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

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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: The current study aimed to identify risk factors for fear of falling during stroke. It may improve the understanding of mechanisms of high incidence of falls development.

Design: A systematic review and meta-analysis

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

Results: 2700 records and 92 full text articles were screened. 8 studies involving 1,597 participants were selected for analysis of risk factors for patients with fear of falling during stroke. The quality of all included studies was assessed as medium or high quality. Review Manager 5.3 was used to calculate OR value and 95% CI of potential risk factors related to fear of falling in stroke patients.

The primary risk factors for fear of falling in stroke patients were female ($OR=2.13$, 95%CI, 1.47

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4 to 3.09.), balance ability ($OR= 5.54$; $95\%CI$, 3.48 to 8.81), mobility ($OR= 1.12$; $95\%CI$, 1.05 to
5
6 1.09), history of falls ($OR= 2.33$; $95\%CI$, 1.54 to 3.53.), walking aid ($OR= 1.98$; $95\% CI$, 1.37 to
7
8 2.88). The secondary factors were anxiety ($OR=2.292$; $95\%CI$, 1.431 to 3.671), depression
9
10 ($OR=1.802$; $95\%CI$, 1.217 to 2.669), poor lower limb motor function ($OR= 1.136$; $95\%CI$, 1.002 to
11
12 1.287), physically inactive ($OR=2.04$; $95\%CI$, 1.01 to 4.12). Measurement of heterogeneity between
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14 studies were high for all outcomes ($I^2=0-93\%$), indicating that the substantial between-study
15
16 heterogeneity in estimated proportions was not attributed to sampling error. The leave-one-out
17
18 analysis showed that no single study significantly affected the final pooled results.

19
20 **Conclusion:** This meta-analysis indicated that female, impaired balance ability, lower mobility,
21
22 using of walking aid, and history of falls in stroke patients, may be at greater risk of falling fear.
23
24 Thus, it is necessary to guide the development of risk stratification tools and the selection of
25
26 interventions.

27
28 **Key words:** risk factors; fear of falling; stroke; meta-analysis

29 30 **Strengths and limitations of this study:**

- 31 ● This study has been reported in accordance with the Preferred Reporting Items for Systematic
32
33 Reviews and Meta-Analyses reporting checklist.
- 34 ● Analyses have been undertaken respecting potential sources of known statistical heterogeneity.
- 35 ● Searches included both published and unpublished sources of literature to reduce the risk of
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37 omitting potentially eligible data.
- 38 ● There was a paucity of available data to permit meta-analyses of risk factors for pain and
39
40 functional impairment.
- 41 ● The variability in methods of assessing risk and reporting of frequency of risk characteristics
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43 limited analyses
- 44 ● The variability in methods of assessing risk and reporting of frequency of risk characteristics
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46 limited analyses
- 47 ● The variability in methods of assessing risk and reporting of frequency of risk characteristics
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49 limited analyses

50 51 **1 Introduction**

52 Stroke is the second leading cause of death in the world¹, and it also causes a serious
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54 burden on caregivers^{2 3}. In 2010, an estimated 16.9 million stroke incidents occurred,
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56 increasing the number of 33 million stroke survivors worldwide⁴. There were 5.9
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58 million people died and 102 million people of DALYs were lost, because of the stroke.

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60 On the other hand, it is well known that stroke can cause physical damage, such as

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4 weakness, paralysis, sensory disturbances, and impaired postural control⁵ and cause
5 mental fatigue, depression, and impaired cognitive function^{2 6}, which could contribute
6 to stroke people falling. A Fall, according to the World Health Organization⁷, is defined
7 as “an event which results in a person coming to rest inadvertently on the ground or
8 floor or other lower level, with or without injury”. Falls are common complication after
9 stroke, and both physical and mental injuries can cause falls⁸. Among those who
10 survived a stroke, 22-48% have experienced at least one fall in the hospital⁸⁻¹⁰ or in the
11 rehabilitation facility^{11 12}. In addition, compared with the age-matched control group,
12 people who have experienced a stroke are more likely to report fear of falling (FoF)¹¹.

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Fear of falling (FOF) is prevalent in individuals with stroke, with up to 88% of
patients with stroke who experience a fall developing FOF¹³. The incidence of FOF is
frequently associated with activity avoidance, which may lead to restricted mobility
and weak body, contribute to reduced functional capabilities, loss of functional
independence, and risk further increases in fall and FOF¹⁴⁻¹⁶.

In clinical practice, strengthen understanding of risk factors for FOF in stroke
patients can provide mechanistic insights and guide clinical practice. Not only affect
the fall event, but also relieve anxiety¹⁷, promote community reintegration¹⁸, and
improve quality of life¹⁹. Some previous studies have proposed the correlation between
many potential risk factors and FOF, intervention measures to reduce the incidence of
FOF during stroke and risk factors for falls in stroke patients²⁰, but they do not reflect
targeted measures, nor do they include a systematic review and meta-analysis of the
risk factors of FOF in the stroke patients²¹⁻²³. Thus, we conducted a systematic review
and meta-analysis to identify risk factors for FOF in patients with stroke.

2 Methods

2.1 Search strategy

We searched PubMed, 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 (MeSH) and natural language text
words with the terms. The first author designed Specific search strategies and the Peer

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4 reviewed electronic search strategies. The specific search strategy for each database can
5 be found in the appendix. Language limitations were not applied. References from
6 relevant papers or reviews were hand-searched for additional studies. Missing relevant
7 data of studies, we contacted authors the study via email. All studies that were classified
8 as FOF studies were then screened. On July 20, 2021, another search was performed on
9 the previously mentioned database to find articles published since the date of the initial
10 search (Supplementary File).

17 **2.2 Inclusion and exclusion criteria**

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19 The inclusion criteria were as follows:(1) Published case-control studies, retrospective
20 cohort studies and prospective cohort studies, cross-sectional study;(2) all participants
21 were 18 years and above and clinically diagnosed with either first stroke or recurrent
22 stroke. (3) studies that were published in the English or Chinese language. (4) The OR
23 (adjusted odds ratio) value and 95% are provided *CI*, or the OR value and 95% *CI*, or
24 the estimated value and standard error of the logistic regression coefficient can be
25 converted. (5) reported the risk factors of FOF in patients with stroke using validated
26 screening tools. We have extracted the data included in the study into a spreadsheet
27 after the pre-test.

28
29 The exclusion criteria were as follows: (1) review papers, case reports, meeting
30 abstracts, qualitative studies. (2) duplicate literature or research with the same data. (3)
31 research of quality evaluation result is low quality.

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33 Endnote X9 software were used to remove duplicates and to facilitate the screening
34 process. All titles and abstracts were screened for inclusion/exclusion based on
35 eligibility criteria. When potentially eligible studies could not be determined by abstract
36 alone, full texts were examined by further assessment.

42 **2.3 Data extraction and quality assessment**

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44 The literature was independently conducted search, reviewed and selected according to
45 predefined criteria. The data were collected from studies: first author, year of
46 publication, the geographical location of the country, the measured/collected tools to
47 assessment FOF, type of study, research period, total sample size, demographic data
48 and risk factors. The study of *OR/RR* or *95%CI* was directly extracted from the included
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4 studies, and if unreported, then it was calculated using the reported proportion to make
5 data conversion²⁴. All the information were recorded in specially standardized forms.
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7 Missing relevant data of studies, we contacted authors the study via email, if the
8 relevant data cannot be obtained in the end, delete the document.
9
10

11 The methodologic quality assessment of case-control studies, retrospective cohort
12 studies and prospective cohort studies was assessed by the Newcastle Ottawa Scale
13 (NOS)²⁵. Including the study population(4 items), comparability (1 item) and outcome
14 evaluation (3 items). The total score of the scale is 9 points, 0 to 3 are divided into low
15 quality research, and 4 to 6 are divided into medium quality research, 7-9 is divided
16 into high-quality research. The risk of bias of cross-sectional study was assessed using
17 the instrument Agency for Research and Health Quality (AHRQ)²⁶. The tool has a total
18 of 11 items. If the answer to an item is "No" or "UNCLEAR", the item's score is "0"; if
19 the answer is "Yes", the item scores "1", with a total score of 0-11 Points, 0 ~ 3
20 points=low quality, 4 ~ 7 points=medium quality, 8 ~ 11 points=high quality²⁷.The
21 process of study selection, data extraction, and quality assessment were all abstracted
22 in duplicate (Q Xie and JH Pei) with third-party adjudication (XM Dou) for
23 disagreements.
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38 **2.4 Statistical analysis**

39 RevMan 5.3 software was used for meta-analysis. Input the original data, and carry out
40 data conversion, all different types of data are converted into *OR/RR* and 95% *CI* form.
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42 First, the research is tested for heterogeneity. If $P \geq 0.5$ and $I^2 \leq 50\%$, a fixed-effects
43 model is used for analysis; if $P < 0.5$, $I^2 > 50\%$, it is considered that there is a large
44 heterogeneity between the studies and is sensitive²⁸. Carry out sensitivity (Sensitivity
45 analyses were performed using the leave-one-out method.) and subgroups analysis to
46 find the source of heterogeneity. If heterogeneity cannot be eliminated, the random
47 effects model is used for analysis. Numerical variable data should be expressed using
48 weighted mean difference and 95% *CI*. The data of binary variables are expressed by
49 odds ratio and 95% *CI*.
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60 **3 RESULTS**

3.1 Literature Selection

A total of 2046 records were initially searched from ten databases (**Fig. 1**). After excluding duplicates, 1646 records were screened. After reading their title and abstract, and ultimately 92 publications were selected for full-text assess. Finally, the full text of 7 studies was assessed for eligibility, and 1,318 participants were included in this meta-analysis by applying the inclusion and exclusion criteria.

3.2 Study Characteristics and Methodologic Quality

In these 8 included studies that conducted in 3 regions, Asia (n = 4), North America (n = 1), and Europe (n = 3). And regarding study design, 2 was of cross-sectional designs, 4 was of case-control studies, and 2 was a prospective cohort study. A summary of include literature characteristics can be found in **Table 1**.

The quality of the case-control studies and prospective cohort study was assessed by the NOS, and the number of NOS scores ranged from 7 to 9,

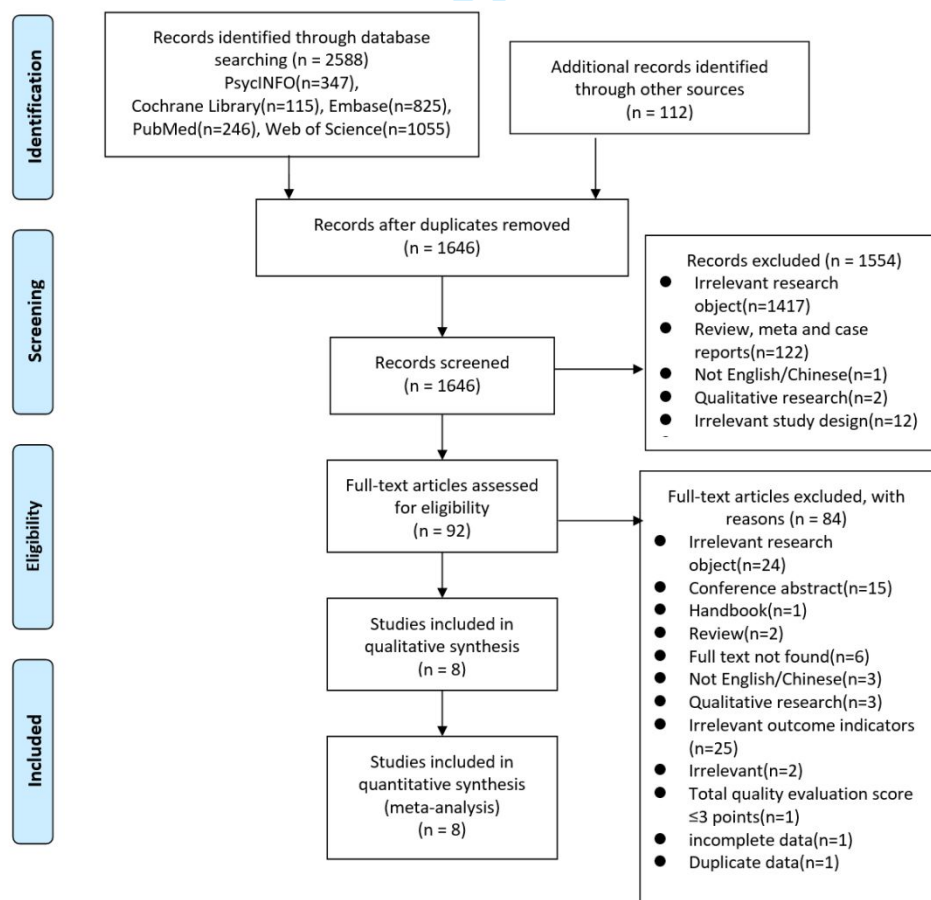


Fig. 1 Flow diagram of study selection in the meta-analysis

Table. 1 Characteristics of the include studies

Author, Year ^a , country	Study design	Sample size ^b	Age, years(Mean \pm SD)	Female N (%)	Outcome Ascertainment	Research period	Stroke reference period	Adjusted risk factors	NOS /AH RQ scores
ZhangQin.et al ²⁹ ,2020, china	cross-sectional study	221	60.13 \pm 8.72 ^b	88 (39.8) ^b	Self-made questionnaire, ADL, SAS, SDS, SFES-I	May 2017-January 2019	first-onset stroke recovery period	1.Age; 2.Marital status; 3. History of falls; 4.Anxiety; 5.Depression	4
LiYing. et al ³⁰ ,2014, China	case-control study	170	73.54 ^c Male: 73.0 \pm 8.4 Fem-ale: 74.2 \pm 7.6	76 (44.70) ^b	Self-made questionnaire, MMS, 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 6 meters	9
Yadav, T. et al ³¹ ,2020, India	case-control study	82	51.6 \pm 12.13 ^b	22(26.8)	TUG, 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 ³² , 2018, Sweden	prospective cohort study	462	74.8 \pm 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	1. Female 2.SwePASS total score < 24 3.Using a walking aid	8

								with a diagnosis of a first-ever or recurrent clinical stroke; acute stroke		
Schinkel-Ivy, A. et al ³³ .2016, Canada	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	8	
Goh, H. T. et al ³⁴ .2016, China	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 ³⁵ .2006, Sweden	cross-sectional study	50	59.9±11.9	19 (38)	The single-item question, FES-S, STS, FMA, BBS, TUG, SIS mood and emotion	NR	they had a stroke onset more than 1 month prior	History of falls	6	
Netha Hussain. et al ³⁶ .2021 Sweden	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 participants in the FallsGOT cohort who 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	

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5 **Notes:** (a) year of publication of the study. (b) data as reported by the authors. (c) Convert based on existing data.(d) the Newcastle-Ottawa Scale.NR: Not reported; FOF: fear of falling; ADL: The modified Barthel
6 Index; SAS: The Self-rating Anxiety Scale; SDS: The Self-rating Depression Scale; SFES-I: Short Falls Efficacy Scale International; BBS: The Berg Balance Scale; MMSE: The mini-mental state examination; MFES:
7 The Modified Fall Efficacy Scale; FES-S: Falls Efficacy Scale–Swedish Version; TUGT: The Timed Up and Go test;PHQ-9: Patient Health Questionnaire –9;FM: The Fugl-Meyer Scale; The SwePASS: the Swedish
8 modified version of the Postural Assessment Scale for Stroke (PASS);SGPALS: the Saltin-Grimby Physical Activity Level Scale; NIHSS: The National Institutes of Health Stroke Scale ;ABC: The Activities-Specific
9 Balance Confidence Scale; FAC: The Functional Ambulation Category; MoCA: The Montreal Cognitive Assessment; FES-I: Fall Efficacy Scale International; FSS: The Fatigue Severity Scale; CES-D Scale: Center for
10 Epidemiologic Studies Depression Scale; SSRS: Social Support Rating Scale; S-AI: State Anxiety Inventory ; T-AI: Trait Anxiety Inventory; SIS: Stroke Impact Scale; STS: the timed sit-to-stand (STS) test.
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and the studies quality level was high. In the 2 cross-sectional studies, the AHRQ score ranged from 4 to 6 points, and the literature quality level was medium. Indicates that the quality of the literature included in this study is relatively high.

