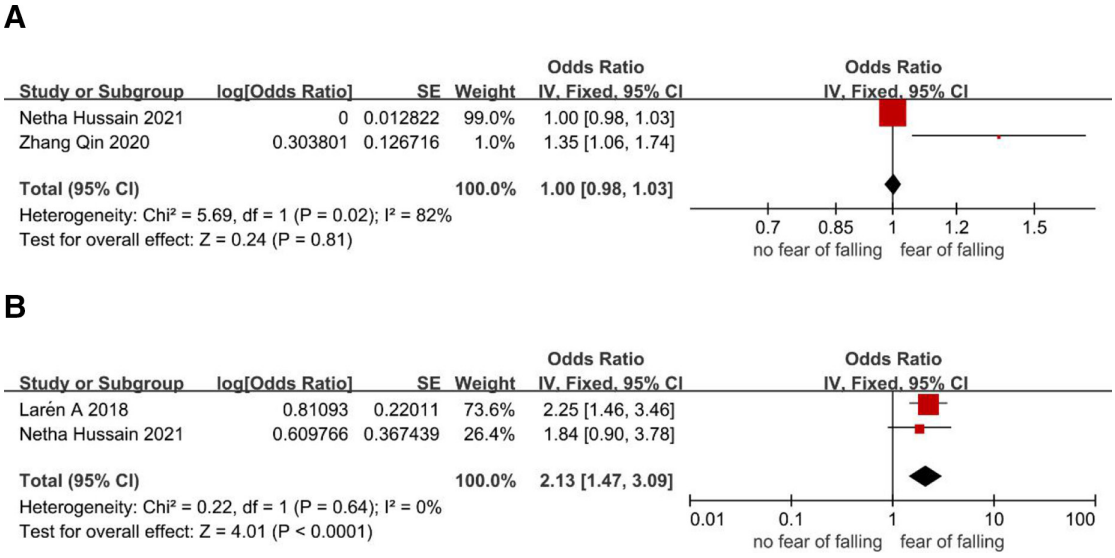

Figure 2 Meta-analyses for the association between sociodemographic factors and fear of falling: (A) age, (B) female gender. The solid vertical line indicates no effect. The solid squares indicate the mean difference and are proportional to the weights used in the meta-analysis. The diamond indicates the weighted mean difference, and the lateral tips of the diamond indicate the associated confidence intervals (CI). The horizontal lines represent the 95% CI.

RESULTS OF THE META-ANALYSIS

Sociodemographic factors

Three of the eight studies reported the relationship between sociodemographic factors and FoF, whereas the two reported predictors were age and women. Due to the limited number of studies, the ability to assess the publication bias by the funnel plot and Egger's test was unsuccessful.[30]

Age

Two studies with 500 participants reported the relationship between age and FoF in patients with stroke. Meta-analysis using a fixed-effects model showed that there was no statistically significant association (*OR*=1.00, 95% CI 0.98 to 1.03, p=0.81, I^2=82%; figure 2A).

Women

Two studies with 741 participants reported the correlation between women and FoF in patients with stroke. A pooled analysis using a fixed-effects model demonstrated that women experienced a significantly higher incidence of FoF than men (*OR*=2.13, 95% CI 1.47 to 3.09, p<0.0001, I^2=0%; figure 2B).

Physical factors

Balance ability

Three studies reported the correlation between balance ability and FoF[14 34 35] (911 participants). Based on the meta-analysis of the three studies on the risk factors of FoF, the results show large heterogeneity (p=0.003, I^2=97%). The sensitivity analysis revealed clinical heterogeneity from different assessment tools. Ying *et al*[34] measured balance ability with the Berg Balance Scale (BBS) score, whereas Larén *et al*[14] and Hussain *et al*[35] defined it by using the SwePASS score (postural control). Subgroup analysis of the SwePASS score showed that patients with stroke with lower balance levels were significantly more susceptible to FoF than higher balance levels (figure 3A). The results showed that the risk of FoF with a SwePASS score <24 (*OR*=5.54; 95% CI 3.48 to 8.81; I^2=86%) was higher than a SwePASS score 25–30 (*OR*=2.30; 95% CI 1.47 to 3.58; I^2=0%). This subgroup difference was statistically significant (p=0.007). There was no evidence of publication bias based on the Egger's test (p=0.135).

Mobility

A meta-analysis using a fixed-effects model included three studies on the risk factors of FoF (377 participants) demonstrated a significantly higher incidence of FoF in lower mobility patients with stroke (*OR*=1.12; 95% CI 1.05 to 1.19; figure 3B) and revealed a considerable heterogeneity between the studies (p=0.0003, I^2=84%). Meta-regression was performed to explore potential sources of heterogeneity based on an a priori list of factors related to clinical prognosis.[33] Meta-regression analysis showed subgroup effects for age ($p_{interaction}$=0.017), sample size ($p_{interaction}$=0.019) and proportion of women ($p_{interaction}$=0.019). Sensitivity analysis (leave-one-out method) showed that the pooled estimate was stable. In addition, there was no evidence of publication bias according to a funnel plot (online supplemental file 4) and the Egger's test (p=0.619).

History of falls

Four studies reported the correlation between experience of falls and FoF[34–37] (720 participants). Furthermore, Watanabe[38] reported that 87.9% of those who have experienced a fall would have a FoF for patients with stroke. Fixed-effects model analysis included four studies that revealed that the risk of FoF in patients with stroke with a history of falls was 2.33 times higher than no falls

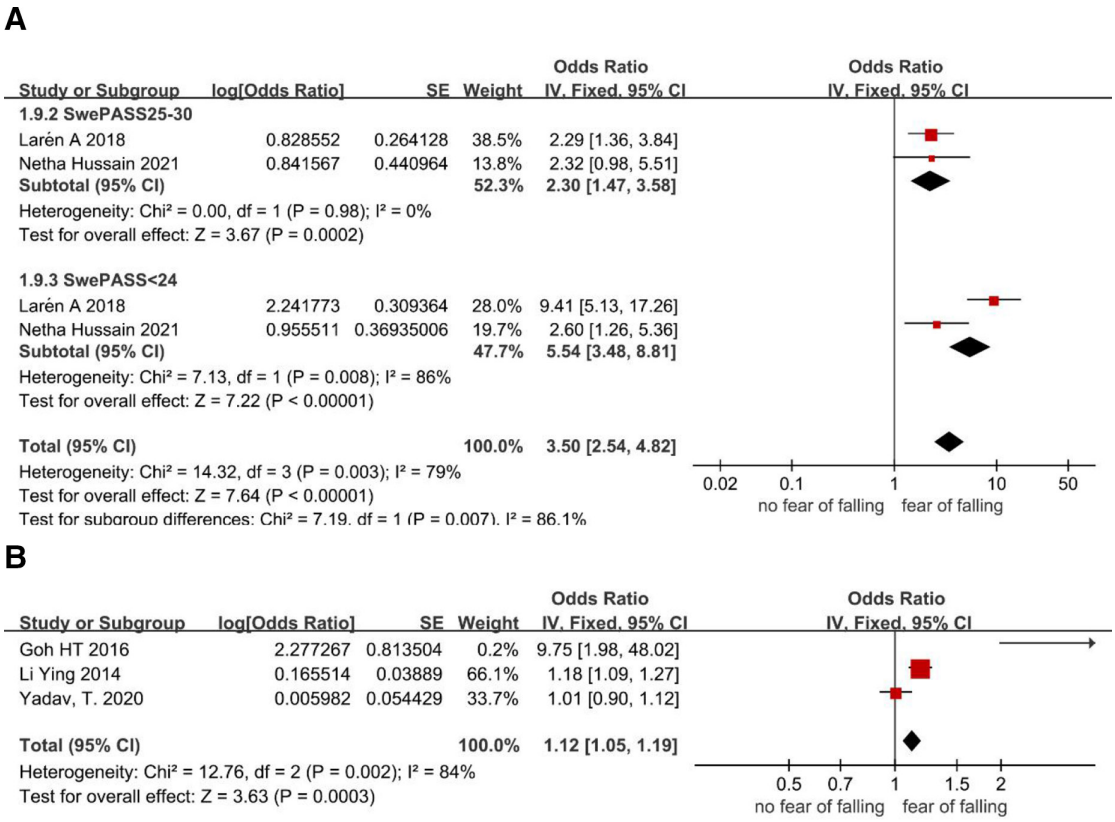

Figure 3 Meta-analyses for the association between physical risk factors and fear of falling:(A) balance ability and (B) mobility.

(*OR*=2.33; 95% CI 1.54 to 3.53; I^2=0%; figure 4). There was no evidence of publication bias according to a funnel plot (online supplemental file 5) and the Egger's test (p=0.205).

Use of walking aid

Two studies listed the relationship between the walking aid for patients with stroke and FoF[14 35] (741 participants). Larén *et al*[14] reported valuable insight into those involved in stroke rehabilitation during the acute phase after stroke. FoF was associated with the use of a walking aid, whereas Hussain *et al*,[35] using the multivariable regression model, showed that the walking support for FoF was not statistically significant. A meta-analysis using a fixed-effects model that included two studies revealed that the risk of FoF in patients with stroke who used a walker is 1.98 times that of those who did not use a walker (*OR*=1.98; 95% CI 1.37 to 2.88, I^2=93%; figure 5).

Other risk factors

Only six factors were assessed in more than one study and found eligible for meta-analysis. All other risk factors estimated are described narratively based on the findings of the associated individual study. Among them, anxiety (*OR*=2.29; 95% CI 1.43 to 3.67), depression (*OR*=1.80; 95% CI 1.22 to 2.67), poor lower limb motor function (*OR*=1.14; 95% CI 1.00 to 1.29) and physically inactiveness (*OR*=2.04; 95% CI 1.01 to 4.12) increased the risk of FoF in patients with stroke.

Qin *et al*[36] and Schmid et al[39] reported that anxiety, depression and marital status were some of the risk factors for FoF. Specifically, marital status with a spouse was protected against the development of FoF. Yadav *et al*[40] identified that every 1 unit increase in lower extremity Fugl-Meyer score had a 1.36 times chance of a person belonging to no FoF group. Thus, improving the

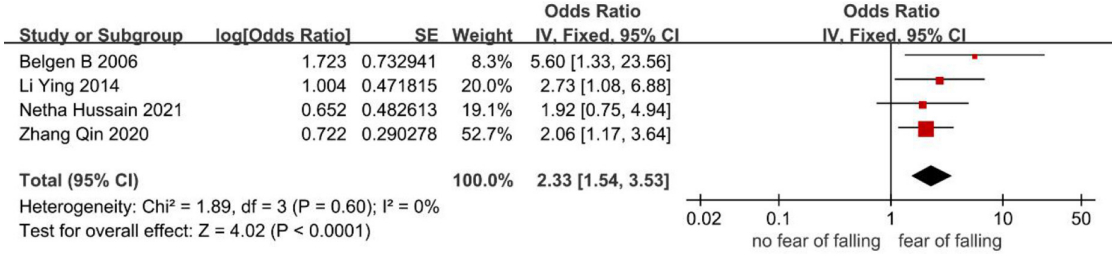

Figure 4 Meta-analyses for the association between history of falls and fear of falling.