4 Results of the meta-analysis

4.1 General factors

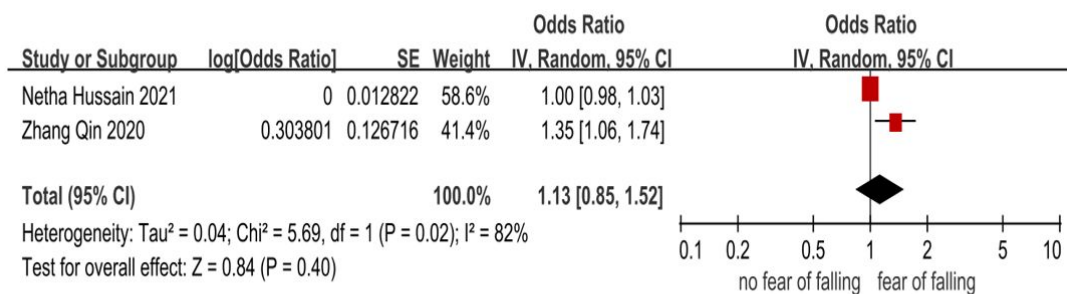
4.1.1 Age

Two studies reported on the relationship between female and the fear of falling in stroke patients, and then extracted data for meta-analysis (2 studies, 500 participants). However, when entered into a meta-analysis using a random-effects model, there were no significant differences in the age of FOF. ($OR=1.13$, 95%CI, 0.85 to 1.52, $P<0.0001$, $I^2=0\%$; **Figure. 2a**).

4.1.2 Female

Two studies reported on the relationship between female and the fear of falling in stroke patients, and then extracted data for meta-analysis (2 studies, 741 participants). Analysis of the results shows that female patients are more likely to develop FOF. ($OR= 2.13$, 95%CI, 1.47 to 3.09, $P<0.0001$, $I^2=0\%$; **Figure. 2b**).

a



b

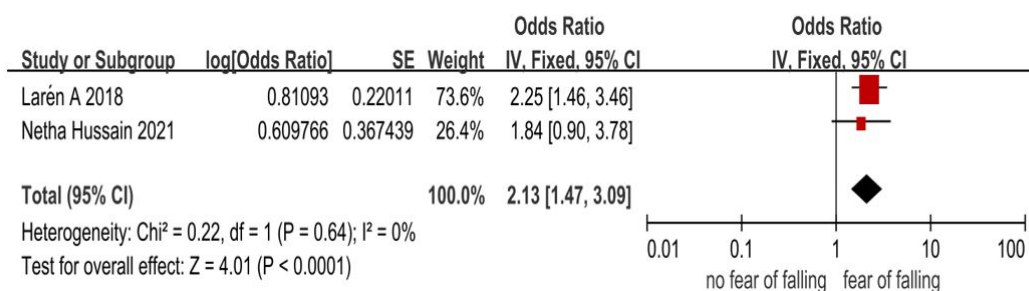


Figure. 2 Meta-analyses for general risk factors for fear of falling: (a) age, (b) female gender. The solid vertical line indicates no effect. The solid squares indicate the mean difference and are proportional to the weights used in the meta-analysis. The diamond

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.

4.2 Physical factors

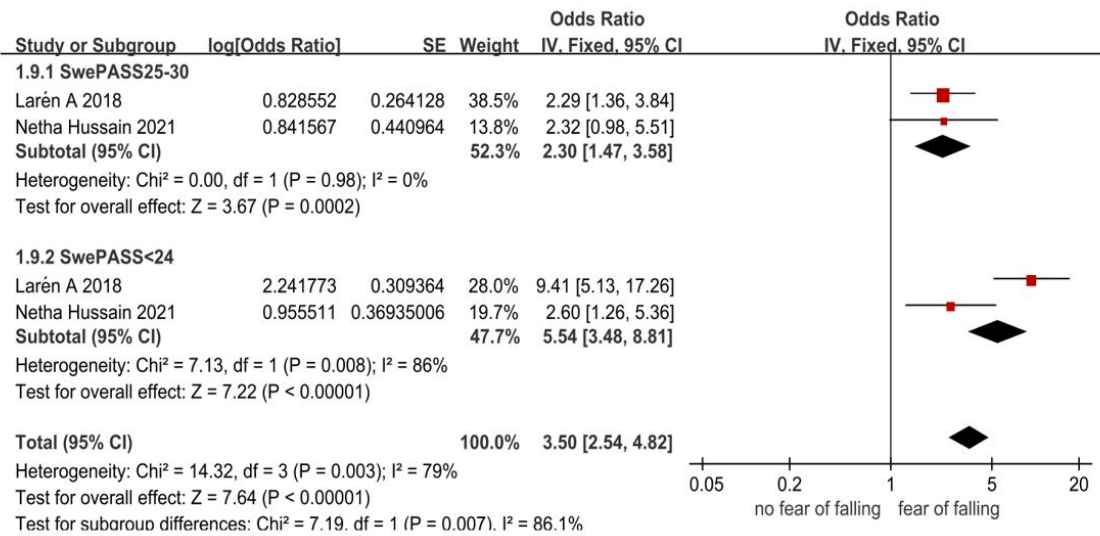
4.2.1 Balance ability

Three studies listed balance ability as an independent risk factors^{30 32 36} (911 participants). However, the assessment of balance ability differed among these studies, with four using varying tools to define its incidence. Li Ying and colleagues (2014)³⁰ measured balance with the Berg Balance Scale (BBS), whereas Amanda Larén and colleagues (2009)³² and Netha Hussain and colleagues (2021)³⁶ defined it as an the SwePASS score (postural control). A meta-analysis using a fixed-effects model that included two studies revealed that lower balance ability significantly contributed to the development of fear of falling (SwePASS score 25-30: $OR= 2.30$; 95% CI , 1.47 to 3.58; $I^2 = 86\%$; SwePASS score <24: $OR= 5.54$; 95% CI , 3.48 to 8.81; $I^2 = 86\%$; **Figure. 3a**).

4.2.1 Mobility

Based on the meta-analysis of the 3 studies on the risk factors of FOF (377 participants). Data analysis shows that there is a large heterogeneity between the studies ($P=0.0003$, $I^2=84\%$), and the sensitivity analysis did not find clinical heterogeneity. Therefore, the fixed-effects model was used to analyze the data, and demonstrated that a significantly higher incidence of FOF between low mobility and high mobility ($OR= 1.12$; 95% CI , 1.05 to 1.09; $I^2 = 84\%$; **Figure. 3b**).

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b

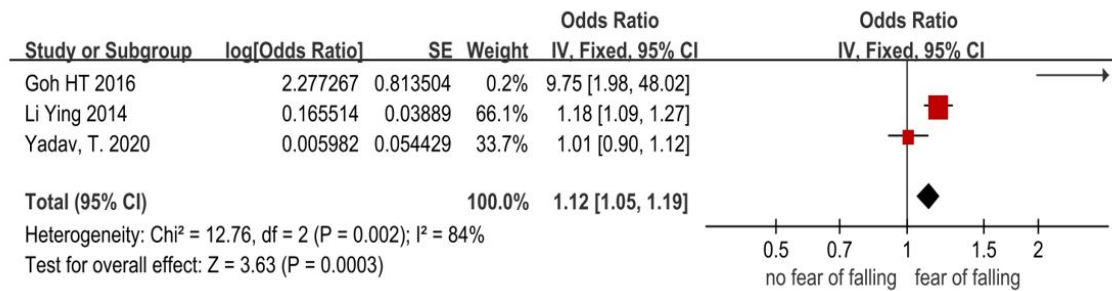


Figure. 3 Meta-analyses for physical risk factors for fear of falling: (a) balance ability, (b) mobility.

4.3 History of falls

Experience of falls was listed as an independent risk factor for FOF in 4 studies^{29 30 35 36} (720 participants). These studies were included in a meta-analysis using a fixed-effects model, demonstrating that history of falls significantly increased the risk of FOF ($OR = 2.33$; $95\%CI$, 1.54 to 3.53; $I^2 = 0\%$; **Figure. 4**). Furthermore, Yuriko Watanabe and peers (2005)¹³ also believe that for stroke patients, 87.9% of those who have experienced a fall will have a fear of falling.

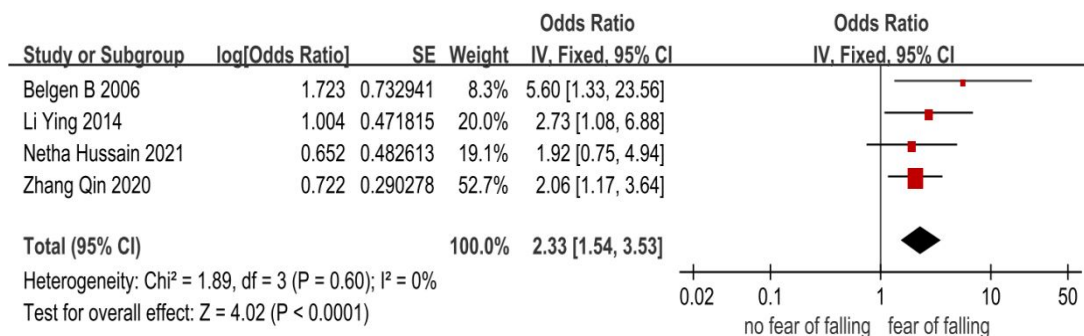


Figure. 4 Meta-analyses for history of falls for fear of falling.

4.4 Use of walking aid

Two studies listed an influencing factor between walking aid for stroke patients and FOF³²⁻³⁶. Amanda Larén and colleagues (2009)³² specified that findings provide valuable insight for those involved in stroke rehabilitation during the acute phase after stroke. FoF is associated with the use of a walking aid. Whereas, Netha Hussain and colleagues (2021)³⁶ pointed that in the multivariable regression model, walking aid for FOF was considered to be not statistically significant. The results of two studies were entered into a pooled analysis using a fixed-effects model. The meta-analysis confirmed that the walking aid for stroke patients significantly increased the risk of FOF (OR= 1.98; 95% CI, 1.37 to 2.88; **Figure. 5**)

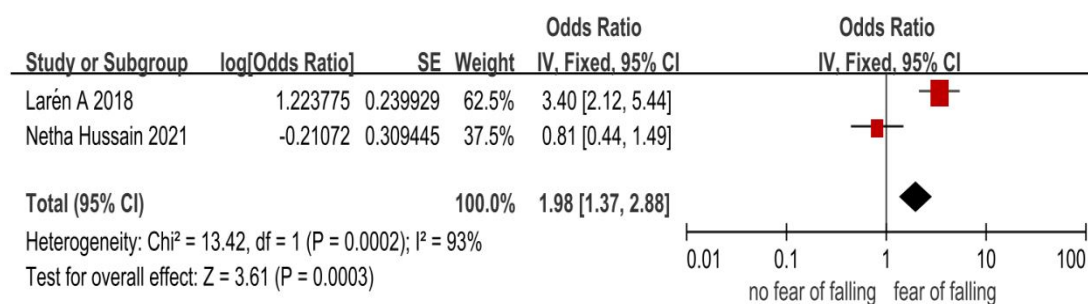


Figure. 5 Meta-analyses for using walking aid for fear of falling.

4.5 Other risk factors

Zhang Qin and colleagues (2020)²⁹ (221 participants) believe that anxiety, depression and marital status is one of the risk factors for FOF, and the marital status of a spouse is a protective factor for patients with fear of falling. In addition, Arlene. A and colleagues (2011)³⁷ also believe that higher anxiety and depression scores are closely

related to FOF, but cannot be meta-analyzed with other related studies. Yadav, T and colleagues³¹ (82 participants) identified poor lower limb motor function as a risk factor for FOF, and the results of logistic regression suggest that lower extremity Fugl-Meyer scale is associated with fear of falls with an OR of 1.136 indicating that for every 1 unit increase in lower extremity Fugl-Meyer score, there is 1.36 times chance of a person belonging to no fear of fall group. But with every change of lower extremity Fugl-Meyer score by 2 units = $e^{2*0.127}$, there is 1.29 times of a chance of a person to belong to no fear of fall group. Thus, indicating that by improving the lower extremity motor function, the chances of belonging to no fear of fall reduces drastically. Furthermore, Netha Hussain and colleagues (2021)³⁶ pointed that previous physical activity to the stroke event, especially Physically inactive may be an independent risk factor of FOF; yet Amanda Larén and colleagues (2009)³² didn't think so. Schinkel-Ivy, A and colleagues³³ (208 participants) believe that FOF was positive related to walking velocity in individuals with stroke. There are few studies on the relationship between gait and fear of falling. This research uses a 4.6-meter-long pressure pad system (Gaitrite, CIR Systems, Clifton, NJ) to measure gait. Walking velocity and double support time as an outcome indicator³⁸. All of the above risk factors have not enough data for meta-analysis. (Data of others risk factors can be found in **Table 2**.)

Table 2 Detailed data on other risk factors for patient FOF after stroke

Risk factors	OR or RR	LL-95%CI	UL-95%CI	P value
anxiety ²⁹	2.292	1.431	3.671	< 0.001
depression ²⁹	1.802	1.217	2.669	0.003
marital status ²⁹	0.617	0.435	0.875	0.006
Lower limb motor function ³¹	1.136	1.002	1.287	0.047
SGPALS score--- Physically inactive ³⁶	2.04	1.01	4.12	0.048
Reactive stepping ³³				
Grasp reactions	0.98	0.95	1.01	0.23
Assists	0.98	0.96	1.00	0.086

Notes: OR: odds ratio; RR: relative risk; LL: lower limit; UL: upper limit

5 Discussion

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4 This study was based on observational studies in which 1,597 stroke participants were
5 included. All patients come from 2 cross-sectional studies, 4 case-control studies, and
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7 2 prospective cohort studies with a wide range of patient characteristics. Furthermore,
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9 we conducted a sensitivity analysis using the leave-one-out method, which indicated
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11 that few studies had a substantial effect on the final pooled estimates, and supported the
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13 credibility of these results. The findings of this meta-analysis showed that female,
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15 impaired balance ability, lower mobility, using of walking aid, and the experience of
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17 falling were strongly associated with FOF among stroke individuals. Pooling results
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19 from a total of 8 studies and another meta-analysis on fall risk factors in community
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21 stroke survivors²⁰ are consistent in impaired mobility (*OR* 4.36)²⁰, reduced balance (*OR*
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23 3.87)²⁰, depression (*OR* 2.11)²⁰ and history of falls are associated with falls and FOF.
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25 Furthermore, this study found history of fall lead to a higher risk of FOF in stroke
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27 patients (*OR* 2.22) compared to falls (*OR* 1.67)²⁰. Similarly, reduced balance is more
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29 likely contribute to FOF compared to falls. The findings of the present study also
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31 highlight that having a history of falls including a near-fall in the home, community or
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33 hospital setting predicts a higher risk of recurrent falling in the stroke group (*OR* 4.19)
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35 than found in community older. In addition, the results of this meta-analysis in line with
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37 another systematic review study about the risk factors of FOF in the elderly³⁹ deem
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39 that the problems of fall history and gait are related to FOF. Our study highlights that
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41 having a history of falls indicates that the risk of falling fear in the stroke group (*OR*
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43 4.19) is higher than that of the elderly (*OR* 0.21).

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45 The results of previous studies have conducted research on the correlation between
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47 various factors and FOF in stroke patients. Some studies demonstrated that a correlation
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49 between gait characteristics and FOF. Among them, Jin Park et al.⁴⁰ have thought that
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51 a moderate negative correlation between Step cycle and FOF in gait parameters ($r = -$
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53 0.581); Eva Rose 'n et al.⁴¹ found that there be significantly Moderate correlations
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55 between the FES(S) and self-selected ($r = 0.53$) as well as for maximum ($r = 0.55$) gait
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57 velocity.

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59 There is also a part of the research on the relationship between balance ability and
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FOF. For example, Semra Oguz et al.⁴² found that there be a strong negative correlation

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4 between objective balance (measured by BBS scores) and FES scores ($r = -0.808$); there
5 is a strong positive correlation between perceived sense of balance (PSB) and FES score
6 ($r = 0.714$); For balance ability and mobility in line with this meta-analysis, the study
7 of Kihun Cho et al.⁴³ showed that the fall efficacy and them were moderately correlated
8 (respectively, $r = 0.669$; $r=0.545$). Other studies such as Christopher et al.⁴⁴ believe that
9 there be a negative correlation between physical function and falls efficacy ($r=-0.66$);
10 studies such as Eun Joo Kim et al.¹⁹ pointed out that physical factors include the
11 functional ambulation category, the strength of hip abductor, knee Extensor, and ankle
12 plantar flexor all have a moderately negative correlation with FOF (respectively $r=-$
13 0.673 ; $r=-0.534$; $r=-0.478$; $r=-0.501$). Obviously, the above results are completely
14 opposite, and it may also be caused by different statistical analysis and research focuses.
15 So, in clinical practice, it is very meaningful to explore the true relationship between
16 FOF and body function by further larger-scale prospective studies.
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21 In addition to the factors related to FOF confirmed by the above studies, there are
22 also some factors that have been studied on the relationship between FOF, such as post-
23 stroke psychological factors, long-term sitting and quality of life research. Anxiety and
24 depression ($r=0.400$), energy, mobility, self-care, upper extremity function of quality
25 of life (person correlation coefficients are $r=-0.476$; $r= -0.615$; $r=-0.617$; $r=-0.507$)¹⁹.
26 There was a significant, moderate, positive correlation between FES-I and sitting time
27 ($r=0.579$)⁴⁵. A previous study determined the differences in gait and balance measures
28 in patients with chronic stroke when they have different levels of attention related to
29 fall. It stated that patients with chronic strokes and slight concern of falling have better
30 gait and balance capabilities compared to patients with high levels of concern⁴⁶.
31 Therefore, these results are potentially clinically relevant. It would be useful to study
32 whether reducing FOF would improve gait, quality of life, physical function and
33 balance performance in patients with stroke. Other than, it would also be useful to have
34 the measurement of FOF be a part of assessment of psychological factors, quality of
35 life, and physical function in these patients.
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58 Furthermore, there is a special aspect regarding the causal relationship between
59 falling and fear of falling. Some studies have confirmed that FOF is an important
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4 predictor of falls in stroke patients⁴⁷⁻⁴⁹, but the other studies also suggest that people
5 who have experienced a fall are more likely to have a fear of falling^{50 51}. Although a
6 large number of studies have tried to prove the relationship between FOF and previous
7 falls⁵²⁻⁵⁴, there is also an evidence pointed that FOF is not always the result of previous
8 falls^{55 56}. Some of these studies have shown that FOF may be considered a risk factor
9 for falls^{48 57}, while other studies have raised questions about this relationship⁵⁸⁻⁶².
10 Recent study has confirmed that the history of falls in the previous year is a good
11 predictor of the fear of falling; but the fear of falling is a predictor of falls during follow-
12 up only in the unadjusted model⁶³.

21 Considering the high global prevalence of stroke-related falls or fear of falling, this
22 study provides evidence for the development of appropriate prevent measures to
23 decrease the FOF risk in stroke patients, and the risk factors of FOF for stroke patients
24 in Asia include marital status, social support status, and payment methods for medical
25 insurance⁶⁴. However, current guidelines for stroke management provide no specific
26 recommendations for psychological monitoring and fear of falling management⁶⁵. Thus,
27 it is vital to identify high-risk patients and provide them with targeted interventions.
28 Furthermore, more studies are needed for developing effective evaluation methods and
29 treatment strategies against FOF among stroke patients to improve their physical
30 function, mental health and quality of life.

31 Some advantages of this meta-analysis should be highlighted. First, most of the
32 included studies were of relative high quality, and the pooled evidence were robust.
33 Second, Under the premise of a large sample size, we could ensure that we can
34 quantitatively analyze the risk factors of falling fear in stroke patients. Therefore, our
35 findings may be more convincing than any single study. Finally, the research data
36 included in this study has been adjusted, and the results of data analysis will hardly be
37 affected by the patient's baseline characteristics.

38 Despite the above advantages, this study also has some limitations. To begin with,
39 two of the included studies are cross-sectional studies and the ability to hypothesize
40 etiology was weak. Besides, significant heterogeneity was found in the results of
41 several meta-analysis, which cannot be fully explained by sensitivity analysis. In
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4 addition, potential predictors of obvious inter-study heterogeneity include measurement
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6 tools for outcome indicators, methodological differences, cultural background, and
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8 ethnicity. Furthermore, the effects of the patient's age, inner anxiety and depression, as
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10 well as the motor function of the lower limbs on the risk of falling fear in stroke patients
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12 have been reported in fewer studies, so the conclusions may be different. Likewise,
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14 since there are relatively few published articles, the funnel plot and Egger linear
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16 regression test cannot be used to evaluate the publication bias, so there may be
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18 publication bias⁶⁶. Moreover, because this study only includes studies in English and
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20 Chinese, so it probably missed the relevant studies in other languages, which leads to
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22 biases in estimates in Western countries. But, there is currently no evidence that meta-
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24 analysis of language limitations can lead to bias^{67 68}. In the end, the analysis is based on
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26 the overall research level, not personal data.

27 28 **6 Conclusion**

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30 The study systematically analyzed risk factors of FOF in stroke patients related to
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32 history of falls; general factors related to age and gender; physical factors related to
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34 lower limb motor function, balance ability and mobility; psychological factors related
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36 to anxiety and depression. The results suggest that female patients and history of falls
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38 might be associated with FOF in stroke patients, with evidence most consistent and
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40 effect sizes largest for FOF. The aggregate analysis of these risk factors can help screen
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42 and distinguish patients at risk of FOF, thereby helping to prevent and optimize timely
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44 interventions for this problem.

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46 Overall, the review highlights the demand to hold on interventions targeting female,
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48 and history of falls, especially interventions in lower socioeconomic groups and
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50 determine their effectiveness. In addition, the results of this review may guide the
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52 development of risk stratification tools, the selection of preventive interventions, and
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54 provide a basis for clinical practice.

55 56 **Footnotes:**

57 58 **Supporting information**

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60 1. File. Search strategy of database (DOCX)

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4 2. Checklist. PRISMA 2009 checklist (DOCX)

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6 3. Literature Selection (XLSX)

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8 4. Data extraction (XLSX)

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42 **Patient consent for publication:** Not required

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44 **Reference**

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Table. 1 Characteristics of the include studies

Author, Year ^a , country	Study design	Sample size ^b	Age, years(Mean ±SD)	Female N (%)	Outcome Ascertainment	Research period	Stroke reference period	Adjusted risk factors	NOS /AH RQ scores
ZhangQin.et al ²⁹ ,2020, china	cross-sectional study	221	60.13±8.72 ^b	88 (39.8) ^b	Self-made questionnaire, ADL, SAS, SDS, SFES-I	May 2017-January 2019	first-onset stroke recovery period	1.Age; 2.Marital status; 3. History of falls; 4.Anxiety; 5.Depression	4
LiYing. et al ³⁰ ,2014, China	case-control study	170	73.54 ^c Male: 73.0±8.4 Fem-ale: 74.2±7.6	76 (44.70) ^b	Self-made questionnaire, MMS, 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 6 meters	9
Yadav, T. et al ³¹ ,2020, India	case-control study	82	51.6 ± 12.13 ^b	22(26.8)	TUG, 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 ³² , 2018, Sweden	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	1. Female 2.SwePASS total score < 24 3.Using a walking aid	8

							with a diagnosis of a first-ever or recurrent clinical stroke; acute stroke		
Schinkel-Ivy, A. et al ³³ .2016, Canada	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	8
Goh, H. T. et al ³⁴ .2016, China	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 ³⁵ .2006, Sweden	cross-sectional study	50	59.9±11.9	19 (38)	The single-item question, FES-S, STS, FMA, BBS, TUG, SIS mood and emotion	NR	they had a stroke onset more than 1 month prior	History of falls	6
Netha Hussain. et al ³⁶ .2021 Sweden	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 participants in the FallsGOT cohort who 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

Notes: (a) year of publication of the study. (b) data as reported by the authors. (c) Convert based on existing data. (d) the Newcastle-Ottawa Scale. NR: Not reported; FOF: fear of falling; ADL: The modified Barthel Index; SAS: The Self-rating Anxiety Scale; SDS: The Self-rating Depression Scale; SFES-I: Short Falls Efficacy Scale International; BBS: The Berg Balance Scale; MMSE: The mini-mental state examination; MFES: The Modified Fall Efficacy Scale; FES-S: Falls Efficacy Scale–Swedish Version; TUGT: The Timed Up and Go test; PHQ-9: Patient Health Questionnaire – 9; FM: The Fugl-Meyer Scale; The SwePASS: the Swedish modified version of the Postural Assessment Scale for Stroke (PASS); SGPALS: the Saltin-Grimby Physical Activity Level Scale; NIHSS: The National Institutes of Health Stroke Scale ; ABC: The Activities-Specific Balance Confidence Scale; FAC: The Functional Ambulation Category; MoCA: The Montreal Cognitive Assessment; FES-I: Fall Efficacy Scale International; FSS: The Fatigue Severity Scale; CES-D Scale: Center for Epidemiologic Studies Depression Scale; SSRS: Social Support Rating Scale; S-AI: State Anxiety Inventory ; T-AI: Trait Anxiety Inventory; SIS: Stroke Impact Scale; STS: the timed sit-to-stand (STS) test.

Table 2 Detailed data on other risk factors for patient FOF after stroke

Risk factors	OR or RR	LL-95%CI	UL-95%CI	P value
anxiety ²⁹	2.292	1.431	3.671	< 0.001
depression ²⁹	1.802	1.217	2.669	0.003
marital status ²⁹	0.617	0.435	0.875	0.006
Lower limb motor function ³¹	1.136	1.002	1.287	0.047
SGPALS score--- Physically inactive ³⁶	2.04	1.01	4.12	0.048
Reactive stepping ³³				
Grasp reactions	0.98	0.95	1.01	0.23
Assists	0.98	0.96	1.00	0.086

Notes: OR: odds ratio; RR: relative risk; LL: lower limit; UL: upper limit

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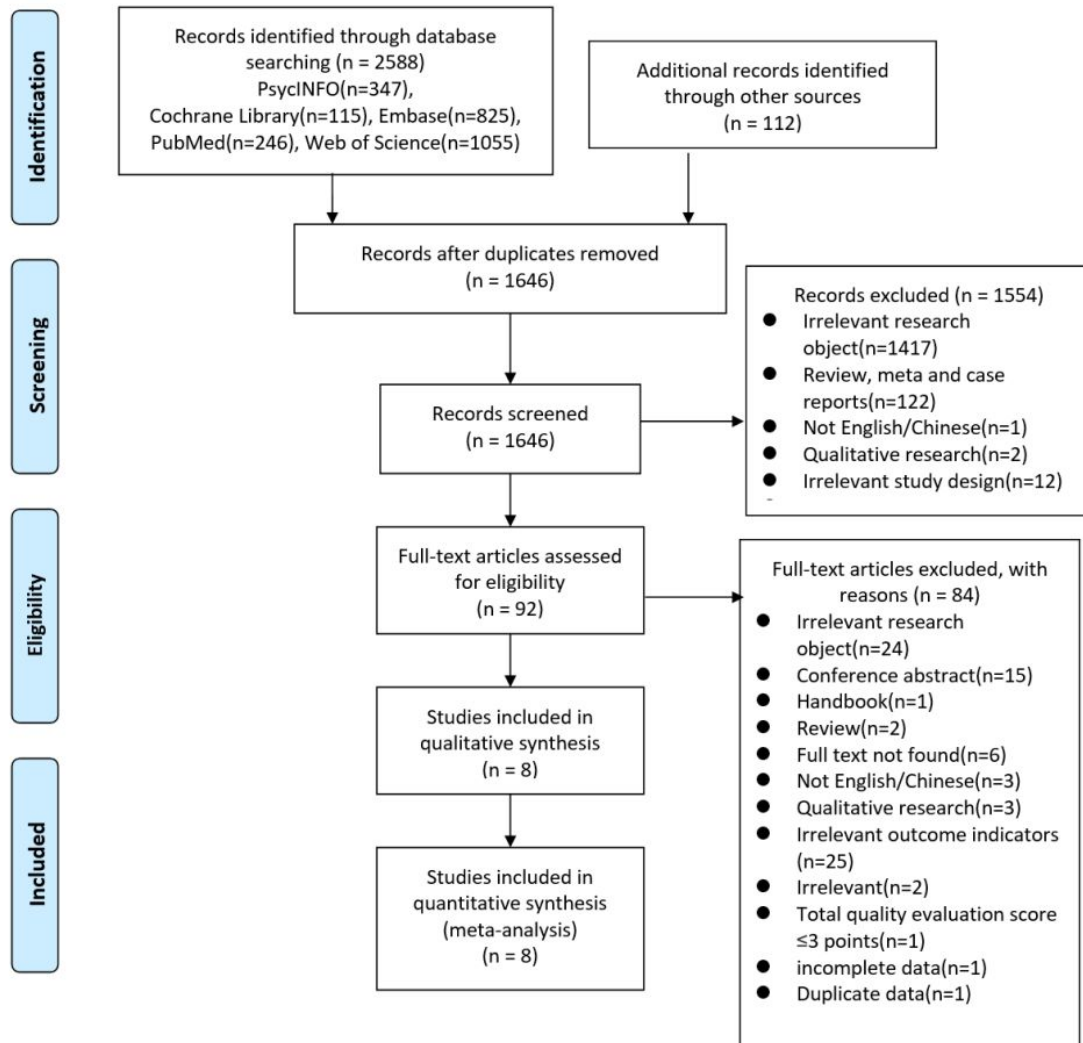
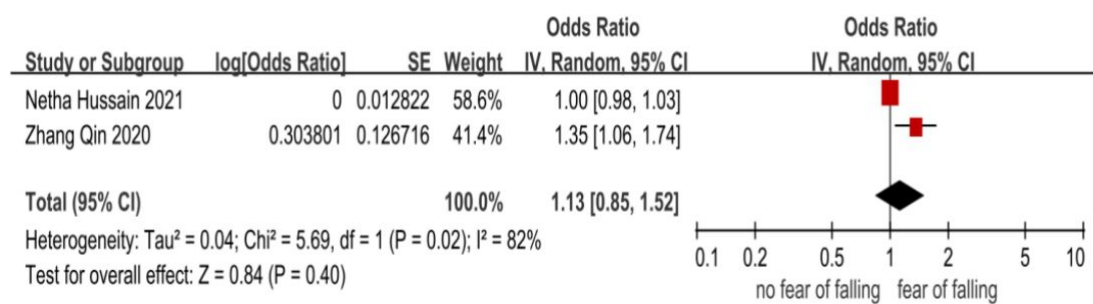