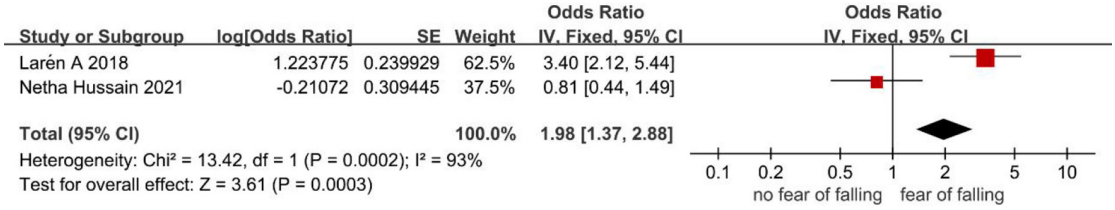

Figure 5 Meta-analyses for the association between using walking aid and fear of falling.

lower extremity motor function can reduce the chances of belonging to no FoF.

Furthermore, Schinkel-Ivy *et al*[41] reported that FoF was positively correlated to the walking velocity in individuals with stroke. This research used a 4.6-meter-long pressure pad system (Gaitrite, CIR Systems, Clifton, New Jersey) to measure gait, where walking velocity and double support time were used as an outcome indicator.[42] Data on other risk factors are found in table 2.

DISCUSSION

This study included observational studies with 1597 stroke participants. Out of the eight studies, two were cross-sectional studies, four were case–control studies, and two were prospective cohort studies with a wide range of patient characteristics. Furthermore, the reliability of the results was confirmed by the sensitivity analysis. This meta-analysis revealed that the female population, impaired balance ability, lower mobility, the experience of falling and walking aid were strongly associated with FoF among stroke individuals. Pooled results of these eight studies and another meta-analysis on fall risk factors in community stroke survivors[20] were consistent for reduced balance (*OR* 3.87),[20] depression (*OR* 2.11)[20] and history of falls associated with the falls and FoF. Furthermore, this study showed the history of fall lead to a higher risk of FoF in patients with stroke (*OR* 2.33) than in falls (*OR* 1.67).[20] Similarly, the reduced balance was more likely to contribute to the FoF. The present study's findings highlighted that having a history of falls, either in-home, in the community or hospital setting, have a higher risk of recurrent falling in the stroke group (*OR* 4.19) than in the older community. In addition, in concurrence with another systematic review study about the risk factors of FoF in the elderly,[43] our analysis also revealed that the problems of fall history and gait were related to FoF. Furthermore, our study highlighted that having a history of falls indicates that the risk of falling fear in the stroke group (*OR* 2.33) was higher than that of the elderly (*OR* 0.21).

The relationship between balance ability and FoF was further analysed. For example, Oguz *et al*[44] found a strong negative correlation between objective balance (measured by BBS scores) and Fall Efficacy Scale (FES) scores (r=–0.808); however, there was a strong positive correlation between perceived sense of balance and FES score (r=0.714). Furthermore, the present study's balance ability and mobility analysis results were in-concurrence with the study of Cho *et al*,[45] who showed that the FoF and they were positively correlated (respectively, r=0.669; r=0.545). Other studies, such as Akosile *et al*,[46] showed a negative correlation between physical function and fall efficacy (r=–0.66). Kim *et al*[19] revealed that the physical factors, including the functional ambulation category, hip abductor strength, knee extensor and ankle plantar flexor had a negative correlation with FoF (respectively, r=–0.673; r=–0.534; r=–0.478; r=–0.501). Of note, the above results are contrary, which can result from different statistical analyses and research focuses used in these studies. Further, gait speed was related to the ability to maintain balance, where gait disorders limited the independent life of patients with stroke.[47] Due to reduced weight transfer capacity and stability, many stroke survivors might find it challenging to maintain their balance.[47] A previous study

Table 2 Detailed data on other risk factors for the patient of FoF after stroke

Risk factors	OR RR	LL—95%CI	UL—95%CI	P value
Anxiety[36]	2.29	1.43	3.67	< 0.001
Depression[36]	1.80	1.22	2.67	0.003
Marital status[36]	0.62	0.44	0.88	0.006
Lower limb motor function[40]	1.14	1.00	1.29	0.047
SGPALS score—physically inactive[35]	2.04	1.01	4.12	0.048
Reactive stepping[41]				
Grasp reactions	0.98	0.95	1.01	0.23
Assists	0.98	0.96	1.00	0.086

LL, lower limit; OR, odds ratio; RR, relative risk; SGPALS, the Saltin-Grimby Physical Activity Level Scale; UL, upper limit.

showed that the stroke patient's gait patterns were slow and required excessive exertion; however, these patient's legs were not well coordinated. Thus, increased foot support time and decreased gait speed in these patients with balance disorders were the risk of falls and increased anxiety.[48] Combined with clinical analysis, stroke mainly occurs in the 60 to 70 years old, where the decline of body function inevitably leads to the FoF. Impaired balance can easily cause patients to fall and, thus, cause them to be aware of the surrounding environment and the safety of their activities, which eventually increases the patient's psychological tension, worry and FoF.[49] Therefore, it is vital to explore the relationship between FoF and body function in clinical practice using large-scale prospective studies.

In addition to the factors mentioned in the various studies, elements such as poststroke psychological factors, long-term sitting and quality of life research have been studied for the relationship with the FoF. Anxiety and depression (r=0.400), energy, mobility, self-care and upper extremity function of quality of life (Pearson's correlation coefficients were r=−0.476; r=−0.615; r=−0.617; r=−0.507)[19] were correlated with FoF. A significantly positive correlation was seen between FES-I and sitting time (r=0.579).[50] The study on differences in gait and balance measures in patients with chronic stroke with the different levels of attention related to falls showed that patients with chronic strokes and slight concern about falling have better gait and balance capabilities than patients with high levels of concern.[51] Therefore, these results are potentially clinically relevant and would be useful to study if reducing FoF can improve gait, quality of life, physical function and balance performance in these patients. Furthermore, it would also be useful to measure FoF as the assessment of psychological factors, quality of life and physical function in these patients. Although stroke itself is not a direct factor in causing the FoF, as a long-term chronic disease, it indicates that the patient's body functions are further declining. Importantly, the treatment of long-term chronic diseases further declines or loses the patient's self-efficacy and self-confidence in behavioural activities, which eventually leads to FoF. The decreases in self-esteem can directly cause depression, anxiety and limited self-care ability and affect FoF. Additionally, in the recovery stage of the first stroke, the walking function is the main factor affecting the occurrence of falls. Since most stroke patients have limb dysfunction, the need to assist in walking during the initial stage of recovery or within a certain period increases the risk of falls.

Furthermore, there is a particular aspect regarding the causal relationship between falling and FoF. Some studies have confirmed that FoF is an essential predictor of falls in patients with stroke,[52–54] and several other studies have suggested that people who have experienced a fall were more likely to have FoF.[55 56] A recent study has confirmed that the history of falls in the recent time was a good predictor for the FoF, but the FoF is a predictor of falls during follow-up only in the unadjusted model.[57] In the current study, differences were observed among the included studies in terms of evaluation for the fall history. The fall history was defined as whether a fall was occurred in the past 6 months, within the past 1 year, or within 6 metres of walking. During these different periods, the probability of falling in stroke patients was different, which affects the likelihood of occurrence of FoF.[58]

Considering the global prevalence of stroke-related falls or FoF, this study provided evidence for developing appropriate preventable measures for decreasing the FoF risk in patients with stroke. The risk factors of FoF for stroke patients in Asia included marital status, social support status and payment methods for medical insurance[59]; However, current guidelines for stroke management provide no specific recommendations for psychological monitoring or the FoF management.[60] Therefore, more studies are required for developing effective evaluation methods and treatment strategies against FoF among patients with stroke to improve their physical function, mental health and quality of life.

This meta-analysis had several significant findings. First, most of the included studies were relatively high quality, with robust evidence. Second, under the premise of a large sample size, the risk factors of falling fear in stroke patients were ensured by quantitative analysis. Hence, our findings may be more convincing compared with the individual studies. Additionally, the research data included in this study were adjusted, and the results of the data analysis were not affected by the patient's baseline characteristics. We also explored the sources of heterogeneity using meta-regression if the analysis included more than two studies. We prespecified sample size and the proportion of women as the meta-regression variables because we considered that studies with smaller sample size and a larger proportion of women could have a larger impact on FoF.[31] In the post hoc analyses, we also added age and SwePASS score as potential regressors because previous studies showed that older populations and smaller SwePASS scores could lead to a larger impact on FoF.[31–33]

Despite the above important findings, this study had some limitations. (1) Two of the included reports were cross-sectional studies, and, thus, the ability to hypothesise aetiology was weak, (2) all the included studies were observational studies, and, therefore, the role of confounding factors should be considered. However, due to the limited number of studies, a multivariate meta-analysis could not be performed to assess the robustness of our findings and analyse the effect size of multiple risk factors at the same time,[61] (3) the effects of the patient's inner anxiety and depression, as well as the motor function of the lower limbs on the risk of falling fear in stroke patients, have been reported in fewer studies. Therefore, the conclusions may vary for individual studies, (4) this meta-analysis only included English and Chinese studies; thus, it probably missed

the relevant studies in other languages, which leads to biases in estimates in Western countries. However, there is currently no evidence suggesting that the meta-analysis of language limitations can lead to such bias.[62 63] In the end, the analysis was based on the overall research level and not on personal data.

CONCLUSION

This study is the first systematic analysis for assessing the risk factors for FoF in patients with stroke, including the history of falls, walking aids, sociodemographic factors, physical characteristics and psychological factors. This study results suggest that women, impaired balance, mobility impairment, history of falls, walking aids, anxiety, depression, poor lower limb motor function and physical inactiveness might be associated with FoF in patients with stroke, especially impaired balance. In addition, the collective evidence was primarily consistent, and the effect size of FoF was large. A comprehensive analysis of these risk factors would help screen and differentiate patients at risk for FoF, thereby helping to prevent and optimise timely interventions.

Overall, there is a paucity of empirical data in this area. Many of the factors identified, in general, that population samples have not been studied in patients with stroke. In addition, other risk factors specific to patients with stroke (eg, gait speed and gait-related factors) need to be evaluated to identify patients with stroke at risk for FoF. Finally, researchers should explore how some variables (ie, anxiety and depression) interact with FoF and how to better protect patients with stroke from it. This intervention will reduce the personal and financial burden and promote these patients' early recovery.

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#	searches	results
1	"Stroke"[MeSH Terms] OR "Carotid Artery Diseases"[MeSH Terms] OR "Cerebrovascular Disorders"[MeSH Terms] OR "Basal Ganglia Cerebrovascular Disease"[MeSH Terms] OR "Cerebral Infarction"[MeSH Terms] OR "Brain Ischemia"[MeSH Terms] OR "Cerebral Small Vessel Diseases"[MeSH Terms] OR "Intracranial Arterial Diseases"[MeSH Terms] OR "Intracranial Hemorrhages"[MeSH Terms] OR "Brain Infarction"[MeSH Terms] OR "stroke, lacunar"[MeSH Terms] OR "vasospasm, intracranial"[MeSH Terms] OR "Hemiplegia"[MeSH Terms] OR "Paresis"[MeSH Terms] OR "gait disorders, neurologic"[MeSH Terms]	405,432
2	stroke*[Title/Abstract] OR "Cerebrovascular Accident*"[Title/Abstract] OR "Cerebrovascular Apoplexy"[Title/Abstract] OR "Brain Vascular Accident*"[Title/Abstract] OR "Cerebrovascular Stroke*"[Title/Abstract] OR "Apoplexy"[Title/Abstract] OR "Cerebral Stroke*"[Title/Abstract] OR "Acute Stroke*"[Title/Abstract] OR "Acute Cerebrovascular Accident*"[Title/Abstract] OR "Brain Stem Infarctions"[Title/Abstract] OR "Cerebral	473,904

	Infarction"[Title/Abstract] OR "Hemorrhagic Stroke"[Title/Abstract] OR "Ischemic Stroke"[Title/Abstract] OR "Embolic Stroke"[Title/Abstract] OR "Thrombotic Stroke"[Title/Abstract] OR "Cardiovascular Diseases"[Title/Abstract] OR "Vascular Diseases"[Title/Abstract] OR "Carotid Artery Disease*"[Title/Abstract] OR "Carotid Artery Disorder*"[Title/Abstract] OR "Carotid Arterial Disease*"[Title/Abstract] OR"Carotid Atheroscleros*"[Title/Abstract] OR "Carotid Atherosclerotic Disease*"[Title/Abstract] OR "Internal Carotid Artery Diseases"[Title/Abstract] OR Common Carotid Artery Diseases[Title/Abstract] OR External Carotid Artery Diseases[Title/Abstract] OR External Carotid Arterial Diseases[Title/Abstract] OR "Carotid Artery Thrombosis"[Title/Abstract] OR "Cerebrovascular Disorder*"[Title/Abstract] OR "Intracranial Vascular Disease*"[Title/Abstract] OR "Intracranial Vascular Disorder*"[Title/Abstract] OR "Cerebrovascular Disease*"[Title/Abstract] OR "Brain Vascular Disorder*"[Title/Abstract] OR "Cerebrovascular Occlusion*"[Title/Abstract] OR "Cerebrovascular Insufficienc*"[Title/Abstract] OR "Basal Ganglia Vascular	

	Disease*"[Title/Abstract] OR "Lenticulostriate Vasculopath*"[Title/Abstract] OR Lenticulostriate Vascular Disease*[Title/Abstract] OR Vascular Lenticulostriate Diseases[Title/Abstract] OR "Basal Ganglia Hemorrhage"[Title/Abstract] OR "Putaminal Hemorrhage"[Title/Abstract] OR "Cerebral Infarct*"[Title/Abstract] OR "Left Hemisphere Cerebral Infarction"[Title/Abstract] OR "Subcortical Infarction*"[Title/Abstract] OR "Posterior Choroidal Artery Infarction"[Title/Abstract] OR "Anterior Choroidal Artery Infarction"[Title/Abstract] OR "Right Hemisphere Cerebral Infarction"[Title/Abstract] OR "CADASIL"[Title/Abstract] OR "Multi-Infarct Dementia"[Title/Abstract] OR "Anterior Cerebral Artery Infarction"[Title/Abstract] OR "Middle Cerebral Artery Infarction"[Title/Abstract] OR "Posterior Cerebral Artery Infarction"[Title/Abstract] OR "Brain Ischemia*"[Title/Abstract] OR "Ischemic Encephalopath*"[Title/Abstract] OR "Cerebral Ischemia*"[Title/Abstract] OR "Brain Hypoxia-Ischemia"[Title/Abstract] OR "Cerebral Small Vessel Disease*"[Title/Abstract] OR "Cerebral Microangiopath*"[Title/Abstract] OR "Intracranial Arterial Disease*"[Title/Abstract] OR "Intracranial Arterial	

	Disorder*"[Title/Abstract] OR "Arterial Brain Disease*"[Title/Abstract] OR Brain Arterial Disease*[Title/Abstract] OR Arterial Brain Disorder*[Title/Abstract] OR "Intracranial Hemorrhage*"[Title/Abstract] OR "Posterior Fossa Hemorrhage*"[Title/Abstract] OR "Brain Hemorrhage*"[Title/Abstract] OR "Cerebral Hemorrhage"[Title/Abstract] OR "Cerebral Intraventricular Hemorrhage"[Title/Abstract] OR "Hypertensive Intracranial Hemorrhage"[Title/Abstract] OR "Cranial Epidural Hematoma"[Title/Abstract] OR "Subdural Hematoma"[Title/Abstract] OR "Pituitary Apoplexy"[Title/Abstract] OR "Subarachnoid Hemorrhage"[Title/Abstract] OR "Brain Infarction*"[Title/Abstract] OR "Brain Infarct*"[Title/Abstract] OR "Anterior Circulation Brain Infarction"[Title/Abstract] OR "Brain Venous Infarction*"[Title/Abstract] OR "Anterior Cerebral Circulation Infarction"[Title/Abstract] OR "Posterior Circulation Brain Infarction"[Title/Abstract] OR "Lacunar Stroke*"[Title/Abstract] OR "Lacunar Syndrome*"[Title/Abstract] OR "Lacunar Infarction*"[Title/Abstract] OR "Lacunar Infarct*"[Title/Abstract] OR "Intracranial	

	Vasospasm*"[Title/Abstract] OR Intracranial Angiospasm*[Title/Abstract] OR "Intracranial Vascular Spasm*"[Title/Abstract] OR "Cerebral Vasospasm*"[Title/Abstract] OR "Cerebrovascular Spasm*"[Title/Abstract] OR "Cerebral Angiospasm*"[Title/Abstract] OR "Cerebral Artery Spasm*"[Title/Abstract] OR "Hemiplegia*"[Title/Abstract] OR "Transient Hemiplegia*"[Title/Abstract] OR "Monoplegia*"[Title/Abstract] OR "Post-Ictal Hemiplegia*"[Title/Abstract] OR "Crossed Hemiplegia*"[Title/Abstract] OR "Flaccid Hemiplegia*"[Title/Abstract] OR "Infantile Hemiplegia*"[Title/Abstract] OR "Spastic Hemiplegia*"[Title/Abstract] OR "Pareses"[Title/Abstract] OR "Paraparesis"[Title/Abstract] OR "Muscular Pares*"[Title/Abstract] OR "Muscle Pares*"[Title/Abstract] OR "Monopares*"[Title/Abstract] OR "Lower Extremity Pares*"[Title/Abstract] OR "Crural Pares*"[Title/Abstract] OR "Upper Extremity Pares*"[Title/Abstract] OR "Brachial Pares*"[Title/Abstract] OR "Hemipares*"[Title/Abstract] OR "Spastic Paraparesis"[Title/Abstract] OR "Neurologic Gait Disorder*"[Title/Abstract] OR Neurologic Locomotion	

	Disorder*[Title/Abstract] OR Neurologic Ambulation Disorder*[Title/Abstract] OR "Neurologic Gait Dysfunction*"[Title/Abstract] OR "Duck Gait"[Title/Abstract] OR Sensorimotor Gait Disorder*[Title/Abstract] OR Athetotic Gait[Title/Abstract] OR Broadened Gait[Title/Abstract] OR "Drop Foot Gait"[Title/Abstract] OR "Festinating Gait"[Title/Abstract] OR "Frontal Gait"[Title/Abstract] OR "Hemiplegic Gait"[Title/Abstract] OR "Hysterical Gait"[Title/Abstract] OR Reeling Gait[Title/Abstract] OR "Rigid Gait"[Title/Abstract] OR "Scissors Gait"[Title/Abstract] OR "Shuffling Gait*"[Title/Abstract] OR "Spastic Gait"[Title/Abstract] OR "Stumbling Gait"[Title/Abstract] OR "Unsteady Gait"[Title/Abstract] OR Widebased Gait[Title/Abstract] OR "Marche a Petit Pas"[Title/Abstract] OR Rapid Fatigue Gait[Title/Abstract] OR Charcot Gait*[Title/Abstract] OR Charcot* Gait[Title/Abstract] OR "Gait Apraxia"[Title/Abstract] OR "Gait Ataxia"[Title/Abstract]	
3	#1 OR #2	654,634
4	"Accidental Falls"[MeSH Terms] OR "Accidents"[MeSH Terms] OR "Accident Prevention"[MeSH Terms]	198,327
5	"Falls"[Title/Abstract] OR "Falling"[Title/Abstract] OR "Accidental Fall*"[Title/Abstract] OR "Slip and Fall"[Title/Abstract] OR "Fall and Slip"[Title/Abstract] OR "Accident	114,050

	Prevention"[Title/Abstract] OR "Accidental Falls"[Title/Abstract] OR "Home Accidents"[Title/Abstract] OR "Accident Prevention*"[Title/Abstract] OR "Hazard Analysis and Critical Control Points"[Title/Abstract] OR "Patient Harm"[Title/Abstract] OR "Patient Safety"[Title/Abstract] OR "Safety Management"[Title/Abstract] OR "Home Accident*"[Title/Abstract]	
6	#4 OR #5	278,637
7	"Fear"[Mesh]	35,295
8	"fear*"[Title/Abstract] OR "Panic"[Title/Abstract]	104,099
9	#7 OR #8	113,388
10	#3 AND #6 AND #9	246