Fig. 1 Flow diagram of study selection in the meta-analysis

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b

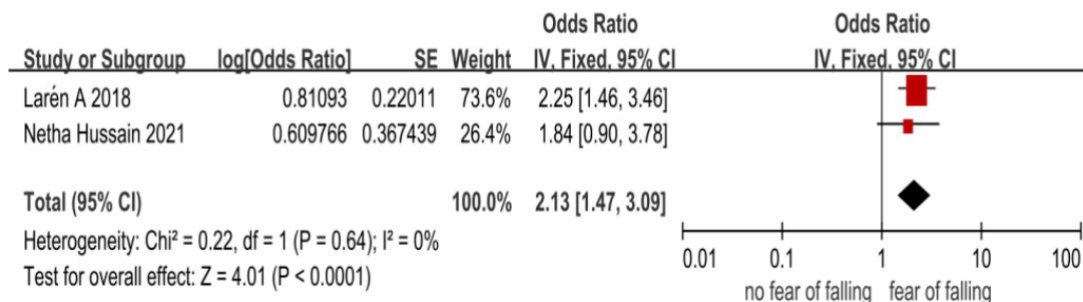
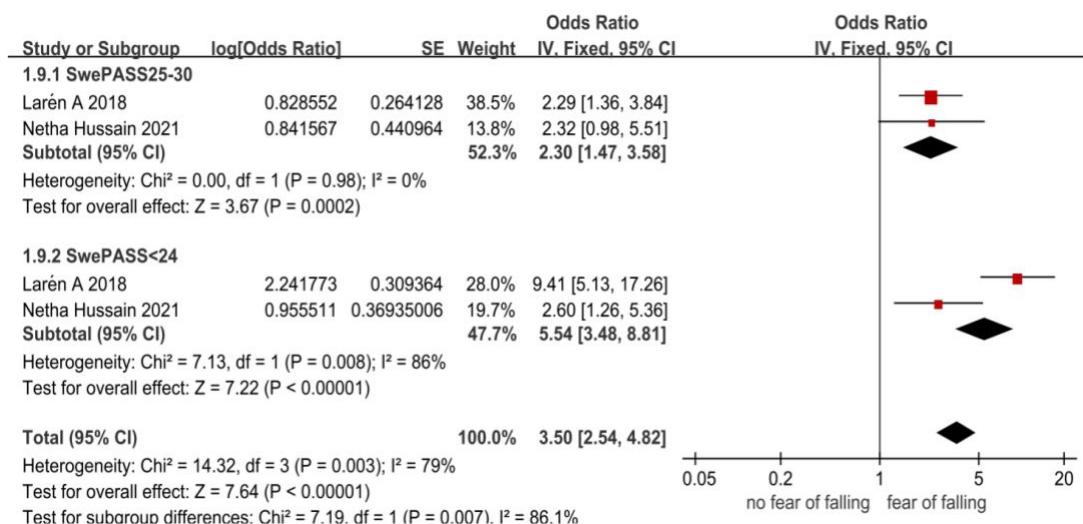


Fig 2. Meta-analyses for identified general risk factors for FOF: (a) age, (b) female gender. The solid vertical line indicates no effect. The solid squares indicate the mean difference and are proportional to the weights used in the meta-analysis. The diamond indicates the weighted mean difference, and the lateral tips of the diamond indicate the associated confidence intervals (CI). The horizontal lines represent the 95% CI.

a



b

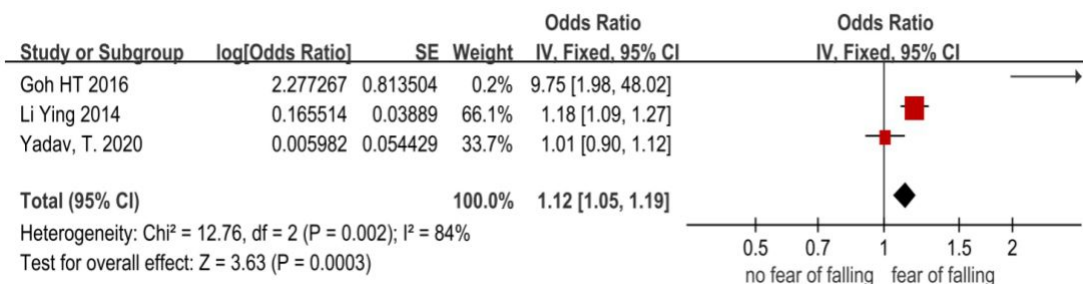


Figure 3 Meta-analyses for physical risk factors for fear of falling: (a) balance ability, (b) mobility. The solid vertical line indicates no effect. The solid squares indicate the mean difference and are proportional to the weights used in the meta-analysis. The diamond indicates the weighted mean difference, and the lateral tips of the diamond indicate the associated confidence intervals (CI). The horizontal lines represent the 95% CI.

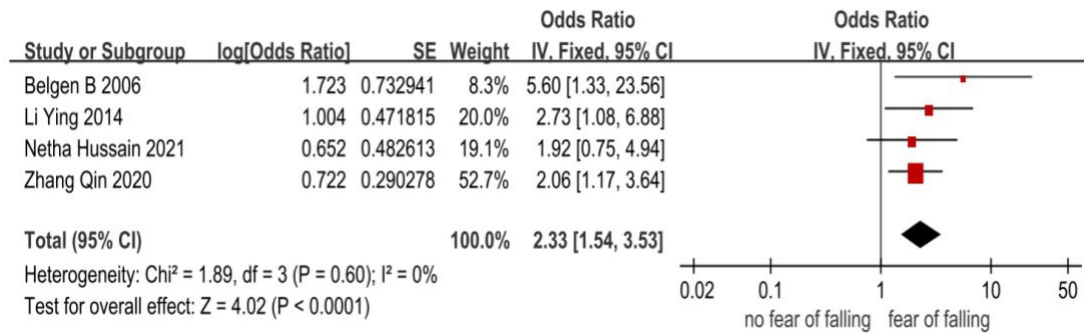


Figure 4 Meta-analyses for history of falls for fear of falling. The solid vertical line indicates no effect. The solid squares indicate the mean difference and are proportional to the weights used in the meta-analysis. The diamond indicates the weighted mean difference, and the lateral tips of the diamond indicate the associated confidence intervals (CI). The horizontal lines represent the 95% CI.

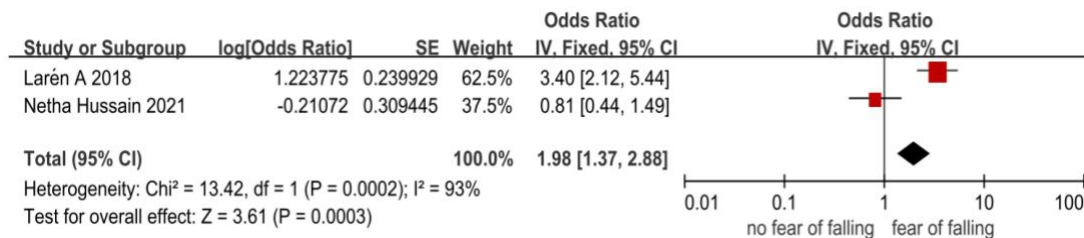


Figure 5 Meta-analyses for using walking aid for fear of falling. The solid vertical line indicates no effect. The solid squares indicate the mean difference and are proportional to the weights used in the meta-analysis. The diamond indicates the weighted mean difference, and the lateral tips of the diamond indicate the associated confidence intervals (CI). The horizontal lines represent the 95% CI.

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Pubmed: from inception to July 16, 2021

#	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	473,904

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4	Infarctions"[Title/Abstract]	OR	"Cerebral
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6	Infarction"[Title/Abstract]	OR	"Hemorrhagic
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8	Stroke"[Title/Abstract]	OR	"Ischemic Stroke"[Title/Abstract]
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12	OR "Embolic Stroke"[Title/Abstract]	OR	"Thrombotic
13			
14	Stroke"[Title/Abstract]	OR	"Cardiovascular
15			
16	Diseases"[Title/Abstract]	OR	"Vascular
17			
18	Diseases"[Title/Abstract]	OR	"Carotid Artery
19			
20	Disease*"[Title/Abstract]	OR	"Carotid Artery
21			
22	Disorder*"[Title/Abstract]	OR	"Carotid Arterial
23			
24	Disease*"[Title/Abstract]		OR"Carotid
25			
26	Atheroscleros*"[Title/Abstract]	OR	"Carotid Atherosclerotic
27			
28	Disease*"[Title/Abstract]	OR	"Internal Carotid Artery
29			
30	Diseases"[Title/Abstract]	OR	Common Carotid Artery
31			
32	Diseases[Title/Abstract]	OR	External Carotid Artery
33			
34	Diseases[Title/Abstract]	OR	External Carotid Arterial
35			
36	Diseases[Title/Abstract]	OR	"Carotid Artery
37			
38	Thrombosis"[Title/Abstract]	OR	"Cerebrovascular
39			
40	Disorder*"[Title/Abstract]	OR	"Intracranial Vascular
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42	Disease*"[Title/Abstract]	OR	"Intracranial Vascular
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44	Disorder*"[Title/Abstract]	OR	"Cerebrovascular
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46	Disease*"[Title/Abstract]	OR	"Brain Vascular
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48	Disorder*"[Title/Abstract]	OR	"Cerebrovascular
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4	Occlusion**[Title/Abstract]	OR	"Cerebrovascular
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6	Insufficienc**[Title/Abstract]	OR	"Basal Ganglia Vascular
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8	Disease**[Title/Abstract]	OR	"Lenticulostriate
9			
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11	Vasculopath**[Title/Abstract]	OR	Lenticulostriate Vascular
12			
13	Disease*[Title/Abstract]	OR	Vascular Lenticulostriate
14			
15	Diseases[Title/Abstract]	OR	"Basal Ganglia
16			
17	Hemorrhage"[Title/Abstract]	OR	"Putaminal
18			
19	Hemorrhage"[Title/Abstract]	OR	"Cerebral
20			
21			
22	Infarct**[Title/Abstract]	OR	"Left Hemisphere Cerebral
23			
24	Infarction"[Title/Abstract]	OR	"Subcortical
25			
26	Infarction**[Title/Abstract]	OR	"Posterior Choroidal Artery
27			
28	Infarction"[Title/Abstract]	OR	"Anterior Choroidal Artery
29			
30	Infarction"[Title/Abstract]	OR	"Right Hemisphere Cerebral
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32	Infarction"[Title/Abstract]	OR	"CADASIL"[Title/Abstract]
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34	"Multi-Infarct Dementia"[Title/Abstract]	OR	"Anterior Cerebral
35			
36	Artery Infarction"[Title/Abstract]	OR	"Middle Cerebral Artery
37			
38	Infarction"[Title/Abstract]	OR	"Posterior Cerebral Artery
39			
40	Infarction"[Title/Abstract]	OR	"Brain Ischemia**[Title/Abstract]
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42	OR "Ischemic Encephalopath**[Title/Abstract]		OR "Cerebral
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44	Ischemia**[Title/Abstract]	OR	"Brain Hypoxia-
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46	Ischemia"[Title/Abstract]	OR	"Cerebral Small Vessel
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48	Disease**[Title/Abstract]	OR	"Cerebral
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4	Microangiopath**[Title/Abstract]	OR	"Intracranial Arterial
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6	Disease**[Title/Abstract]	OR	"Intracranial Arterial
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8	Disorder**[Title/Abstract]	OR	"Arterial Brain
9			
10	Disease**[Title/Abstract]	OR	Brain Arterial
11			
12	Disease*[Title/Abstract]	OR	Arterial Brain
13			
14	Disorder*[Title/Abstract]	OR	"Intracranial
15			
16	Hemorrhage**[Title/Abstract]	OR	"Posterior Fossa
17			
18	Hemorrhage**[Title/Abstract]	OR	"Brain
19			
20	Hemorrhage**[Title/Abstract]	OR	"Cerebral
21			
22	Hemorrhage"[Title/Abstract]	OR	"Cerebral Intraventricular
23			
24	Hemorrhage"[Title/Abstract]	OR	"Hypertensive Intracranial
25			
26	Hemorrhage"[Title/Abstract]	OR	"Cranial Epidural
27			
28	Hematoma"[Title/Abstract]	OR	"Subdural
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30	Hematoma"[Title/Abstract]	OR	"Pituitary
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32	Apoplexy"[Title/Abstract]	OR	"Subarachnoid
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34	Hemorrhage"[Title/Abstract]	OR	"Brain
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36	Infarction**[Title/Abstract]	OR	"Brain Infarct**[Title/Abstract]
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38	OR "Anterior Circulation Brain Infarction"[Title/Abstract]	OR	
39			
40	"Brain Venous Infarction**[Title/Abstract]	OR	"Anterior
41			
42	Cerebral Circulation Infarction"[Title/Abstract]	OR	"Posterior
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44	Circulation Brain Infarction"[Title/Abstract]	OR	"Lacunar
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46	Stroke**[Title/Abstract]	OR	"Lacunar
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4	Syndrome**[Title/Abstract]	OR	"Lacunar
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6	Infarction**[Title/Abstract]	OR	"Lacunar
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8			
9	Infarct**[Title/Abstract]	OR	"Intracranial
10			
11			
12	Vasospasm**[Title/Abstract]	OR	Intracranial
13			
14	Angiospasm*[Title/Abstract]	OR	"Intracranial Vascular
15			
16			
17	Spasm**[Title/Abstract]	OR	"Cerebral
18			
19	Vasospasm**[Title/Abstract]	OR	"Cerebrovascular
20			
21			
22	Spasm**[Title/Abstract]	OR	"Cerebral
23			
24			
25	Angiospasm**[Title/Abstract]	OR	"Cerebral Artery
26			
27	Spasm**[Title/Abstract]	OR	"Hemiplegia**[Title/Abstract]
28			
29			
30	"Transient Hemiplegia**[Title/Abstract]	OR	
31			
32	"Monoplegia**[Title/Abstract]	OR	"Post-Ictal
33			
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35	Hemiplegia**[Title/Abstract]	OR	"Crossed
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37			
38	Hemiplegia**[Title/Abstract]	OR	"Flaccid
39			
40	Hemiplegia**[Title/Abstract]	OR	"Infantile
41			
42			
43	Hemiplegia**[Title/Abstract]	OR	"Spastic
44			
45	Hemiplegia**[Title/Abstract]	OR	"Pareses"[Title/Abstract]
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47			
48	"Paraparesis"[Title/Abstract]	OR	"Muscular
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50	Pares**[Title/Abstract]	OR	"Muscle Pares**[Title/Abstract]
51			
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53	OR "Monopares**[Title/Abstract]	OR	"Lower Extremity
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56	Pares**[Title/Abstract]	OR	"Crural Pares**[Title/Abstract]
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59	"Upper Extremity Pares**[Title/Abstract]	OR	"Brachial
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	<p>Pareses*[Title/Abstract] OR "Hemipareses*[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]</p>	
3	#1 OR #2	654,634
4	"Accidental Falls"[MeSH Terms] OR "Accidents"[MeSH	198,327

	Terms] OR "Accident Prevention"[MeSH Terms]	
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 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]	114,050
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 16, 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	17045

	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, 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 Atheroscleros* 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	99308

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4	Disease*	OR Lenticulostriate Vasculopath* OR
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6	Lenticulostriate	Vascular Disease* OR Vascular
7		
8		
9	Lenticulostriate Diseases	OR Basal Ganglia Hemorrhage OR
10		
11	Putaminal Hemorrhage	OR Cerebral Infarct* OR Left
12		
13	Hemisphere Cerebral Infarction	OR Subcortical Infarction*
14		
15		
16	OR Posterior Choroidal Artery Infarction	OR Anterior
17		
18	Choroidal Artery Infarction	OR Right Hemisphere Cerebral
19		
20	Infarction	OR CADASIL OR Multi-Infarct Dementia OR
21		
22	Anterior Cerebral Artery Infarction	OR Middle Cerebral Artery
23		
24	Infarction	OR Posterior Cerebral Artery Infarction OR Brain
25		
26	Ischemia*	OR Ischemic Encephalopath* OR Cerebral
27		
28	Ischemia*	OR Brain Hypoxia-Ischemia OR Cerebral Small
29		
30	Vessel Disease*	OR Cerebral Microangiopath* OR
31		
32	Intracranial Arterial Disease*	OR Intracranial Arterial
33		
34	Disorder*	OR Arterial Brain Disease* OR Brain Arterial
35		
36	Disease*	OR Arterial Brain Disorder* OR Intracranial
37		
38	Hemorrhage*	OR Posterior Fossa Hemorrhage* OR Brain
39		
40	Hemorrhage*	OR Cerebral Hemorrhage OR Cerebral
41		
42	Intraventricular Hemorrhage	OR Hypertensive Intracranial
43		
44	Hemorrhage	OR Cranial Epidural Hematoma OR Subdural
45		
46	Hematoma	OR Pituitary Apoplexy OR Subarachnoid
47		
48	Hemorrhage	OR Brain Infarction* OR Brain Infarct* OR
49		
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<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60</p>	<p>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</p>
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	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 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	101648
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 16, 2021