Cochrane database Library：from inception to July 20, 2021

#	searches	results
1	[mh "Stroke"] OR [mh "Carotid Artery Diseases"] OR [mh "Cerebrovascular Disorders"] OR [mh "Basal Ganglia Cerebrovascular Disease"] OR [mh "Cerebral Infarction"] OR [mh "Brain Ischemia"] OR [mh "Cerebral Small Vessel Diseases"] OR [mh "Intracranial Arterial Diseases"] OR [mh "Intracranial Hemorrhages"] OR [mh "Brain Infarction"] OR [mh "stroke, lacunar"] OR [mh "vasospasm, intracranial"] OR [mh "Hemiplegia"] OR [mh "Paresis"] OR [mh "gait disorders,	17045

	neurologic"]	
2	(stroke* OR Cerebrovascular Accident* OR Cerebrovascular Apoplexy OR Brain Vascular Accident* OR Cerebrovascular Stroke* OR Apoplexy OR Cerebral Stroke* OR Acute Stroke* OR Acute Cerebrovascular Accident* OR Brain Stem Infarctions OR Cerebral Infarction OR Hemorrhagic Stroke OR Ischemic Stroke OR Embolic Stroke OR Thrombotic Stroke OR Cardiovascular Diseases OR Vascular Diseases OR Carotid Artery Disease* OR Carotid Artery Disorder* OR Carotid Arterial Disease* OR Carotid Atherosclerosis* OR Carotid Atherosclerotic Disease* OR Internal Carotid Artery Diseases OR Common Carotid Artery Diseases OR External Carotid Artery Diseases OR External Carotid Arterial Diseases OR Carotid Artery Thrombosis OR Cerebrovascular Disorder* OR Intracranial Vascular Disease* OR Intracranial Vascular Disorder* OR Cerebrovascular Disease* OR Brain Vascular Disorder* OR Cerebrovascular Occlusion* OR Cerebrovascular Insufficienc* OR Basal Ganglia Vascular Disease* OR Lenticulostriate Vasculopath* OR Lenticulostriate Vascular Disease* OR Vascular Lenticulostriate Diseases OR Basal Ganglia Hemorrhage OR Putaminal Hemorrhage OR Cerebral Infarct* OR Left Hemisphere Cerebral Infarction OR Subcortical	99308

	Infarction* OR Posterior Choroidal Artery Infarction OR Anterior Choroidal Artery Infarction OR Right Hemisphere Cerebral Infarction OR CADASIL OR Multi-Infarct Dementia OR Anterior Cerebral Artery Infarction OR Middle Cerebral Artery Infarction OR Posterior Cerebral Artery Infarction OR Brain Ischemia* OR Ischemic Encephalopath* OR Cerebral Ischemia* OR Brain Hypoxia-Ischemia OR Cerebral Small Vessel Disease* OR Cerebral Microangiopath* OR Intracranial Arterial Disease* OR Intracranial Arterial Disorder* OR Arterial Brain Disease* OR Brain Arterial Disease* OR Arterial Brain Disorder* OR Intracranial Hemorrhage* OR Posterior Fossa Hemorrhage* OR Brain Hemorrhage* OR Cerebral Hemorrhage OR Cerebral Intraventricular Hemorrhage OR Hypertensive Intracranial Hemorrhage OR Cranial Epidural Hematoma OR Subdural Hematoma OR Pituitary Apoplexy OR Subarachnoid Hemorrhage OR Brain Infarction* OR Brain Infarct* OR Anterior Circulation Brain Infarction OR Brain Venous Infarction* OR Anterior Cerebral Circulation Infarction OR Posterior Circulation Brain Infarction OR Lacunar Stroke* OR Lacunar Syndrome* OR Lacunar Infarction* OR Lacunar Infarct* OR Intracranial Vasospasm* OR Intracranial Angiospasm* OR Intracranial Vascular Spasm* OR Cerebral Vasospasm* OR	

	Cerebrovascular Spasm* OR Cerebral Angiospasm* OR Cerebral Artery Spasm* OR Hemiplegia* OR Transient Hemiplegia* OR Monoplegia* OR Post-Ictal Hemiplegia* OR Crossed Hemiplegia* OR Flaccid Hemiplegia* OR Infantile Hemiplegia* OR Spastic Hemiplegia* OR Pareses OR Paraparesis OR Muscular Pares* OR Muscle Pares* OR Monopares* OR Lower Extremity Pares* OR Crural Pares* OR Upper Extremity Pares* OR Brachial Pares* OR Hemipares* OR Spastic Paraparesis OR Neurologic Gait Disorder* OR Neurologic Locomotion Disorder* OR Neurologic Ambulation Disorder* OR Neurologic Gait Dysfunction* OR Duck Gait OR Sensorimotor Gait Disorder* OR Athetotic Gait OR Broadened Gait OR Drop Foot Gait OR Festinating Gait OR Frontal Gait OR Hemiplegic Gait OR Hysterical Gait OR Reeling Gait OR Rigid Gait OR Scissors Gait OR Shuffling Gait* OR Spastic Gait OR Stumbling Gait OR Unsteady Gait OR Widebased Gait OR Marche a Petit Pas OR Rapid Fatigue Gait OR Charcot Gait* OR Charcot* Gait OR Gait Apraxia OR Gait Ataxia):ti,ab,kw	
3	#1 OR #2	100254
4	[mh "Accidental Falls"] OR [mh "Accidents"] OR [mh "Accident Prevention"]	6089
5	(Falls OR Falling OR Accidental Fall* OR Slip and Fall OR Fall	101648

	and Slip OR Accident Prevention OR Accidental Falls OR Home Accidents OR Accident Prevention* OR Hazard Analysis and Critical Control Points OR Patient Harm OR Patient Safety OR Safety Management OR Home Accident*):ti,ab,kw	
6	#4 OR #5	104168
7	[mh "Fear"]	1562
8	(fear* OR Panic):ti,ab,kw	12288
9	#7 OR #8	12289
10	#3 AND #6 AND #9	115

Web of science: from inception to July 20, 2021

#	searches	results
1	TS=(Gait Disorders, Neurologic OR Paresis OR Vasospasm, Intracranial OR Stroke, Lacunar OR Basal Ganglia Cerebrovascular Disease OR stroke* OR Cerebrovascular Accident* OR Cerebrovascular Apoplexy OR Brain Vascular Accident* OR Cerebrovascular Stroke* OR Apoplexy OR Cerebral Stroke* OR Acute Stroke* OR Acute Cerebrovascular Accident* OR Brain Stem Infarctions OR Cerebral Infarction OR Hemorrhagic Stroke OR Ischemic Stroke OR Embolic Stroke OR Thrombotic Stroke OR Cardiovascular Diseases OR Vascular Diseases OR Carotid Artery Disease* OR Carotid Artery Disorder* OR Carotid Arterial Disease* OR Carotid	3,756,024

	Atherosclerosis* OR Carotid Atherosclerotic Disease* OR Internal Carotid Artery Diseases OR Common Carotid Artery Diseases OR External Carotid Artery Diseases OR External Carotid Arterial Diseases OR Carotid Artery Thrombosis OR Cerebrovascular Disorder* OR Intracranial Vascular Disease* OR Intracranial Vascular Disorder* OR Cerebrovascular Disease* OR Brain Vascular Disorder* OR Cerebrovascular Occlusion* OR Cerebrovascular Insufficienc* OR Basal Ganglia Vascular Disease* OR Lenticulostriate Vasculopath* OR Lenticulostriate Vascular Disease* OR Vascular Lenticulostriate Diseases OR Basal Ganglia Hemorrhage OR Putaminal Hemorrhage OR Cerebral Infarct* OR Left Hemisphere Cerebral Infarction OR Subcortical Infarction* OR Posterior Choroidal Artery Infarction OR Anterior Choroidal Artery Infarction OR Right Hemisphere Cerebral Infarction OR CADASIL OR Multi-Infarct Dementia OR Anterior Cerebral Artery Infarction OR Middle Cerebral Artery Infarction OR Posterior Cerebral Artery Infarction OR Brain Ischemia* OR Ischemic Encephalopath* OR Cerebral Ischemia* OR Brain Hypoxia-Ischemia OR Cerebral Small Vessel Disease* OR Cerebral Microangiopath* OR Intracranial Arterial Disease* OR Intracranial Arterial Disorder* OR Arterial Brain Disease* OR	

	Brain Arterial Disease* OR Arterial Brain Disorder* OR Intracranial Hemorrhage* OR Posterior Fossa Hemorrhage* OR Brain Hemorrhage* OR Cerebral Hemorrhage OR Cerebral Intraventricular Hemorrhage OR Hypertensive Intracranial Hemorrhage OR Cranial Epidural Hematoma OR Subdural Hematoma OR Pituitary Apoplexy OR Subarachnoid Hemorrhage OR Brain Infarction* OR Brain Infarct* OR Anterior Circulation Brain Infarction OR Brain Venous Infarction* OR Anterior Cerebral Circulation Infarction OR Posterior Circulation Brain Infarction OR Lacunar Stroke* OR Lacunar Syndrome* OR Lacunar Infarction* OR Lacunar Infarct* OR Intracranial Vasospasm* OR Intracranial Angiospasm* OR Intracranial Vascular Spasm* OR Cerebral Vasospasm* OR Cerebrovascular Spasm* OR Cerebral Angiospasm* OR Cerebral Artery Spasm* OR Hemiplegia* OR Transient Hemiplegia* OR Monoplegia* OR Post-Ictal Hemiplegia* OR Crossed Hemiplegia* OR Flaccid Hemiplegia* OR Infantile Hemiplegia* OR Spastic Hemiplegia* OR Pareses OR Paraparesis OR Muscular Pares* OR Muscle Pares* OR Monopares* OR Lower Extremity Pares* OR Crural Pares* OR Upper Extremity Pares* OR Brachial Pares* OR Hemipares* OR Spastic Paraparesis OR Neurologic Gait Disorder* OR	

	Neurologic Locomotion Disorder* OR Neurologic Ambulation Disorder* OR Neurologic Gait Dysfunction* OR Duck Gait OR Sensorimotor Gait Disorder* OR Athetotic Gait OR Broadened Gait OR Drop Foot Gait OR Festinating Gait OR Frontal Gait OR Hemiplegic Gait OR Hysterical Gait OR Reeling Gait OR Rigid Gait OR Scissors Gait OR Shuffling Gait* OR Spastic Gait OR Stumbling Gait OR Unsteady Gait OR Widebased Gait OR Marche a Petit Pas OR Rapid Fatigue Gait OR Charcot Gait* OR Charcot* Gait OR Gait Apraxia OR Gait Ataxia)	
2	TS=(Accidents OR Accidents,Home OR Falls OR Falling OR Accidental Fall* OR Slip and Fall OR Fall and Slip OR Accident Prevention OR Home Accidents OR Accident Prevention* OR Hazard Analysis and Critical Control Points OR Patient Harm OR Patient Safety OR Safety Management OR Home Accident*)	1,584,808
3	TS=(fear* OR Panic)	217,740
4	#1 AND #2 AND #3	1055