#	searches	results
1	TS=(Gait Disorders, Neurologic OR Paresis OR Vasospasm, Intracranial OR Stroke, Lacunar OR Basal	3,756,024

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60</p>	<p>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 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</p>
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1		
2		
3		
4		Cerebral Infarct* OR Left Hemisphere Cerebral Infarction
5		
6		OR Subcortical Infarction* OR Posterior Choroidal Artery
7		
8		Infarction OR Anterior Choroidal Artery Infarction OR Right
9		
10		Hemisphere Cerebral Infarction OR CADASIL OR Multi-
11		
12		Infarct Dementia OR Anterior Cerebral Artery Infarction OR
13		
14		Middle Cerebral Artery Infarction OR Posterior Cerebral
15		
16		Artery Infarction OR Brain Ischemia* OR Ischemic
17		
18		Encephalopath* OR Cerebral Ischemia* OR Brain Hypoxia-
19		
20		Ischemia OR Cerebral Small Vessel Disease* OR Cerebral
21		
22		Microangiopath* OR Intracranial Arterial Disease* OR
23		
24		Intracranial Arterial Disorder* OR Arterial Brain Disease*
25		
26		OR Brain Arterial Disease* OR Arterial Brain Disorder* OR
27		
28		Intracranial Hemorrhage* OR Posterior Fossa
29		
30		Hemorrhage* OR Brain Hemorrhage* OR Cerebral
31		
32		Hemorrhage OR Cerebral Intraventricular Hemorrhage OR
33		
34		Hypertensive Intracranial Hemorrhage OR Cranial Epidural
35		
36		Hematoma OR Subdural Hematoma OR Pituitary Apoplexy
37		
38		OR Subarachnoid Hemorrhage OR Brain Infarction* OR
39		
40		Brain Infarct* OR Anterior Circulation Brain Infarction OR
41		
42		Brain Venous Infarction* OR Anterior Cerebral Circulation
43		
44		Infarction OR Posterior Circulation Brain Infarction OR
45		
46		Lacunar Stroke* OR Lacunar Syndrome* OR Lacunar
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3		
4		Infarction* OR Lacunar Infarct* OR Intracranial
5		
6		Vasospasm* OR Intracranial Angiospasm* OR Intracranial
7		
8		Vascular Spasm* OR Cerebral Vasospasm* OR
9		
10		Cerebrovascular Spasm* OR Cerebral Angiospasm* OR
11		
12		Cerebral Artery Spasm* OR Hemiplegia* OR Transient
13		
14		Hemiplegia* OR Monoplegia* OR Post-Ictal Hemiplegia*
15		
16		OR Crossed Hemiplegia* OR Flaccid Hemiplegia* OR
17		
18		Infantile Hemiplegia* OR Spastic Hemiplegia* OR Pareses
19		
20		OR Paraparesis OR Muscular Pares* OR Muscle Pares*
21		
22		OR Monopares* OR Lower Extremity Pares* OR Crural
23		
24		Pares* OR Upper Extremity Pares* OR Brachial Pares* OR
25		
26		Hemipares* OR Spastic Paraparesis OR Neurologic Gait
27		
28		Disorder* OR Neurologic Locomotion Disorder* OR
29		
30		Neurologic Ambulation Disorder* OR Neurologic Gait
31		
32		Dysfunction* OR Duck Gait OR Sensorimotor Gait
33		
34		Disorder* OR Athetotic Gait OR Broadened Gait OR Drop
35		
36		Foot Gait OR Festinating Gait OR Frontal Gait OR
37		
38		Hemiplegic Gait OR Hysterical Gait OR Reeling Gait OR
39		
40		Rigid Gait OR Scissors Gait OR Shuffling Gait* OR Spastic
41		
42		Gait OR Stumbling Gait OR Unsteady Gait OR Widebased
43		
44		Gait OR Marche a Petit Pas OR Rapid Fatigue Gait OR
45		
46		Charcot Gait* OR Charcot* Gait OR Gait Apraxia OR Gait
47		
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	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 16, 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 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+")	19,393
2	"Hypoxia, Brain" OR stroke* OR "Cerebrovascular Accident*" OR "Cerebrovascular Apoplexy" OR "Brain Vascular	38,873

	<p>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 Atheroscleros*" 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</p>	
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 3
 4 Infarction" OR "Anterior Choroidal Artery Infarction" OR "Right
 5
 6 Hemisphere Cerebral Infarction" OR "CADASIL" OR "Multi-
 7
 8 Infarct Dementia" OR "Anterior Cerebral Artery Infarction" OR
 9
 10 "Middle Cerebral Artery Infarction" OR "Posterior Cerebral
 11
 12 Artery Infarction" OR "Brain Ischemia*" OR "Ischemic
 13
 14 Encephalopath*" OR "Cerebral Ischemia*" OR "Brain Hypoxia-
 15
 16 Ischemia" OR "Cerebral Small Vessel Disease*" OR "Cerebral
 17
 18 Microangiopath*" OR "Intracranial Arterial Disease*" OR
 19
 20 "Intracranial Arterial Disorder*" OR "Arterial Brain Disease*" OR
 21
 22 OR "Brain Arterial Disease*" OR "Arterial Brain Disorder*" OR
 23
 24 "Intracranial Hemorrhage*" OR "Posterior Fossa
 25
 26 Hemorrhage*" OR "Brain Hemorrhage*" OR "Cerebral
 27
 28 Hemorrhage" OR "Cerebral Intraventricular Hemorrhage" OR
 29
 30 "Hypertensive Intracranial Hemorrhage" OR "Cranial Epidural
 31
 32 Hematoma" OR "Subdural Hematoma" OR "Pituitary
 33
 34 Apoplexy" OR "Subarachnoid Hemorrhage" OR "Brain
 35
 36 Infarction*" OR "Brain Infarct*" OR "Anterior Circulation Brain
 37
 38 Infarction" OR "Brain Venous Infarction*" OR "Anterior
 39
 40 Cerebral Circulation Infarction" OR "Posterior Circulation Brain
 41
 42 Infarction" OR "Lacunar Stroke*" OR "Lacunar Syndrome*" OR
 43
 44 "Lacunar Infarction*" OR "Lacunar Infarct*" OR "Intracranial
 45
 46 Vasospasm*" OR "Intracranial Angiospasm*" OR "Intracranial
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	<p>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"</p>	
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 16, 2021

#	searches	results
1	exp Ataxia/ or exp Basal Ganglia/ or exp Brain Disorders/ or	326126

	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/	
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 16, 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 'intracranial aneurysm'/exp OR 'occlusive cerebrovascular disease'/exp OR 'vertebrobasilar insufficiency'/exp OR 'brain embolism'/exp OR 'brain vasospasm'/exp OR 'artery	788,888

	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 'carotid arterial disorders':ab,ti OR 'carotid arteriopathy':ab,ti OR 'carotid artery dis*':ab,ti OR	551,619

1		
2		
3		
4		'carotid disease':ab,ti OR 'cerebral apoplexia':ab,ti OR
5		
6		'cerebral artery occlusion':ab,ti OR 'cerebral artery
7		
8		thrombosis':ab,ti OR 'cerebral blood circulation disorder':ab,ti
9		
10		OR 'cerebral blood flow disorder':ab,ti OR 'cerebral circulat*
11		
12		disorder':ab,ti OR 'cerebral emboli*':ab,ti OR 'cerebral
13		
14		haematoma':ab,ti OR 'cerebral haemorrhage':ab,ti OR
15		
16		'cerebral infarct*':ab,ti OR 'cerebral insult':ab,ti OR 'cerebral
17		
18		isch*emia':ab,ti OR 'cerebral microbleed':ab,ti OR 'cerebral
19		
20		thrombosis':ab,ti OR 'cerebral vascular accident':ab,ti OR
21		
22		'cerebral vascular insufficiency':ab,ti OR 'cerebral
23		
24		vasospasm':ab,ti OR 'cerebro vascular accident':ab,ti OR
25		
26		'cerebrovascular accident':ab,ti OR 'cerebrovascular
27		
28		arrest':ab,ti OR 'cerebrovascular circulation disorder':ab,ti OR
29		
30		'cerebrovascular embolism':ab,ti OR 'cerebrovascular
31		
32		failure':ab,ti OR 'cerebrovascular infarction':ab,ti OR
33		
34		'cerebrovascular injury':ab,ti OR 'cerebrovascular insu*':ab,ti
35		
36		OR 'cerebrovascular insu*':ab,ti OR 'cerebrovascular
37		
38		isch*emia':ab,ti OR 'cerebrovascular obliteration':ab,ti OR
39		
40		'cerebrovascular obstruction':ab,ti OR 'cerebrovascular
41		
42		occlusion':ab,ti OR 'cerebrovascular thrombosis':ab,ti OR
43		
44		'cerebrum embolism':ab,ti OR 'cerebrum vascular
45		
46		accident':ab,ti OR 'corpus callosum bleeding':ab,ti OR 'corpus
47		
48		
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4		callosum haemorrhage':ab,ti OR 'cortical infarction':ab,ti OR
5		
6		'cva':ab,ti OR encephalorrhagia:ab,ti OR 'gait deviation*':ab,ti
7		
8		OR 'hematencephalon':ab,ti OR hemip*':ab,ti OR 'hemisphere
9		
10		OR 'hematencephalon':ab,ti OR hemip*':ab,ti OR 'hemisphere
11		
12		infarct*':ab,ti OR 'interhemispheric hematoma':ab,ti OR
13		
14		'intracerebral bleeding':ab,ti OR 'intracerebral
15		
16		haematoma':ab,ti OR 'intracerebral haemorrhage':ab,ti OR
17		
18		'intracortical hemorrhage':ab,ti OR 'intracranial
19		
20		aneurysm':ab,ti OR 'intracranial artery thrombosis':ab,ti OR
21		
22		'intracranial bleeding':ab,ti OR 'intracranial embolism':ab,ti
23		
24		OR 'intracranial hematoma':ab,ti OR 'intracranial
25		
26		hemorrhage':ab,ti OR 'intracranial thrombosis':ab,ti OR
27		
28		'intracranial vasospasm':ab,ti OR 'isch*emic cerebral
29		
30		attack':ab,ti OR 'isch*emic seizure':ab,ti OR 'ische*mia
31		
32		cerebri':ab,ti OR 'isch*emic brain disease':ab,ti OR 'isch*emic
33		
34		encephalopathy':ab,ti OR 'musc* paresis':ab,ti OR 'neural
35		
36		isch*emia':ab,ti OR 'occlusive cerebrovascular disease':ab,ti
37		
38		OR 'paretic muscle':ab,ti OR 'partial paralysis':ab,ti OR
39		
40		stroke:ab,ti OR 'thrombosis cerebri':ab,ti OR 'vertebral basilar
41		
42		insufficiency':ab,ti OR 'vertebrobasilar artery
43		
44		insufficiency':ab,ti OR 'vertebrobasilar disease':ab,ti OR
45		
46		'vertebrobasilar isch*':ab,ti OR 'vertebrobasilar
47		
48		syndrome':ab,ti
49		
50		
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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	129,871

	Fear of Falling Measure':ab,ti OR 'SAFFE':ab,ti OR 'UICFFM':ab,ti OR 'Activities Specific Balance 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

#	ing (✓ or not)	Author	Year	uring study design	research period
NO. 1	✓	Zhang Qin	2020	Self-made (cross-sectional)	May 2017-J
NO. 10	✓	Li Ying	2014	Self-made (case-control)	March 2013
NO. 14	✓	Yadav, T.	2020	TUG, FM, Fcase-control	23 August-
NO. 25	✓	Amanda La	2018	The single-ipropective	between 1 (
NO. 36	✓	Schinkel-Iv	2016	The single-icase-control	October 20
NO. 39	✓	Goh, H. T.	2016	FAC, FM, Bcase-control	NR
NO. 74	✓	Beliz Belge	2006	The single-icross-sectional	NR
NO. 93	✓	Netha Hussain	2021	NIHSS, MoC	This prospebetween 1 (

Country	Sample of experience of co	Age, years (N, %)	Female (N, %)	
China	221 the Medical NR	NR	NR	60.13±8.72 88(39.82)
China	170 the Medical	67	103 Patients in	73.0±8.4 76(44.70)
India	82 Data were c	59	23 community	51.6 ± 12.1 22(26.8)
Sweden	462 the stroke u	237	225 similar parti	74.8 ± 12 226(48.9)
Canada	208 Data from ii	84	124 similar parti	FOF: 68.6 ±11.6 (61.9) No FOF: 65.3±13.6 43 (34.7)
china	125 Seventy-fiv	75	50	66.6±6.9 26 (35)
Sweden	50 NR NR	NR	NR	59.9±11.9 19 (38)
Sweden	279 In FallsGO	117	162 similar parti	75.83 ± 11.17 FOF:71 (60.7) FOF:78.05 ± 11.13 No FOF: 72 (44.4) 74.22 ±

Stroke referen	ed risk f	OR	OR_LL	OR_UL	Quality evaluation of SelectionmparabilOutcome		
first-onset s	1.Age;	1.355	1.057	1.737			
	2.Marital str	0.617 (OR	0.435	0.875			
	3. History o	2.058	1.165	3.635			
	4.Anxiety;	2.292	1.431	3.671			
	5.Depressic	1.802	1.217	2.669			
Medically d	1. Berg bal	0.697	0.609	0.799	4	2	3
	2. TUG mol	1.180	1.093	1.273			
	3.History of	2.728	1.082	6.878			
patients wit	1..Gender (3.254	0.826	12.822	4	2	2
	2.Fugl-Mey	1.136	1.002	1.287			
	3.Timed Up	1.006	0.904	1.119			
patients ag	1.Female	2.25	1.46	3.46	4	2	3
	2.SwePAS	9.41	5.13	17.25			
	3.SwePAS	2.29	1.36	3.83			
	4.SwePAS	1					
	5.Using a w	3.4	2.12	5.43			
	6.SGPALS	1					
in-patient s	1.Grasp rea	0.98	0.95	1.01			
	2.Assists	0.98	0.96	1.000			
	aged 60 ye: FAC≤4	9.75	1.98	48.04	3	2	2
	they had a :History of fa	5.6	1.3	23			
individuals	1.Age	1	0.97	1.02	3	2	3
			1.0	1.06			
	2.Female	1.84	0.9	3.8			
	3.falls	1.92	0.76	5.04			
	4.Use of wa	0.81	0.44	1.48			
	5.SwePAS						
	S score (postural control)-- Poor	2.6	1.26	5.36			
6.SwePAS	2.32	0.98	5.52				
7.SGPALS	2.04	1.01	4.12				