CINAHL (Ebsco): from inception to July 20, 2021

#	searches	results
1	(MH "stroke patients") OR (MH "stroke units") OR (MH "Stroke+") OR (MH "Carotid Artery Diseases+") OR (MH "Cerebrovascular Disorders+") OR (MH "Basal Ganglia	19,393

	Cerebrovascular Disease+") OR (MH "Cerebral Infarction") OR (MH "Cerebral Ischemia+") OR (MH "Cerebral Small Vessel Diseases+") OR (MH "Intracranial Arterial Diseases+") OR (MH "Intracranial Hemorrhage+") OR (MH "Hypoxia, Brain+") OR (MH "stroke, lacunar") OR (MH "Hemiplegia") OR (MH "gait disorders, neurologic+")	
2	"Hypoxia, Brain" OR stroke* OR "Cerebrovascular Accident*" OR "Cerebrovascular Apoplexy" OR "Brain Vascular Accident*" OR "Cerebrovascular Stroke*" OR "Apoplexy" OR "Cerebral Stroke*" OR "Acute Stroke*" OR "Acute Cerebrovascular Accident*" OR "Brain Stem Infarctions" OR "Cerebral Infarction" OR "Hemorrhagic Stroke" OR "Ischemic Stroke" OR "Embolic Stroke" OR "Thrombotic Stroke" OR "Cardiovascular Diseases" OR "Vascular Diseases" OR "Carotid Artery Disease*" OR "Carotid Artery Disorder*" OR "Carotid Arterial Disease*" OR"Carotid Atherosclerос*" OR "Carotid Atherosclerotic Disease*" OR "Internal Carotid Artery Diseases" OR "Common Carotid Artery Diseases" OR "External Carotid Artery Diseases" OR "External Carotid Arterial Diseases" OR "Carotid Artery Thrombosis" OR "Cerebrovascular Disorder*" OR "Intracranial Vascular Disease*" OR "Intracranial Vascular Disorder*" OR "Cerebrovascular Disease*" OR "Brain Vascular Disorder*" OR	38,873

	"Cerebrovascular Occlusion*" OR "Cerebrovascular Insufficienc*" OR "Basal Ganglia Vascular Disease*" OR "Lenticulostriate Vasculopath*" OR "Lenticulostriate Vascular Disease*" OR "Vascular Lenticulostriate Diseases" OR "Basal Ganglia Hemorrhage" OR "Putaminal Hemorrhage" OR "Cerebral Infarct*" OR "Left Hemisphere Cerebral Infarction" OR "Subcortical Infarction*" OR "Posterior Choroidal Artery Infarction" OR "Anterior Choroidal Artery Infarction" OR "Right Hemisphere Cerebral Infarction" OR "CADASIL" OR "Multi-Infarct Dementia" OR "Anterior Cerebral Artery Infarction" OR "Middle Cerebral Artery Infarction" OR "Posterior Cerebral Artery Infarction" OR "Brain Ischemia*" OR "Ischemic Encephalopath*" OR "Cerebral Ischemia*" OR "Brain Hypoxia-Ischemia" OR "Cerebral Small Vessel Disease*" OR "Cerebral Microangiopath*" OR "Intracranial Arterial Disease*" OR "Intracranial Arterial Disorder*" OR "Arterial Brain Disease*" OR "Brain Arterial Disease*" OR "Arterial Brain Disorder*" OR "Intracranial Hemorrhage*" OR "Posterior Fossa Hemorrhage*" OR "Brain Hemorrhage*" OR "Cerebral Hemorrhage" OR "Cerebral Intraventricular Hemorrhage" OR "Hypertensive Intracranial Hemorrhage" OR "Cranial Epidural Hematoma" OR "Subdural Hematoma" OR "Pituitary Apoplexy" OR	

	"Subarachnoid Hemorrhage" OR "Brain Infarction*" OR "Brain Infarct*" OR "Anterior Circulation Brain Infarction" OR "Brain Venous Infarction*" OR "Anterior Cerebral Circulation Infarction" OR "Posterior Circulation Brain Infarction" OR "Lacunar Stroke*" OR "Lacunar Syndrome*" OR "Lacunar Infarction*" OR "Lacunar Infarct*" OR "Intracranial Vasospasm*" OR "Intracranial Angiospasm*" OR "Intracranial Vascular Spasm*" OR "Cerebral Vasospasm*" OR "Cerebrovascular Spasm*" OR "Cerebral Angiospasm*" OR "Cerebral Artery Spasm*" OR "Hemiplegia*" OR "Transient Hemiplegia*" OR "Monoplegia*" OR "Post-Ictal Hemiplegia*" OR "Crossed Hemiplegia*" OR "Flaccid Hemiplegia*" OR "Infantile Hemiplegia*" OR "Spastic Hemiplegia*" OR "Pareses" OR "Paraparesis" OR "Muscular Pares*" OR "Muscle Pares*" OR "Monopares*" OR "Lower Extremity Pares*" OR "Crural Pares*" OR "Upper Extremity Pares*" OR "Brachial Pares*" OR "Hemipares*" OR "Spastic Paraparesis" OR "Neurologic Gait Disorder*" OR "Neurologic Locomotion Disorder*" OR "Neurologic Ambulation Disorder*" OR "Neurologic Gait Dysfunction*" OR "Duck Gait" OR "Sensorimotor Gait Disorder*" OR "Athetotic Gait OR Broadened Gait" OR "Drop Foot Gait" OR "Festinating Gait" OR "Frontal Gait" OR "Hemiplegic Gait" OR "Hysterical Gait" OR Reeling	

	Gait" OR "Rigid Gait" OR "Scissors Gait" OR "Shuffling Gait*" OR "Spastic Gait" OR "Stumbling Gait" OR "Unsteady Gait" OR "Widebased Gait" OR "Marche a Petit Pas" OR "Rapid Fatigue Gait" OR "Charcot Gait*" OR "Charcot* Gait" OR "Gait Apraxia" OR "Gait Ataxia"	
3	S1 OR S2	40,724
4	(MH "Fall Prevention (Iowa NIC)") OR (MH "Fall Risk (Saba CCC)") OR (MH "Fall Risk Assessment Tool") OR (MH "Hendrich Fall Risk Model") OR (MH "Morse Fall Scale") OR (MH "Safety Behavior: Fall Prevention (Iowa NOC)") OR (MH "Accidental Falls")	5,446
5	fall* OR Falling OR "Accident Prevention" OR "Home Accidents" OR "Accident Prevention*" OR "Hazard Analysis and Critical Control Points" OR "Patient Harm" OR "Patient Safety" OR "Safety Management" OR "Home Accident*" OR "near-fall" OR slip* OR trip* OR stumble* or tumble* OR "lose footing"	46,176
6	S4 OR S5	51,519
7	(MH "Phobic Disorders+") OR (MH "Fear (NANDA)") OR (MH "Fear Control (Iowa NOC)") OR (MH "Fear (Saba CCC)") OR (MH "Fear+")	4604
8	fear* OR Panic OR fright* OR afraid	12,992
9	S7 OR S8	13,571
10	S3 AND S6 AND S9	31

PsycINFO (Ovid): from APA PsycInfo1806 to 1966; APA PsycInfo1987 to January Week 3 2021--- from inception to July 20, 2021

#	searches	results
1	exp Ataxia/ or exp Basal Ganglia/ or exp Brain Disorders/ or exp Carotid Arteries/ or exp Cerebral Hemorrhage/ or exp Cerebral Ischemia/ or exp Cerebrovascular Accidents/ or exp Cerebrovascular Disorders/ or exp Gait/ or exp General Paresis/ or exp Hemiplegia/ or exp Movement Disorders/ or exp Paralysis/ or exp Cognitive Rehabilitation/ or exp Risk Factors/ or exp Thromboses/ or exp Vasoconstriction/	326126
2	exp Accident Prevention/ or exp Aging/ or exp Accidents/ or exp Cerebrovascular Accidents/ or exp Equilibrium/ or exp Falls/	109963
3	exp Fear/ or exp Conditioned Fear/ or exp Panic Attack/ or exp Panic/ or exp Panic Disorder/ or exp Anxiety	87289
4	1 and 2 and 3	347

Embase: from inception to July 20, 2021

#	searches	results
1	'cerebrovascular accident'/exp OR 'basal ganglion hemorrhage'/exp OR 'brain hematoma'/exp OR 'brain hemorrhage'/exp OR 'brain infarction'/exp OR 'brain ischemia'/exp OR 'carotid artery disease'/exp OR 'cerebral artery disease'/exp OR 'cerebrovascular accident'/exp OR	788,888

	'intracranial aneurysm'/exp OR 'occlusive cerebrovascular disease'/exp OR 'vertebrobasilar insufficiency'/exp OR 'brain embolism'/exp OR 'brain vasospasm'/exp OR 'artery dissection'/exp OR 'hemiplegia'/exp OR 'stroke patient'/exp OR 'stroke unit'/exp OR 'paresis'/exp OR 'gait disorder'/exp	
2	'abnormal gait':ab,ti OR 'acute cerebrovascular lesion':ab,ti OR 'acute focal cerebral vasculopathy':ab,ti OR 'apoplex*':ab,ti OR 'arteria vertebrobasillaris insufficiency':ab,ti OR 'arterial dissection':ab,ti OR 'basal gangli* cerebrovascular disease':ab,ti OR 'basal ganglia haemorrhage':ab,ti OR 'basal ganglion haemorrhage':ab,ti OR 'brachial basilar insufficiency':ab,ti OR 'brain accident':ab,ti OR 'brain attack':ab,ti OR 'brain arterial insufficiency':ab,ti OR 'brain artery obstruction':ab,ti OR 'brain artery occlusion':ab,ti OR 'brain artery thrombosis':ab,ti OR 'brain bleeding':ab,ti OR 'brain blood flow disturbance':ab,ti OR 'brain circulation disorder':ab,ti OR 'brain embolus':ab,ti OR 'brain haematoma':ab,ti OR 'brain haemorrhage':ab,ti OR 'brain infarct*':ab,ti OR 'brain insult*':ab,ti OR 'brain isch*emic attack':ab,ti OR 'brain ischaemia':ab,ti OR 'brain microh*emorrhage':ab,ti OR 'brain phlebothrombosis':ab,ti OR 'brain thrombo*':ab,ti OR 'brain vascular accident':ab,ti OR 'brain vascular obstruction':ab,ti OR 'brain vasospasm':ab,ti OR	551,619