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#	Author	Year	Title	Include(yes	The cause of excluding
1	Zhang Qin	2020	Influencing	yes	
2	Song Na	2020	Influencing	no	Total quality evaluation score ≤ 3 p
3	Luo Li-Lei	2020	Research s	no	Review
4	Xu Yan-Hua	2019	Correlation	no	Irrelevant outcome indicators
5	Li Jing	2019	Study on th	no	Irrelevant research object
6	Sun Hong-Y	2017	Correlation	no	Irrelevant research object
7	Zhang Di	2016	Study on e	no	Irrelevant research object
8	DengNing	2016	A follow-up	no	Irrelevant outcome indicators
9	Cong Yan	2016	Risk Factor	no	Irrelevant research object
10	LiYing	2014	The current	yes	
11	Guan, Q.	2013	Factors infl	no	Irrelevant outcome indicators
12	HuBei	2009	Risk factors	no	Irrelevant
13	Li Ming-e	2008	Risk factors	no	Irrelevant research object
14	Yadav, T.	2020	Factors affe	yes	
15	Duran, A.	2020	Ptsd Sympt	no	Conference abstract
16	T. Aguiar, L.	2020	Perspective	no	Irrelevant research object
17	T. Tashiro,	2019	Life-Space	no	Irrelevant research object
18	H. Persson,	2019	Prediction c	no	Conference abstract
19	C. U. Liu, Tai-	2019	The reliabili	no	Irrelevant research object
20	Wa	2019	Participatio	no	Irrelevant outcome indicators
21	Hanna, E.	2018	Investigatio	no	Conference abstract
22	Sertel, M.	2018	Relationshi	no	Full text not found
23	Saygili, F.	2018	Perceived e	no	Conference abstract
24	Rafsten, Mansfield,	2018	stroke	no	Handbook
25	A. Larén, A.	2018	Fear of falli	yes	
26	Janssen,	2018	Participatio	no	Duplicate data
27	H. Chun, H.	2018	Fear of falli	no	Conference abstract
28	Y. Y. Chun, H.	2018	Fear of falli	no	Conference abstract
29	Y. Y. Van Dijk,	2017	A cross-sec	no	Irrelevant research object
30	M. M. Stout, R.	2017	Fear of falling for older	no	Full text not found
31	D. Oguz, S.	2017	The relator	no	Irrelevant outcome indicators
32	Ng, S.	2017	Fear of falli	no	Irrelevant research object
33	Larén, A.	2017	Fear of falli	no	Conference abstract
34	Goz, E.	2017	Relationshi	no	Conference abstract
35	Schinkel-	2016	Relationshi	yes	
36	Ivy, A.	2016	Fear of Fall	no	Irrelevant research object
37	Nct,	2016	The correla	no	Full text not found
38	Kavian, M.	2016	Falls and F	yes	
39	Goh, H. T.	2016	Falls and F	yes	

1				
2	40	Visschedijk, J. H. M. Schmid,	2015 Longitudinal	Irrelevant research object
3				
4	41	Arlene A. Schlick, C. Loureiro,	2015 Fear of Fall	Irrelevant outcome indicators
5				
6	42	Schlick, C. Loureiro,	2015 Falls and fe	Irrelevant outcome indicators
7				
8	43	A. P. C. Jones,	2015 Sedentary l	Conference abstract
9				
10	44	Valerie	2015 Fear of Fall	Conference abstract
11				
12	45	Guan, Q. de Melo	2015 Multifactor	yes
13				
14	46	Borges,	2015 Fear of falli	Irrelevant research object
15				
16	47	Sheila Cho, K.	2015 Risk factors	Irrelevant outcome indicators
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18	48	Yatar, G. Phadke,	2014 The relatio	Full text not found
19				
20	49	C. P.	2014 Relationshi	Conference abstract
21				
22	50	Park, J. Lane, R.	2014 Relationshi	Irrelevant outcome indicators
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24	51	A. Jalayondej	2014 Fear of Fall	Irrelevant outcome indicators
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26	52	a, C. Da Silva,	2014 Six-month	Irrelevant research object
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28	53	Carolyn P.	2014 Falling, Bal	Qualitative research
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30	54	Azad, A. Kneebone	2014 Clinical ass	Irrelevant
31				
32	55	, I. Vahlberg,	2013 Fear of falli	Conference abstract
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34	56	B. Perez-	2012 Factors rel	Conference abstract
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36	57	Jara,	2012 Differences	Irrelevant research object
37				
38	58	Javier Kim, E. J. Batchelor,	2012 Fear of falli	Irrelevant outcome indicators
39				
40	59	F. A. Schmid,	2012 Falls after s	Review
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42	60	A. A. Matsuda,	2011 Fear of falli	Irrelevant outcome indicators
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44	61	Patricia Noritake Akosile,	2011 Falls in mul	Irrelevant research object
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48	62	Christoph er	2011 Relationshi	Irrelevant outcome indicators
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52	63	Olusanjo Zapata,	2010 Fear of falli	Not English/Chinese
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55	64	Olmos Balash, Y. Schmid,	2010 Disorders o	Conference abstract
56				
57	65	Arlene A. Schmid,	2009 Consequen	Qualitative research
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59	66	A. A.	2009 Poststroke	Irrelevant outcome indicators
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1	McGrath,		
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3	67 Joanna	2008 Fear of falli	Irrelevant research object
4	Collicutt		
5	Batchelor,		
6	68 F.	2008 Fear of falli	Full text not found
7	Andersson		
8	69 , Å G.	2008 Fear of falli	Full text not found
9	Schmid,		
10	70 A. A.	2007 Fear of falli	Qualitative research
11	Morley,		
12	71 John E	2007 Falls--wher	Irrelevant research object
13	Chou, Kee-		
14	72 Lee	2007 The tempor	Irrelevant research object
15	73 Balash, Y.	2007 The effects	Irrelevant research object
16	74 Belgen, B.	2006 The associã	Irrelevant outcome indicators
17	Andresen,		
18	75 Elena M.	2006 Cross-Secti	Irrelevant outcome indicators
19	Watanabe		
20	76 , Y.	2005 Fear of falli	incomplete data
21	77 Rosén, E.	2005 Fear of falli	Irrelevant outcome indicators
22	78 Giladi, N.	2005 Clinical cha	Irrelevant research object
23	79 Stolze, H.	2004 Falls in freq	Irrelevant research object
24	Friedman,		
25	80 S. M.	2002 Falls and feno	Irrelevant research object
26			
27	81 Strubel, D.	2001 [Dementia ç	Not English/Chinese
28			
29	82 Karin	1999 Fear of falli	Irrelevant outcome indicators
30	Hellström		
31	83 Mahsa	2016 The Correlã	Not English/Chinese
32	Kaviani		
33	84 Hamid	2018 The Correlã	Irrelevant outcome indicators
34	Azadeh		
35	Thomas		
36	85 Hadjistavr	2011 The Relatio	Irrelevant research object
37	opoulos		
38	86 Mania Shei	2016 Fear of Fall	Irrelevant outcome indicators
39	87 Alison Schii	2015 Relationshi	Irrelevant outcome indicators
40	88 Zhou Min	2016 Current stai	Irrelevant outcome indicators
41	89 Chen Ping	2018 Study on th	Irrelevant research object
42	90 Deng Ning	2016 The status ;	Irrelevant outcome indicators
43	91 Shao Ping	2016 The relator	Irrelevant outcome indicators
44	Arlene A.		
45	92 Schmid	2009 Poststroke	Irrelevant outcome indicators
46	Netha		
47	93 Hussain	2021 Prediction c	
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Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	2
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	NO
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	3
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	3-4
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	4-5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	4
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	4-5
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	5
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	5



PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	5
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	19
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	7-9
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	7-9
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	10-13
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	10-13
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	10-13
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	10-13
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	14
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	17
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	17
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	19

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Risk Factors For Fear of Falling in Stroke Patients: A Systematic Review and Meta-Analysis

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Keywords: Risk factors; fear of falling; stroke; systematic review; meta-analysis

Word count: 4,096

Abstract

Objective: The current study aimed to identify risk factors for fear of falling (FoF) during in stroke patients. This study intends to improve the understanding of mechanisms of the high incidence of fall development.

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: 2731 records and 92 full texts articles were screened. 8 studies involving 1,597 participants were selected to analyze risk factors for stroke patients with FoF. The quality of all included studies was assessed and categorized as medium or high quality. Review Manager 5.3 was used to merge the *OR* value and 95% *CI* of the potential risk factors. Meta-regression was performed by Stata version 15. The primary risk factors for FoF in stroke patients were female (*OR*=2.13, 95% *CI*, 1.47 to 3.09.), impaired balance ability (*OR*= 5.03; 95%*CI*, 1.43 to 17.72.) and history of falls (*OR*= 2.33; 95%*CI*, 1.54 to 3.53.). The secondary factors were anxiety (*OR*=2.292; 95%*CI*, 1.431 to 3.671), depression (*OR*=1.802; 95%*CI*, 1.217 to 2.669), poor lower limb motor function (*OR*= 1.136; 95%*CI*, 1.002 to 1.287), 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 inter-study heterogeneity in estimated proportions was not attributed in the sampling error. The leave-one-out analysis showed that no single study significantly affected the overall final results.

Conclusion: This meta-analysis indicated that females, impaired balance ability and a history of falls in stroke patients might be at greater risk for FoF. Thus, it is necessary to guide the development of risk stratification tools as well as the selection of interventions.

Keywords: Risk factors; fear of falling; stroke; systematic review; meta-analysis

Strengths and limitations of this study:

- This study has been reported per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses reporting checklist.
- Analyses were undertaken considering the potential sources of known statistical

heterogeneity.

- Searches included published as well as the unpublished sources of literature to reduce the risk of omitting potentially eligible data.
- There was a paucity of available data to permit meta-analyses of risk factors for pain and functional impairment.
- The variability in methods of assessing risk and reporting the frequency of risk characteristics limited analyses

1 Introduction

Stroke is the second leading cause of death worldwide¹, which also creates 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 world⁴. As a result, there were 5.9 million people who died, whereas 102 million people of disability-adjusted life-years (DALYs) 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 control⁵, mental fatigue, depression, and impaired cognitive function^{2 6}, which could further contribute to stroke people falling. According to the World Health Organization⁷, 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.” Falls are a common complication after stroke, where both physical and mental injuries can cause falls⁸. Among those who survived a stroke, 22-48% have experienced at least one fall in the hospital⁸⁻¹⁰ or in the rehabilitation facility^{11 12}. In addition, compared with the age-matched control group, people who have experienced a stroke, are more likely to report fear of falling (FoF)¹¹.

Usually, a conscious FoF is advantageous for patient’s self-protection, but it usually generates high level of FoF psychology, which not only limit the patient’s active rehabilitation exercise behavior, reduce their mobility, flexibility, and independence, but also increases their anxiety and depression¹³. The FoF psychology eventually hinders the recovery of patient’s physical and mental functions, thereby

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4 increasing the risk of falling, and ultimately forming a vicious circle¹⁴.

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6 In clinical practice, strengthening the understanding of FoF risk factors in stroke
7 patients can provide useful insights for its mechanism as well as guide the clinical
8 practice. Many reports have mentioned that identifying the FoF status of stroke
9 patients and strengthening the comprehensive interventions in this field, can plausibly
10 help break the vicious circle, relieve anxiety¹⁵, promote community reintegration¹⁶,
11 and improve the quality of life¹⁷. Some previous studies have proposed the correlation
12 between many potential risk factors and FOF, intervention measures to reduce the
13 incidence of FOF during stroke, and risk factors for falls in stroke patients¹⁸.
14 However, these reports neither reflect targeted measures, nor include a systematic
15 review and meta-analysis of the risk factors for FoF in stroke patients¹⁹⁻²¹. Therefore,
16 we conducted this systematic review and meta-analysis to identify risk factors for FoF
17 in patients with stroke.
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29 **2 Methods**

30 **2.1 Search strategy**

31 We searched PubMed, Embase, Cochrane Library, Web of Science, CINAHL,
32 PsycINFO, Grey literature, and other databases (from inception to July 2021) for
33 studies that identified risk factors for FoF in patients with stroke.
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37 Our search strategy used medical subject heading (MeSH) and natural language
38 text words. The first author designed specific search strategies and peer-reviewed
39 electronic search strategies. The specific search strategy for each database is
40 mentioned in the appendix, however language limitations were not applied.
41 References from relevant papers or reviews were hand-searched for additional studies.
42 for missing relevant data of studies, we contacted the authors of the study via email.
43 All studies that were classified as FoF studies were then screened. On 20 July 2021,
44 another search was performed on the previously mentioned database to search the
45 articles published since the initial examination date (**Supplementary file 1**).
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55 **2.2 Inclusion and exclusion criteria**

56 The inclusion criteria:(1) Published case-control studies, retrospective cohort studies,
57 prospective cohort studies, cross-sectional study. (2) All participants 18 years and
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4 above and clinically diagnosed with either first stroke or recurrent stroke. (3) Studies
5 published in the English or Chinese language. (4) The adjusted OR (odds ratio)/ RR
6 (relative risk) value, 95% confidence intervals (CIs), or the OR value and 95% CI, or
7 the estimated value and standard error of the logistic regression coefficient are
8 convertible. (5) Reported risk factors of FoF in patients with stroke using validated
9 screening tools. (6) The data can be extracted, including the spreadsheet of the
10 pre-test in the study.
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13 The exclusion criteria: (1) Review papers, case reports, meeting abstracts,
14 qualitative studies: (2) Duplicate literature or research with the same data. (3)
15 Research of quality evaluation results is low.
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18 Endnote X9 software was used to remove duplicates as well as to facilitate the
19 screening process. All titles and abstracts were screened for the inclusion/exclusion
20 based on the eligibility criteria. Wherever, potentially eligible studies could not be
21 determined by the abstract alone, full texts were examined for further assessment
22 (Supplementary file 2).
23

24 **2.3 Data extraction and quality assessment**

25
26 The literature extraction was independently conducted based on the search, reviewed,
27 and selected according to predefined criteria. The data were collected from studies as
28 following: first author, year of publication, the geographical location, the
29 measured/collected tools to assess FoF, study type, research period, total sample size,
30 demographic data, and risk factors. The *OR/RR* or *95% CI* was directly extracted from
31 the included studies. All the information was recorded in especially standardized
32 forms. For the missing relevant data of studies, we contacted authors of the study via
33 email, however if the relevant data could not be obtained the study was excluded
34 (Supplementary file 3).
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37 The methodologic quality assessment of case-control studies, retrospective cohort
38 studies, and prospective cohort studies were assessed by the Newcastle Ottawa Scale
39 (NOS)²², for the study population (4 items), comparability (1 item), and outcome
40 evaluation (3 items). The scale's total score was kept as 9 points, where 0 to 3 were
41 divided into low-quality research, 4 to 6 were divided into medium quality research,
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4 and 7-9 were divided into high-quality research. In addition, the risk of bias of
5 cross-sectional study was assessed using the instrument Agency for Research and
6 Health Quality (AHRQ)²³. The tool had total of 11 items as follows: If the answer to
7 an object was “No” or “UNCLEAR,” the item’s score was “0”; if the answer was
8 “Yes,” the item scores “1”, with a total score of 0-11 Points, 0-3 points=low quality,
9 4-7 points=medium quality, 8-11 points=high quality²⁴. The process of study
10 selection, data extraction, and quality assessment were all conducted in duplicate (Q
11 Xie and JH Pei) with third-party adjudication (XM Dou) for disagreements.
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19 **2.4 Statistical analysis**

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21 Meta-regression was performed by Stata version.15, whereas all other statistical
22 analyses were conducted with the RevMan 5.3 software. Inter-studies heterogeneity
23 were tested using Cochrane’s Q statistic, and the degree of heterogeneity was assessed
24 using the I^2 statistics, where the I^2 values of 25%, 50%, and 75% indicated low,
25 moderate, and high heterogeneity, respectively. 95% *CI* for FoF was calculated using
26 a fixed-effects model, however a random-effects model was used whenever
27 Cochrane’s Q-statistic detected significant heterogeneity. The findings were
28 illustrated in the form of forest plots. To assess the risk factors of FoF, the odds ratios
29 (ORs) and associated 95% *CI* were extracted from included studies, and then RevMan
30 5.3 software was used to merge the *OR* value. Publication bias was identified by using
31 funnel plot²⁵. In stratified meta-analyses, the literature data were divided into
32 subgroups according to the degree of the SwePASS score. Sensitivity analyses were
33 performed using the leave-one-out method. Meta-regression was performed to assess
34 the effect of adjustment for the key co-variates of the year of publication, sample size,
35 and the number of female. A p-value of ($p < 0.05$) was the threshold for statistical
36 significance.
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52 **2.5 Patient and public involvement**

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54 No patient was involved in the study.
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56 **3 RESULTS**

57 **3.1 Literature Selection**

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59 Initially, a total of 2731 records were searched from the six databases and other
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4 resources (**Figure. 1**). After exclusion of duplicates, remaining 1646 records were
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6 screened. After analyzing the title and abstract, ultimately 92 publications were
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8 selected for the full-text assessment. Finally, eight full text studies with 1,597
9
10 participants were found eligible and therefore included in this meta-analysis.