	'carotid arterial disorders':ab,ti OR 'carotid arteriopathy':ab,ti OR 'carotid artery dis*':ab,ti OR 'carotid disease':ab,ti OR 'cerebral apoplexia':ab,ti OR 'cerebral artery occlusion':ab,ti OR 'cerebral artery thrombosis':ab,ti OR 'cerebral blood circulation disorder':ab,ti OR 'cerebral blood flow disorder':ab,ti OR 'cerebral circulat* disorder':ab,ti OR 'cerebral emboli*':ab,ti OR 'cerebral haematoma':ab,ti OR 'cerebral haemorrhage':ab,ti OR 'cerebral infarct*':ab,ti OR 'cerebral insult':ab,ti OR 'cerebral isch*emia':ab,ti OR 'cerebral microbleed':ab,ti OR 'cerebral thrombosis':ab,ti OR 'cerebral vascular accident':ab,ti OR 'cerebral vascular insufficiency':ab,ti OR 'cerebral vasospasm':ab,ti OR 'cerebro vascular accident':ab,ti OR 'cerebrovascular accident':ab,ti OR 'cerebrovascular arrest':ab,ti OR 'cerebrovascular circulation disorder':ab,ti OR 'cerebrovascular embolism':ab,ti OR 'cerebrovascular failure':ab,ti OR 'cerebrovascular infarction':ab,ti OR 'cerebrovascular injury':ab,ti OR 'cerebrovascular insu*':ab,ti OR 'cerebrovascular insu*':ab,ti OR 'cerebrovascular isch*emia':ab,ti OR 'cerebrovascular obliteration':ab,ti OR 'cerebrovascular obstruction':ab,ti OR 'cerebrovascular occlusion':ab,ti OR 'cerebrovascular thrombosis':ab,ti OR 'cerebrum embolism':ab,ti OR 'cerebrum vascular accident':ab,ti OR 'corpus callosum	

	bleeding':ab,ti OR 'corpus callosum haemorrhage':ab,ti OR 'cortical infarction':ab,ti OR 'cva':ab,ti OR encephalorrhagia:ab,ti OR 'gait deviation*':ab,ti OR 'hematencephalon':ab,ti OR hemip*:ab,ti OR 'hemisphere infarct*':ab,ti OR 'interhemispheric hematoma':ab,ti OR 'intracerebral bleeding':ab,ti OR 'intracerebral haematoma':ab,ti OR 'intracerebral haemorrhage':ab,ti OR 'intracortical hemorrhage':ab,ti OR 'intracranial aneurysm':ab,ti OR 'intracranial artery thrombosis':ab,ti OR 'intracranial bleeding':ab,ti OR 'intracranial embolism':ab,ti OR 'intracranial hematoma':ab,ti OR 'intracranial hemorrhage':ab,ti OR 'intracranial thrombosis':ab,ti OR 'intracranial vasospasm':ab,ti OR 'isch*emic cerebral attack':ab,ti OR 'isch*emic seizure':ab,ti OR 'ische*mia cerebri':ab,ti OR 'isch*emic brain disease':ab,ti OR 'isch*emic encephalopathy':ab,ti OR 'musc* paresis':ab,ti OR 'neural isch*emia':ab,ti OR 'occlusive cerebrovascular disease':ab,ti OR 'paretic muscle':ab,ti OR 'partial paralysis':ab,ti OR stroke:ab,ti OR 'thrombosis cerebri':ab,ti OR 'vertebral basilar insufficiency':ab,ti OR 'vertebrobasilar artery insufficiency':ab,ti OR 'vertebrobasilar disease':ab,ti OR 'vertebrobasilar isch*':ab,ti OR 'vertebrobasilar syndrome':ab,ti	
3	1 or 2	914,196

4	'falling'/exp OR 'accident prevention'/exp OR 'accident proneness'/exp OR 'disaster planning'/exp OR 'medical countermeasure'/exp OR 'home accident'/exp	76,482
5	'accidental falls':ab,ti OR fall*:ab,ti OR 'injury prevention':ab,ti OR 'accident prevention':ab,ti OR 'accident neurosis':ab,ti OR 'accident proneness':ab,ti OR 'medical countermeasure*':ab,ti OR 'domestic accident':ab,ti OR 'home accident*':ab,ti OR 'falls-efficacy scale':ab,ti OR near-fall:ab,ti OR slip*:ab,ti OR trip*:ab,ti OR stumble*:ab,ti OR 'lose footing':ab,ti OR tumble:ab,ti	644,144
6	4 or 5	687,599
7	'fear'/exp OR 'anxiety'/exp OR 'anticipatory anxiety'/exp OR 'fear of falling'/exp OR 'fear of missing out'/exp OR 'performance anxiety'/exp OR 'fear conditioning test'/exp OR 'frustration'/exp OR 'patient worry'/exp OR 'grief'/exp OR 'hopelessness'/exp OR 'helplessness'/exp OR 'mental irritation'/exp OR 'panic'/exp	341,289
8	Fear:ab,ti OR fright:ab,ti OR afraid:ab,ti OR 'fear of falling':ab,ti OR 'Falls Efficacy Scale':ab,ti OR 'Mobility Efficacy Scale':ab,ti OR 'Survey of Activities and Fear of Falling in the Elderly':ab,ti OR 'University of Illinois at Chicago Fear of Falling Measure':ab,ti OR 'SAFFE':ab,ti OR 'UICFFM':ab,ti OR 'Activities Specific Balance	129,871

	Confidence Scale':ab,ti OR 'Confidence in Maintaining Balance Scale':ab,ti OR 'CON-Fbal':ab,ti OR basophobia:ab,ti OR 'fear of walking':ab,ti OR 'fears of missing out':ab,ti OR 'FOMO (fear)':ab,ti OR 'fear conditioning procedure':ab,ti OR worry:ab,ti OR 'worry (patient)':ab,ti OR grieving:ab,ti OR despair:ab,ti OR 'mental irritation':ab,ti OR 'panic attack':ab,ti OR 'panic disorder':ab,ti	
9	7 or 8	393,516
10	3 and 6 and 9	825

#	Author	Year	Title	Include (yes)/ Exclude (no)	The cause of excluding
1	Zhang Qin	2020	Influencing factors of fear of falling in patients with first cerebral infarction in recovery period	yes	
2	Song Na	2020	Influencing factors and nursing countermeasures of falling fear in patients with cerebral apoplexy	no	Total quality evaluation score ⩽3 points
3	Luo Li-Lei	2020	Research status of falling fear in patients with cerebral infarction	no	Review
4	Xu Yan-Hua	2019	Correlation of walking gait characteristics and fear of falling in patients with acute ischemic stroke and hemiplegia	no	Irrelevant outcome indicators
5	Li Jing	2019	Study on the infulance and the risk facters in Chengdu community post—stroke patients	no	Irrelevant research object
6	Sun Hong-Yan	2017	Correlation between fear of falling and quality of life in patients with first stroke	no	Irrelevant research object
7	Zhang Di	2016	Study on epidemiology of incidence and risk factors of falls in rural community-dwelling older population in Beijing	no	Irrelevant research object
8	DengNing	2016	A follow-up study : Fear of Falling among patients with first ever cerebral infarction and its related factors	no	Irrelevant outcome indicators
9	Cong Yan	2016	Risk Factors of Falls in Elderly Patients With Stroke and the Experience of Comprehensive Nursing Intervention	no	Irrelevant research object
10	LiYing	2014	The current status and influencing factors of fear of falling among the stroke older patients	yes	
11	Guan, Q.	2013	Factors influencing fear of falling in patients with stroke	no	Irrelevant outcome indicators
12	HuBei	2009	Risk factors and nursing intervention of falls with stroke patients	no	Irrelevant
13	Li Ming-e	2008	Risk factors and nursing intervention for falls in the aged	no	Irrelevant research object
14	Yadav, T.	2020	Factors affecting fear of falls in patients with chronic stroke	yes	
15	Duran, A. T.	2020	Ptsd Symptoms and Its Association with Fear of Falling and Subsequent Activity Restriction in Patients with Tia/Stroke	no	Conference abstract
16	Aguiar, L. T.	2020	Perspectives, satisfaction, self-efficacy, and barriers to aerobic exercise reported by individuals with chronic stroke in a developing country	no	Irrelevant research object

17	Tashiro, H.	2019	Life-Space Mobility and Relevant Factors in Community-dwelling Individuals with Stroke in Japan: A Cross-sectional Study	no	Irrelevant research object
18	Persson, C. U.	2019	Prediction of physical activity level after mild stroke: A 6-month followup of 215 patients in the fall study of gothenburg (fallsgot)	no	Conference abstract
19	Liu, Tai-Wa	2019	The reliability and validity of the Survey of Activities and Fear of Falling in the Elderly for assessing fear and activity avoidance among stroke survivors. [References]	no	Irrelevant research object
20	Hanna, E.	2019	Participation, Fear of Falling, and Upper Limb Impairment are Associated with High Sitting Time in People with Stroke	no	Irrelevant outcome indicators
21	Sertel, M.	2018	Investigation of the relationship between balance and fear of falling and movement in stroke patients	no	Conference abstract
22	Saygili, F.	2018	Relationship between fear of falls, daily living activities, and trunk control in stroke patients	no	Full text not found
23	Rafsten, L.	2018	Perceived and assessed balance in patients with stroke within 24 hours after discharge to home	no	Conference abstract
24	Mansfield, A.	2018	stroke	no	Handbook
25	Larén, A.	2018	Fear of falling in acute stroke: The Fall Study of Gothenburg (FallsGOT)	yes	
26	Janssen, H.	2018	Participation, fear of falling and upper limb impairment is associated with high sitting time in people with stroke	no	Duplicate data
27	Chun, H. Y. Y.	2018	Fear of falling is independently associated with agoraphobia after mild stroke and transient ischaemic attack	no	Conference abstract
28	Chun, H. Y. Y.	2018	Fear of falling is independently associated with agoraphobia after mild stroke and TIA	no	Conference abstract
29	Van Dijk, M. M.	2017	A cross-sectional study comparing lateral and diagonal maximum weight shift in people with stroke and healthy controls and the correlation with balance, gait and fear of falling	no	Irrelevant research object
30	Stout, R. D.	2017	Fear of falling for older and stroke-involved adults	no	Full text not found
31	Oguz, S.	2017	The relationship between objective balance, perceived sense of balance, and fear of falling in stroke patients	no	Irrelevant outcome indicators