11 **3.2 Study Characteristics and Methodologic Quality**

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13 The included 8 studies were conducted in 3 regions i.e., Asia (n = 4), North America
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15 (n = 1), and Europe (n = 3). Among these eight studies, 2 were cross-sectional, 4 were
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17 case-control, and 2 were prospective cohort studies. A summary of literature
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19 characteristics used in the analysis is shown in **Table 1**.

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21 The NOS assessed the quality of the case-control studies and prospective cohort
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23 study, and the number of NOS scores ranged from 7 to 9.
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Table. 1 Characteristic of the included studies

Author, year ^a , country	Study design	Sample size (N)	Age, years(Mean ±SD)	Female N (%)	Outcome Ascertainment	Research period	Stroke reference period	Adjusted risk factors ^b	NOS ^{c/} AHRQ ^d scores
Zhang Qin. et al. ²⁶ ,2020, china	Cross-sectional study	221	60.13±8.72 ^b	88 (39.8) ^b	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. ²⁷ ,2014, China	Case-control study	170	73.54 ^c Male: 73.0±8.4 Female: 74.2±7.6	76 (44.70) ^b	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 6 meters	9
Yadav, T. et al. ²⁸ ,2020, India	Case-control study	82	51.6 ± 12.13 ^b	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. ²⁹ , 2018, Sweden	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

1 2 3 4 5 6 7 8 9	Schinkel-Ivy, A. et al. ³⁰ .2016, Canada	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	8
10 11 12 13 14	Goh, H. T. et al. ³¹ .2016, China	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
15 16 17 18 19	Beliz Belgen. et al. ³² .2006, Sweden	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
20 21 22 23 24 25 26 27 28 29 30 31	Netha Hussain. et al. ³³ .2021 Sweden	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 participants in the Falls GOT cohort 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

(a) Year of publication of the study. (b) data as reported by the authors. (c) the Newcastle-Ottawa Scale. (d) the instrument Agency for Research and Health Quality. NR: Not reported; FoF: fear of falling; ADL: The modified Barthel Index; SAS: The Self-rating Anxiety Scale; SDS: The Self-rating Depression Scale; SFES-I: Short Falls Efficacy Scale International; BBS: The Berg Balance Scale; MMSE: The mini-mental state examination; MFES: The Modified Fall Efficacy Scale; FES-S: Falls Efficacy Scale–Swedish Version; TUGT: The Timed Up and Go test; PHQ-9: Patient Health Questionnaire–9; FM/FMA: The Fugl-Meyer Scale; The SwePASS: the Swedish modified version of the Postural Assessment Scale for Stroke (PASS); SGPALS: the Saltin-Grimby Physical Activity Level Scale; NIHSS: The National Institutes of Health Stroke Scale ;ABC: The Activities-Specific Balance Confidence Scale; FAC: The Functional Ambulation Category; MoCA: The Montreal Cognitive Assessment; FES-I: Fall Efficacy Scale International; FSS: The Fatigue

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Severity Scale; CES-D Scale: Center for Epidemiologic Studies Depression Scale; SSRS: Social Support Rating Scale; S-AI: State Anxiety Inventory ; T-AI: Trait Anxiety Inventory; SIS: Stroke Impact Scale; STS: the timed sit-to-stand (STS) test.

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5 and the studies quality level was high. For example, in the 2 cross-sectional studies,
6 the AHRQ score ranged from 4 to 6 points, however the literature quality level was
7 medium. This indicates that the quality of the literature included in this study was
8 relatively high.
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12 **4 Results of the meta-analysis**

13 **4.1 General factors**

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16 Three of the 8 studies mentioned general factors as risk factors for FoF, whereas the
17 two reported predictors were age and female. However, due to the limited number of
18 studies, the ability to assess the publication bias by the funnel plot was unsuccessful²⁵.
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22 **4.1.1 Age**

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24 Two studies reported the relationship between females and the fear of falling in stroke
25 patients (2 studies, 500 participants). As the results showed large heterogeneity
26 ($P=0.81$, $I^2=82\%$), the random effects model was used for analysis. However, in
27 meta-analysis using a random-effects model, no significant differences were observed
28 for the age of FoF. ($OR=1.13$, $95\%CI$, 0.85 to 1.52, $P=0.40$, $I^2=82\%$; **Figure. 2a**).
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33 **4.1.2 Female**

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35 Two studies reported the correlation between the females and the fear of falling in
36 stroke patients (2 studies, 741 participants). The analysis revealed the risk of FoF in
37 the women with stroke was 2.13 times higher than men. ($OR= 2.13$, $95\%CI$, 1.47 to
38 3.09, $P<0.0001$, $I^2=0\%$; **Figure. 2b**).
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43 **4.2 Physical factors**

44 **4.2.1 Balance ability**

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46 Three studies mentioned balance ability as an independent risk factor^{27 29 34} (911
47 participants) for FoF. The meta-analysis of these three studies on the risk factors of
48 FOF, revealed large heterogeneity ($P=0.03$, $I^2=97\%$), therefore a random effect model
49 was used for the analysis. There were no statistical significance difference was
50 observed between the risk of FoF in a good balance and a poor balance. ($OR= 2.53$;
51 $95\%CI$, 0.45 to 14.26; $P=0.29$, $I^2 = 97\%$; **Supplementary file 4**). The sensitivity
52 analysis was used for detecting clinical heterogeneity from varying tools to define its
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4 incidence. Li Ying et al., (2014)²⁷ measured balance with the Berg Balance Scale
5 (BBS), whereas Amanda Larén et al., (2009)²⁹ and Netha Hussain et al., (2021)³³
6 defined it by using the SwePASS score (postural control). The subgroup analysis of
7 the SwePASS score shows that the risk of FoF in the lower balance ability was
8 2.30-5.03 times then higher balance ability (SwePASS score 25-30: $OR= 2.30$;
9 $95\%CI$, 1.47 to 3.58; $I^2 = 0\%$; SwePASS score <24: $OR= 5.03$; $95\%CI$, 1.43 to 17.72;
10 $I^2 = 86\%$; **Figure. 3a**). An obvious asymmetry was observed in the funnel plot
11 (**Supplementary file 5**), demonstrating a risk of publication bias.

12 13 14 15 16 17 18 19 **4.2.1 Mobility**

20
21 Meta-analysis of the 3 studies on the risk factors of FoF (377 participants) revealed a
22 large heterogeneity between the studies ($P=0.0003$, $I^2=84\%$). Therefore, the
23 random-effects model was used, which demonstrated no significantly difference
24 incidence of FoF in lower mobility and higher mobility. ($OR=1.14$; $95\%CI$, 0.91 to
25 1.42; $I^2 = 84\%$; **Figure. 3b**). An obvious asymmetry was observed in the funnel plot
26 (**Supplementary file 6**), demonstrating have publication bias risk. We further
27 explored covariates affecting the heterogeneity of ORs among the included studies.
28 Univariate meta-regression analysis identified year of publication [coefficient =
29 -0.0266 ($95\% CI$: -0.0484521 , -0.004748), $p= 0.017$], sample size [coefficient =
30 0.0017837 ($95\% CI$: 0.0002939 , 0.0032735), $p= 0.019$] and percentage of female
31 [coefficient = 0.0027886 ($95\% CI$: 0.0003634 , 0.0052138), $p= 0.024$] as a significant
32 source of heterogeneity. However, due to the limited number of studies, it was
33 impractical to eliminate the sources of heterogeneity and adjust covariates, therefore
34 multivariate meta-regression could not be performed. Due to the relatively large
35 sample size of this meta-analysis, the sensitivity analysis (leave-one-out method)
36 showed no clinical heterogeneity.

37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 **4.3 History of falls**

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53 Experience of falls were listed as an independent risk factor for FoF in 4 studies^{26 27 32}
54 ³³ (720 participants). A fixed-effects model analysis revealed that the risk of FoF in
55 stroke patients with a history of falls was 2.33 times higher than no falls ($OR= 2.33$;
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4 95%CI, 1.54 to 3.53; $I^2 = 0\%$; **Figure. 4**). Furthermore, Yuriko Watanabe et al., (2005)
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6 ³⁵reported that for stroke patients, 87.9% of those who have experienced a fall would
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8 have a fear of falling. An apparent symmetry was observed in the funnel plot
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10 (**Supplementary file 7**), demonstrating no publication bias risk.

11 12 **4.4 Use of walking aid**

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14 Two studies listed influencing factor between the walking aid for stroke patients and
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16 FoF^{29 33} (741 participants). Amanda Larén et al., (2009)²⁹ reported valuable insight for
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18 those involved in the stroke rehabilitation during the acute phase after stroke. FoF was
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20 associated with the use of a walking aid. Whereas Netha Hussain et al., (2021)³³
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22 using the multivariable regression model, showed that the walking support for FoF
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24 was not statistically significant. Due to the considerable heterogeneity ($I^2 = 93\%$), the
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26 random effects model was used for the meta-analysis. The results further confirmed
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28 that stroke patients who used a walker and those who did not use a walker did not
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30 have any statistical significance ($OR= 1.68$; 95% CI, 0.41 to 6.86; **Figure. 5**).

31 32 **4.5 Other risk factors**

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34 Zhang Qin et al., (2020)²⁶ (221 participants) reported that anxiety, depression, and
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36 marital status were some of the risk factors for FoF. The marital status was a
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38 protective factor for the patients with a FoF. In addition, Arlene. A et al., (2011)³⁶
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40 reported that higher anxiety and depression scores were closely related to FoF but
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42 cannot be meta-analyzed with other related studies. Yadav, T, et al.,²⁸ (82
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44 participants) identified poor lower limb motor function as a risk factor for FoF. The
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46 logistic regression results suggested that the lower extremity Fugl-Meyer scale was
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48 associated with FoF with an OR of 1.136, indicating every 1 unit increase in lower
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50 extremity Fugl-Meyer score had 1.36 times chance of a person belonging to no FoF
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52 group. However, with every change of lower extremity Fugl-Meyer score by 2 units =
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54 $e^{2*0.127}$, there were 1.29 times chance for a person to belong in the no FoF group.
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56 Thus, indicating that improving the lower extremity motor function can reduce the
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58 chances of belonging to no FoF. Furthermore, Netha Hussain et al., (2021)³³ showed
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60 that the previous physical activity to the stroke event, and the physically inactiveness

may be an independent risk factor of FoF. Yet, Amanda Larén et al., (2009)²⁹ was not in-concurrence with these findings. Schinkel-Ivy, A, et al.³⁰ (208 participants) reported that FoF was positively correlated to the walking velocity in individuals with stroke. There were few studies demonstrating the relationship between gait and FoF. This research used a 4.6-meter-long pressure pad system (Gaitrite, CIR Systems, Clifton, NJ) to measure gait, where walking velocity and double support time were used as an outcome indicator³⁷. However, all the above-mentioned risk factors did not have enough data for conducting the meta-analysis. (Data of other risk factors can be found in **Table 2.**)

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

Risk factors	OR or RR	LL-95%CI	UL-95%CI	p-value
Anxiety ²⁶	2.292	1.431	3.671	< 0.001
Depression ²⁶	1.802	1.217	2.669	0.003
Marital status ²⁶	0.617	0.435	0.875	0.006
Lower limb motor function ²⁸	1.136	1.002	1.287	0.047
SGPALS score---Physically inactive ³³	2.04	1.01	4.12	0.048
Reactive stepping ³⁰				
Grasp reactions	0.98	0.95	1.01	0.23
Assists	0.98	0.96	1.00	0.086

OR: odds ratio; RR: relative risk; LL: lower limit; UL: upper limit

5 Discussion

This study included observational studies with 1,597 stroke participants. Out of the 8 studies, 2 were cross-sectional studies, 4 were case-control studies, and 2 were prospective cohort studies with a wide range of patient characteristics. Further, the reliability of the results was confirmed by the sensitivity analysis. This meta-analysis revealed that female, impaired balance ability and the experience of falling were strongly associated with FoF among the stroke individuals. Pooled results of these 8 studies and another meta-analysis on fall risk factors in community stroke survivors¹⁸

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4 were consistent for reduced balance (*OR* 3.87)¹⁸, depression (*OR* 2.11)¹⁸ and history
5 of falls association with the falls and FoF. Furthermore, this study showed the history
6 of fall lead to a higher risk of FoF in stroke patients (*OR* 2.22) compared to the falls
7 (*OR* 1.67)¹⁸. Similarly, reduced balance was more likely to contribute to the FoF. The
8 present study's findings highlighted that having a history of falls, either in home,
9 community, or hospital setting, have a higher risk of recurrent falling in the stroke
10 group (*OR* 4.19) than in older community. In addition, in-concurrence with another
11 systematic review study about the risk factors of FOF in the elderly³⁸, our analysis
12 also revealed that the problems of fall history and gait were related to FoF. Further,
13 our study highlighted that having a history of falls indicates that the risk of falling fear
14 in the stroke group (*OR* 4.19) was higher than that of the elderly (*OR* 0.21).

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25 The relationship between balance ability and FoF was further analyzed. For
26 example, Semra Oguz et al.³⁹ found a strong negative correlation between objective
27 balance (measured by BBS scores) and FES scores ($r = -0.808$), however there was a
28 strong positive correlation between perceived sense of balance (PSB) and FES score
29 ($r = 0.714$). Further, the balance ability and mobility analysis results of the present
30 study were in-concurrence with the study of Kihun Cho et al.⁴⁰, who showed that the
31 FoF and they were moderately correlated (respectively, $r = 0.669$; $r=0.545$). Other
32 studies such as Christopher et al.⁴¹ showed a negative correlation between physical
33 function and falls efficacy ($r=-0.66$), whereas Eun Joo Kim et al.¹⁷ revealed that the
34 physical factors including the functional ambulation category, the strength of hip
35 abductor, knee extensor, and ankle plantar flexor had moderately negative correlation
36 with FoF (respectively $r=-0.673$; $r=-0.534$; $r=-0.478$; $r=-0.501$). Of note, the above
37 results are contrary, which can be a result of different statistical analyses and research
38 focuses used in these studies. Further, gait speed was related to the ability to maintain
39 balance, where gait disorders were limiting the independent life of stroke patients⁴².
40 Especially, due to reduced weight transfer capacity and stability, many stroke
41 survivors might find it difficult to maintain their balance⁴². A previous study showed
42 that the stroke patient's gait patterns were slow and required excessive exertion,
43 however these patient's legs were not well coordinated. Thus, increased foot support
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4 time and decreased gait speed in these patients with balance disorders were the risk of
5 falls and increased anxiety⁴³. Combined with clinical analysis, stroke mainly occurs in
6 the 60 to 70 years old, where the decline of body function inevitably leads to the FoF.
7 Impaired balance can easily cause patient's to fall, and thus cause the patient to be
8 aware with the surrounding environment and safety of their activities, which
9 eventually increases the patient's psychological tension, worry, and fear of falling⁴⁴.
10 Therefore, it is important to explore the relationship between FoF with body function
11 in clinical practice by using large-scale prospective studies.
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19 In addition to the factors mentioned in the various studies, elements such as
20 post-stroke psychological factors, long-term sitting, and quality of life research have
21 been studied for the relationship with the FoF. Anxiety & depression ($r=0.400$),
22 energy, mobility, self-care and upper extremity function of quality of life (pearson
23 correlation coefficients were $r=-0.476$; $r=-0.615$; $r=-0.617$; $r=-0.507$)¹⁷ were
24 correlated with FoF. There was a significant, moderate and positive correlation was
25 seen between FES-I and sitting time ($r=0.579$)⁴⁵. The study done on differences in
26 gait and balance measures in patients with chronic stroke with the different levels of
27 attention related to fall, showed that patient's with chronic strokes and slight concern
28 about falling have better gait and balance capabilities than patients with high levels of
29 concern⁴⁶. Therefore, these results are potentially clinically relevant and would be
30 useful to study if reducing FoF can improve gait, quality of life, physical function, and
31 balance performance in these patients. Further, it would also be useful to have the
32 measurement of FoF as the assessment of psychological factors, quality of life, and
33 physical function in these patients. Although, stroke itself is not a direct factor for
34 causing the FoF, yet as a long-term chronic diseases, it indicates that the patient's
35 body functions are further declining. Importantly, the treatment of long-term chronic
36 diseases further decrease or lose patients self-efficacy and self-confidence in
37 behavioral activities, which eventually leads to FoF. The decreases in self-esteem can
38 directly cause depression, anxiety, and limited self-care ability and affects FoF.
39 Additionally, in the recovery stage of the first stroke, the walking function is the main
40 factor for affecting the occurrence of falls. Since most stroke patients have limb
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4 dysfunction, the need to assist in walking during the initial stage of recovery or within
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6 a certain period increases the risk of falls.