32	Ng, S.	2017	Fear of falling in patients with chronic stroke	no	Irrelevant research object
33	Larén, A.	2017	Fear of falling acute after stroke: A part of the fall study in Gothenburg	no	Conference abstract
34	Goz, E.	2017	Relationship between fall frequency and fear of fall, motor function and disability in geriatric and nongeriatric stroke patients	no	Conference abstract
35				no	Conference abstract
36	Schinkel-Ivy, A.	2016	Relationships between fear of falling, balance confidence, and control of balance, gait, and reactive stepping in individuals with sub-acute stroke	yes	
37	Nct,	2016	Fear of Falling in Patients With Chronic Stroke	no	Irrelevant research object
38	Kavian, M.	2016	The correlation between the standing stability and fear of falling in patients with stroke	no	Full text not found
39	Goh, H. T.	2016	Falls and Fear of Falling After Stroke: A Case-Control Study	yes	
40	Visschedijk, J. H. M.	2015	Longitudinal follow-up study on fear of falling during and after rehabilitation in skilled nursing facilities	no	Irrelevant research object
41	Schmid, Arlene A.	2015	Fear of Falling in People With Chronic Stroke	no	Irrelevant outcome indicators
42	Schlick, C.	2015	Falls and fear of falling in vertigo and balance disorders: A controlled cross-sectional study	no	Irrelevant outcome indicators
43	Loureiro, A. P. C.	2015	Sedentary behaviors in stroke survivors	no	Conference abstract
44	Jones, Valerie	2015	Fear of Falling Among Persons With Chronic Stroke...AOTA/NBCOT National Student Conclave. Dearborn, Michigan. November 18-19 2016	no	Conference abstract
45	Guan, Q.	2015	Multifactor analysis for risk factors involved in the fear of falling in patients with chronic stroke from mainland China	no	Irrelevant outcome indicators
46	de Melo Borges, Sheila	2015	Fear of falling and falls in older adults with mild cognitive impairment and Alzheimer's disease.	no	Irrelevant research object
47	Cho, K.	2015	Risk factors related to falling in stroke patients: a cross-sectional study	no	Irrelevant outcome indicators
48	Yatar, G. I.	2014	The relationship between falling frequency, fear of falling, balance functions, balance security and hemiparetic side in patients with stroke	no	Full text not found

49	Phadke, C. P.	2014	Relationship between spasticity and balance confidence in persons post-stroke	no	Conference abstract
50	Park, J.	2014	Relationships of stroke patients' gait parameters with fear of falling	no	Irrelevant outcome indicators
51	Lane, R. A.	2014	Fear of Falling in Claudicants and Its Relationship to Physical Ability, Balance, and Quality of Life	no	Irrelevant outcome indicators
52	Jalayondeja, C.	2014	Six-month prospective study of fall risk factors identification in patients post-stroke	no	Irrelevant research object
53	Da Silva, Carolyn P.	2014	Falling, Balance Confidence, and Fear of Falling After Chronic Stroke	no	Qualitative research
54	Azad, A.	2014	Clinical assessment of fear of falling after stroke: validity, reliability and responsiveness of the Persian version of the Fall Efficacy Scale-International	no	Irrelevant
55	Kneebone, I.	2013	Fear of falling: Psychological management after stroke	no	Conference abstract
56	Vahlberg, B.	2012	Factors related to mobility and physical activity in individuals one to three years after stroke	no	Conference abstract
57	Perez-Jara, Javier	2012	Differences in fear of falling in the elderly with or without dizziness. [References]	no	Irrelevant research object
58	Kim, E. J.	2012	Fear of falling in subacute hemiplegic stroke patients: associating factors and correlations with quality of life	no	Irrelevant outcome indicators
59	Batchelor, F. A.	2012	Falls after stroke	no	Review
60	Schmid, A. A.	2011	Fear of falling among people who have sustained a stroke: A 6-month longitudinal pilot study	no	Irrelevant outcome indicators
61	Matsuda, Patricia Noritake	2011	Falls in multiple sclerosis	no	Irrelevant research object
62	Akosile, Christopher Olusanjo	2011	Relationships between fall indices and physical function of stroke survivors in Nigeria...including commentary by Batchelor F and Bugdayci D	no	Irrelevant outcome indicators
63	Zapata, Paloma Olmos	2010	Fear of falling in the elderly with recurrent dizziness: A descriptive study. [Spanish]. [References]	no	Not English/Chinese
64	Balash, Y.	2010	Disorders of gait with fear of fall in community dwelling elders	no	Conference abstract
65	Schmid, Arlene A.	2009	Consequences of Poststroke Falls: Activity Limitation, Increased Dependence, and the Development of Fear of Falling	no	Qualitative research

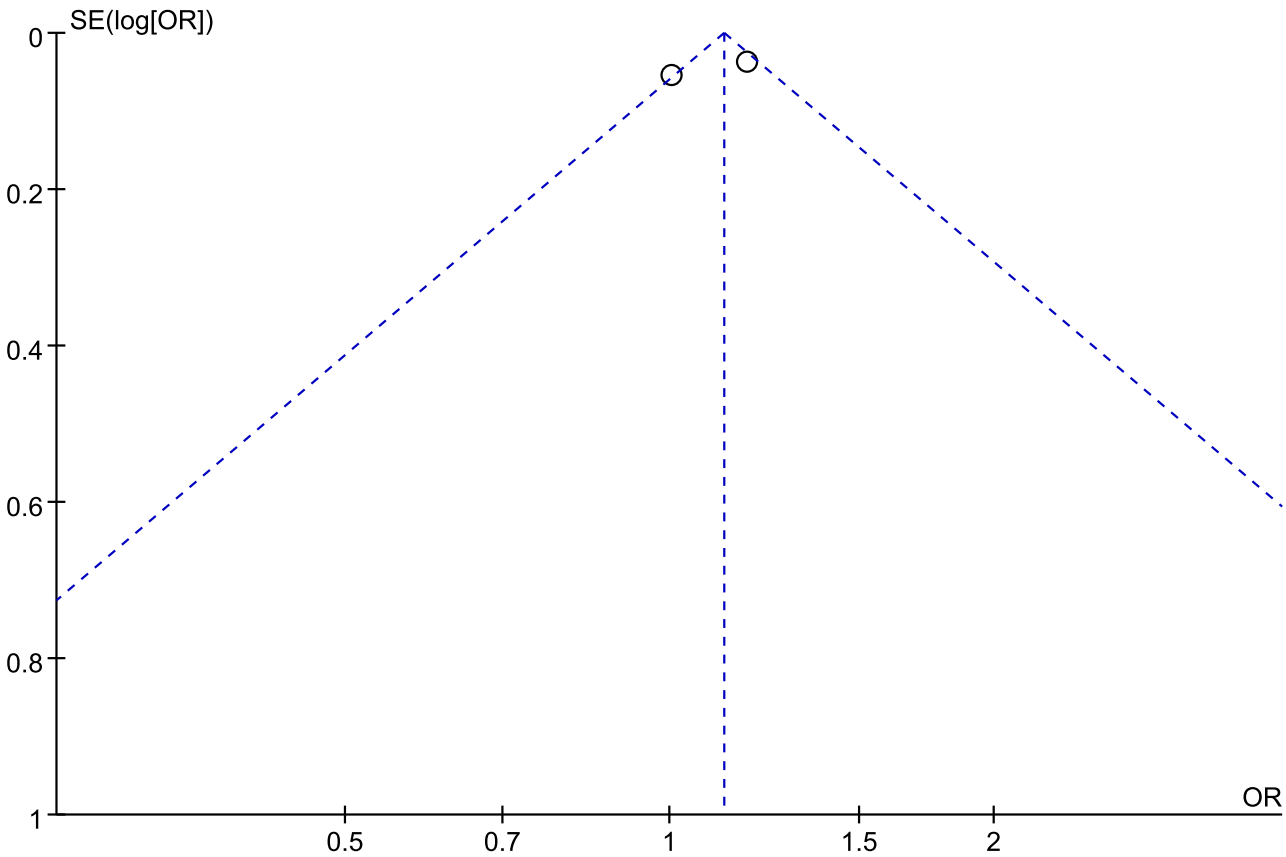
66	Schmid, A. A.	2009	Poststroke Fear of Failing in the Hospital Setting	no	Irrelevant outcome indicators
67	McGrath, Joanna Collicutt	2008	Fear of falling after brain injury. [References]	no	Irrelevant research object
68	Batchelor, F.	2008	Fear of falling and falls after stroke: the chicken or the egg?	no	Full text not found
69	Andersson, Å G.	2008	Fear of falling in stroke patients: Relationship with previous falls and functional characteristics	no	Full text not found
70	Schmid, A. A.	2007	Fear of falling: An emerging issue after stroke	no	Qualitative research
71	Morley, John E	2007	Falls--where do we stand?	no	Irrelevant research object
72	Chou, Kee-Lee	2007	The temporal relationship between falls and fear-of-falling among Chinese older primary-care patients in Hong Kong.	no	Irrelevant research object
73	Balash, Y.	2007	The effects of reducing fear of falling on locomotion in older adults with a higher level gait disorder	no	Irrelevant research object
74	Belgen, B.	2006	The association of balance capacity and falls self-efficacy with history of falling in community-dwelling people with chronic stroke	yes	
75	Andresen, Elena M.	2006	Cross-Sectional and Longitudinal Risk Factors for Falls, Fear of Falling, and Falls Efficacy in a Cohort of Middle-Aged African Americans.	no	Irrelevant outcome indicators
76	Watanabe, Y.	2005	Fear of falling among stroke survivors after discharge from inpatient rehabilitation	no	incomplete data
77	Rosén, E.	2005	Fear of falling, balance, and gait velocity in patients with stroke	no	Irrelevant outcome indicators
78	Giladi, N.	2005	Clinical characteristics of elderly patients with a cautious gait of unknown origin	no	Irrelevant research object
79	Stolze, H.	2004	Falls in frequent neurological diseases - Prevalence, risk factors and aetiology	no	Irrelevant research object
80	Friedman, S. M.	2002	Falls and fear of falling: Which comes first? A longitudinal prediction model suggests strategies for primary and secondary prevention	no	Irrelevant research object
81	Strubel, D.	2001	[Dementia and falls]	no	Not English/Chinese
82	Karin Hellström	1999	Fear of falling in patients with stroke:a reliability study	no	Irrelevant outcome indicators
83	Mahsa Kaviani	2016	The Correlation between the Standing Stability and Fear of Falling in Patients with Stroke	no	Not English/Chinese

84	Hamid Azadeh	2018	The Correlation Between Rates of Falling, Balance, Quality of Life and Fear of Falling in Patients With Chronic Stroke	no	Irrelevant outcome indicators
85	Thomas Hadjistavropoulos	2011	The Relationship of Fear of Falling and Balance Confidence With Balance and Dual Tasking Performance	no	Irrelevant research object
86	Mania Sheikh	2016	Fear of Falling in Patients with Chronic Stroke: Differences of Functional Gait and Balance Measures According to the Level of Concern about Falling	no	Irrelevant outcome indicators
87	Alison Schinkel-Ivy	2015	Relationships between fear of falling, balance confidence, and control of balance, gait, and reactive stepping in individuals with sub-acute stroke	no	Irrelevant outcome indicators
88	Zhou Min	2016	Current status and in fluencing factors of fear of falling among elderly in patients	no	Irrelevant outcome indicators
89	Chen Ping	2018	Study on the Status and Influencing Factors about Fear of Falling in Community-dwelling Older Adults with Stroke	no	Irrelevant research object
90	Deng Ning	2016	The status and influencing factors of fear of falling in patients with first ever cerebral infarction	no	Irrelevant outcome indicators
91	Shao Ping	2016	The relationship between fear of falling and anxiety and depression in elderly patients with stroke	no	Irrelevant outcome indicators
92	Arlene A. Schmid	2009	Poststroke Fear of Falling in the Hospital Setting	no	Irrelevant outcome indicators
93	Netha Hussain	2021	Prediction of fear of falling at 6 months after stroke based on 279 individuals from the Fall Study of Gothenburg	yes	

#	Including (√ or ×)	Author	Year	Measuring tools	Study design	Research period	Country	Total sample size	Sample source of experimental group	Experimental group (N)	Control group (N)	Sample source of control group	Age, years (Mean± SD)	Female (N,%)	Stroke reference period	Adjusted risk factors	OR	LL-95%CI	UL-95%CI	Quality evaluation of NOS				Quality evaluation of AHRQ
																				Selection	Comparability	Outcome	NOS scores	AHRQ scores
NO.1	√	Zhang Qin	2020	Self-made questionnaire, ADL, SAS, SDS, SFES-I	cross-sectional study	May 2017-January 2019	China	221	the Medical Department of Neurology, Department of Cardiology, Shandong First Medical University, Shandong, People's Republic of China	NR	NR	NR	60.13±8.72	88 (39.82)	first-onset stroke recovery period	1.Age;	1.355	1.057	1.737					4
																2.Marital status;	0.617	0.435	0.875					
																3. History of falls;	2.058	1.165	3.635					
																4.Anxiety;	2.292	1.431	3.671					
																5.Depression	1.802	1.217	2.669					
NO.10	√	Li Ying	2014	Self-made questionnaire, MMSE, The single-item question, MFES, BBS, TUGT	case-control study	March 2013-August 2013	China	170	the Medical Department of Neurology, Huadong Hospital Affiliated to Fudan University, ShangHai, People's Republic of China	67	103	Patients in the same period	73.54; Male: 73.0±8.4 Female: 74.2±7.6	76 (44.70)	Medically diagnosed	1. Berg balance force (min)	0.697	0.609	0.799	4	2	3	9	
																2. TUG mobile capability (s)	1.180	1.093	1.273					
																3.History of falls within 6 meters	2.728	1.082	6.878					
NO.14	√	Yadav, T.	2020	TUG, FM, PHQ-9, The single-item question	case-control study	23 August-10 February 2019.	India	82	Data were collected from 82 subjects who were recruited from tertiary-care rehabilitation centers, specialized centers for elderly, hospitals/clinics where they came for follow-up visits, and by contacting physical therapists providing home visit	59	23	community controls	51.6 ± 12.13	22(26.8)	patients with cerebral stroke for more than 3 months	1..Gender (Male)	3.254	0.826	12.822	4	2	2	8	
																2.Fugl-Meyer Scale score	1.136	1.002	1.287					
																3.Timed Up and Go score	1.006	0.904	1.119					
NO.25	√	Amanda Larén	2018	The single-item question, The SwePASS, SGPALS, using a walking aid and/or a wheelchair, NIHSS	prospective cohort study	between 1 October 2014 and 30 June 2016.	Sweden	462	the stroke unit of the Sahlgrenska University Hospital (SU)/Östra, Gothenburg, Sweden	237	225	similar participants	74.8 ± 12	226 (48.9)	patients aged 18 years or older with a diagnosis of a first-ever or recurrent clinical stroke	1.Female	2.25	1.46	3.46	3	2	3	8	

															2.SwePASS total score<24	9.41	5.13	17.25					
															3.SwePASS total score25-30	2.29	1.36	3.83					
															4.SwePASS score>31	1							
															5.Using a walking aid	3.4	2.12	5.43					
NO.36	√	Schinkel-Ivy, A.	2016	The single-item question, ABC	case-control study	October 2009 and September 2012	Canada	208	Data from individuals with stroke who underwent in-patient stroke rehabilitation at a rehabilitation	84	124	similar participants	FOF: 68.6±11.6 No FOF: 65.3±13.6	FOF:52 (61.9) No FOF: 43 (34.7)	in-patient stroke rehabilitation	1.Grasp reactions	0.98	0.95	1.01				7	
																2.Assists	0.98	0.96	1.000					
NO.39	√	Goh, H. T.	2016	FAC, FM, BBS, MoCA, PHQ-9, FES-I, FSS	case-control study	NR	china	125	Seventy-five patients with a previous stroke were recruited from outpatients and local support groups	75	50		66.6±6.9	26 (35)	aged 60 years or older, had stroke onset more than 3 months ago	FAC≤4	9.75	1.98	48.04	3	2	2	7	
NO.74	√	Beliz Belgen	2006	The single-item question, FES-S, STS, FMA, BBS, TUG, SIS mood and	cross-sectional study	NR	Sweden	50	NR	NR	NR	NR	59.9±11.9	19 (38)	they had a stroke onset more than 1 month prior	History of falls;	5.6	1.3	23				6	
NO.93	√	Netha Hussain	2021	NIHSS,MoCA,The single-item question,SwePASS,SGPALS	This prospective, longitudinal cohort study	between 1 October 2014 and 30 June 2016	Sweden	279	In FallsGOT, a consecutive sample of 504 individuals 18 years or older, with a clinical diagnosis of stroke and admitted to the stroke unit at Sahlgrenska University Hospital/Östra in Gothenburg	117	162	similar participants	75. 83 ± 11.17 FOF:78.05 ± 11.13 No FOF: 74.22 ± 10.95	143 (51.3) FOF:71 (60.7) No FOF: 72 (44.4)	individuals 18 years or older,All the participants in the FallsGOT cohort who were still alive 6 months after a stroke.	1.Age	1	0.97 1.0	1.02 1.06	3	2	3	8	
																2.Female	1.84	0.9	3.8					
																3.falls	1.92	0.76	5.04					
																4.Use of walking aid	0.81	0.44	1.48					
																5.SwePASS score (postural control)--Poor (0–24)	2.6	1.26	5.36					

6.SwePASS score---Moderate (25–30)	2.32	0.98	5.52
7.SGPALS score--Physically inactive	2.04	1.01	4.12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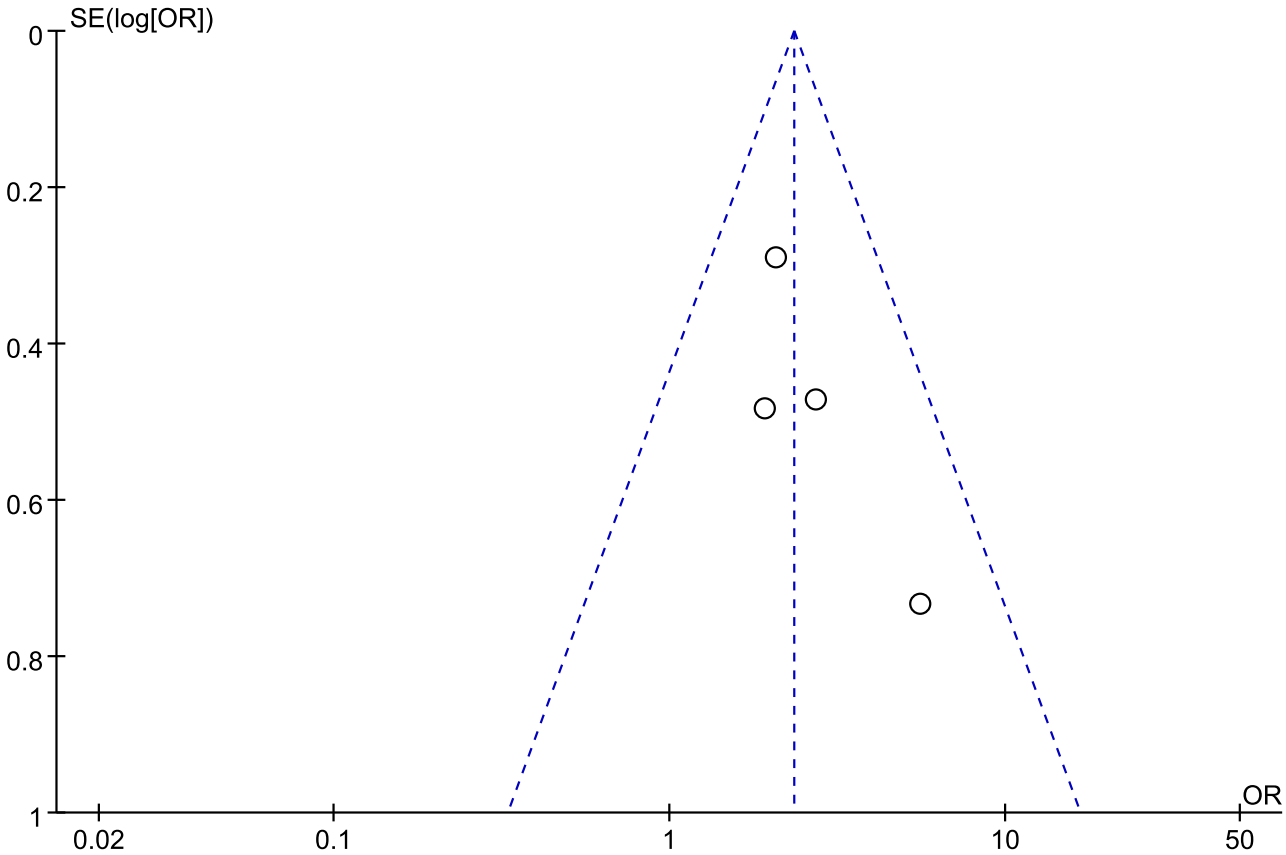
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