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8 Furthermore, there is a particular aspect regarding the causal relationship between
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10 falling and fear of falling. Some studies have confirmed that FoF is an essential
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12 predictor of falls in the stroke patients⁴⁷⁻⁴⁹, however several other studies have
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14 suggested that people who have experienced a fall were more likely to have FoF⁵⁰⁻⁵¹.
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16 A recent study has confirmed that the history of falls in the recent time was a good
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18 predictor for the FoF, but the fear of falling is a predictor of falls during follow-up
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20 only in the unadjusted model⁵². In the current study, differences were observed among
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22 the included studies in terms of evaluation for the fall history. The fall history was
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24 defined as whether a fall was occurred in the past 6 months, within the past 1 year, or
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26 within 6 meters of walking. Of note, during these different periods, the probability of
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28 falling in stroke patients was different, which affects the likelihood of occurrence of
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30 FoF⁵³.

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32 Considering the global prevalence of stroke-related falls or FoF, this study provided
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34 evidence for the development of appropriate preventable measures for decreasing the
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36 FoF risk in stroke patients. The risk factors of FoF for stroke patients in Asia included
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38 marital status, social support status, and payment methods for medical insurance⁵⁴;
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40 However, current guidelines for stroke management provides no specific
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42 recommendations for the psychological monitoring or the fear of falling
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44 management⁵⁵. Therefore, it is vital to identify high-risk patients as well as to provide
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46 them targeted interventions. However, more studies are required for developing the
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48 effective evaluation methods and treatment strategies against FoF among stroke
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50 patients to improve their physical function, mental health, and quality of life.

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52 This meta-analysis had several important findings. First, most of the included
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54 studies were of relatively high quality, with the robust evidence. Second, under the
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56 premise of large sample size, the risk factors of falling fear in stroke patients were
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58 ensured by quantitative analysis. Hence, our findings may be more convincing
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60 compared to the individual studies. Finally, the research data included in this study

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4 was adjusted, and the results of data analysis was not affected by the patient's baseline
5 characteristics.
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8 Despite the above important findings, this study had some limitations. (1) Two of
9 the included reports were cross-sectional studies, and thus the ability to hypothesize
10 etiology was poor. (2) Potential predictors of evident inter-study heterogeneity
11 included measurement tools for outcome indicators, methodological differences,
12 cultural background, and ethnicity. However, due to the limited number of studies,
13 multivariate meta-analysis could not be performed to assess the robustness of our
14 findings and analyzing the effect size of multiple risk factors at the same time⁵⁶. (3)
15 The effects of the patient's age, inner anxiety, and depression, as well as the motor
16 function of the lower limbs on the risk of falling fear in stroke patients, have been
17 reported in fewer studies, therefore the conclusions may vary for individual studies.
18 Likewise, since there were relatively few published articles, the funnel chart was
19 asymmetric, citing the probable publication bias, thus multivariate regression couldn't
20 be performed²⁵. (4) This meta-analysis only included English and Chinese studies,
21 thus it probably missed the relevant studies in other languages, which leads to biases
22 in estimates in Western countries. However, there are currently no evidence
23 suggesting that the meta-analysis of language limitations can lead to such bias^{57 58}. In
24 the end, the analysis was based on the overall research level and not on the personal
25 data.
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42 **6 Conclusion**

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44 The study systematically analyzed risk factors of FoF in stroke patients related to the
45 history of falls, general aspects related to age and gender, physical characteristics
46 related to lower limb motor function, balance ability, & mobility; psychological
47 factors related to anxiety and depression. The results showed that the female patients,
48 impaired balance ability and history of falls might be associated with FoF in stroke
49 patients, as evidence were mostly consistent and effect sizes were largest for the FoF.
50 The aggregate analysis of these risk factors would help screen and distinguish patients
51 the risk of FoF, thereby helping to prevent and optimize timely interventions.
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Overall, the review highlights can be utilized for interventions targeting female

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4 patients, impaired balance ability and history of falls, especially intervening in
5 impaired balance ability and determining their effectiveness. Moreover, the results of
6 this review may guide the development of risk stratification tools, the selection of
7 preventive interventions and for providing basis for clinical practice.
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11 **Footnotes:**

12 **Supplementary file**

- 13 1. The search strategy of the database.
- 14 2. Literature Selection.
- 15 3. Data extraction.
- 16 4. Forest plot—Balance ability
- 17 5. Funnel plot—Balance ability
- 18 6. Funnel plot—Mobility
- 19 7. Funnel plot—History of falls

20 **Contributorship statement:**

21 Qi Xie and Ju-Hong Pei contributed equally to this work

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23 Analysis and interpretation of data: Qi Xie, Ju-Hong Pei, Ya-Bin Zhang, Ling Gou.

24 Drafting of the manuscript: Qi Xie, Ju-Hong Pei, Juan-Ping Zhong, Xin-Man Dou.

25 Critical revision of the manuscript: Yu-Jie Su, Xin-Man Dou, Ling Gou, Xing-Lei
26 Wang, Hui Yan.

27 Approval of the final version for publication: All the authors.

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35 (2019SHFZ2019).
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Patient consent for publication: Not applicable.

Ethics and dissemination: Not applicable.

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Figure legend/caption

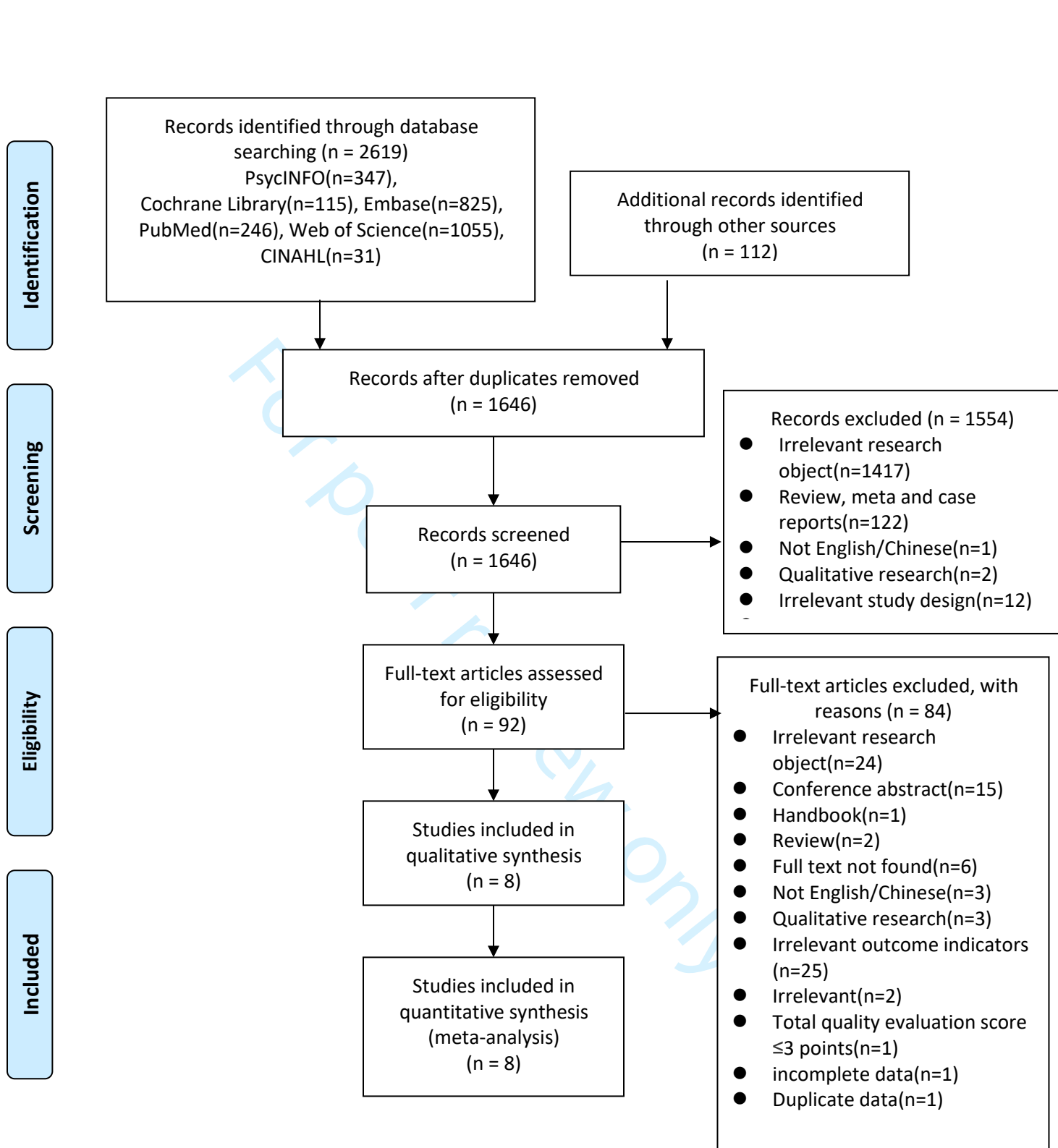
Figure. 1 Flow diagram of study selection in the meta-analysis

Figure. 2 Meta-analyses for general risk factors for 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.

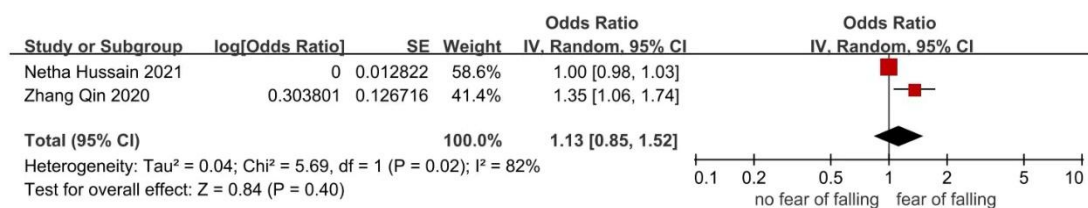
Figure. 3 Meta-analyses for physical risk factors for fear of falling:(a) balance ability, (b) mobility.

Figure. 4 Meta-analyses for history of falls for fear of falling.

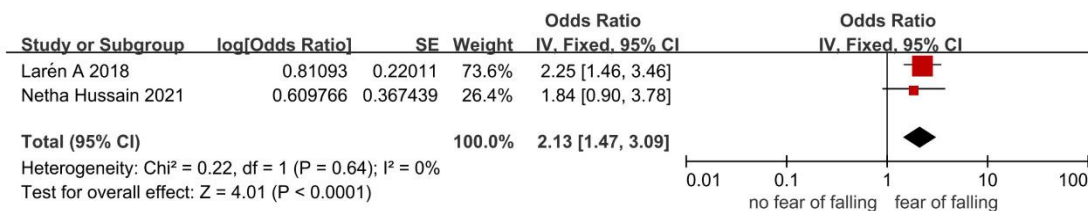
Figure. 5 Meta-analyses for using walking aid for fear of falling.



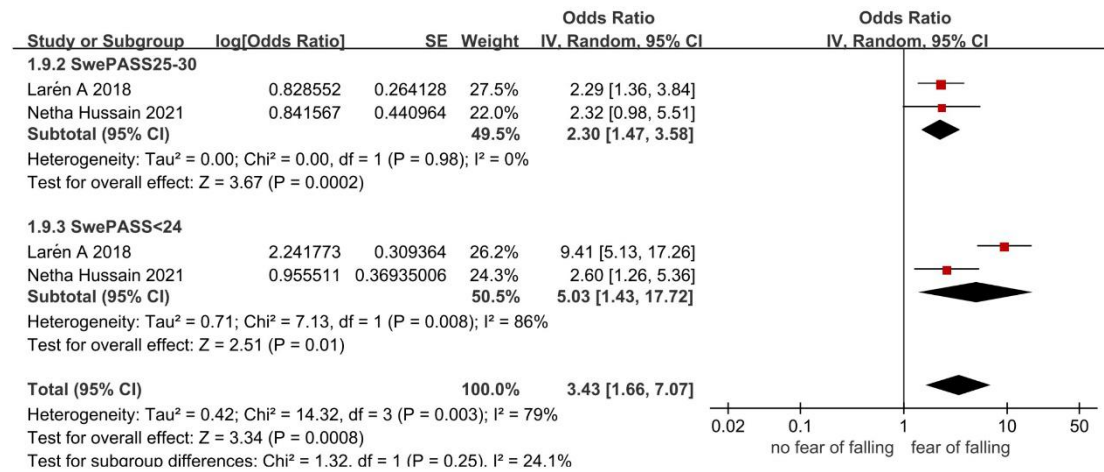
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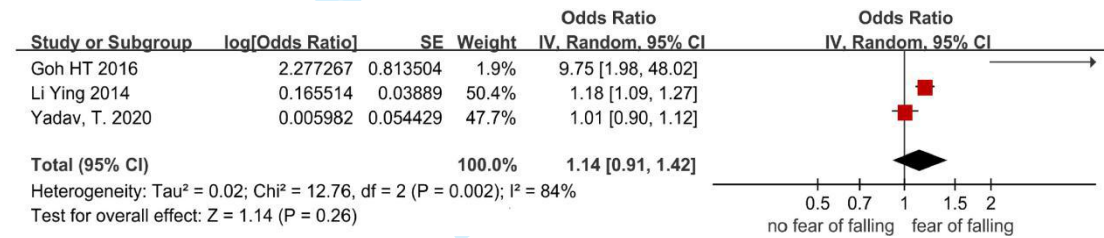
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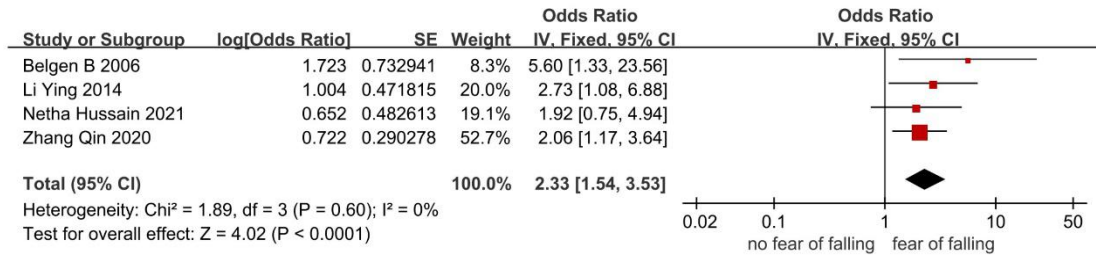


3a



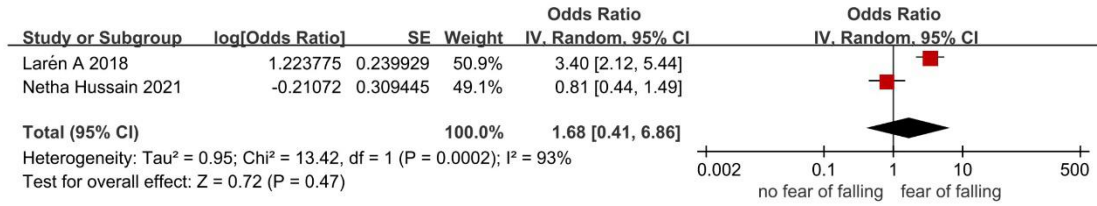
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For peer review only

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4 **Pubmed: from inception to July 20, 2021**
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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

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3				
4	Infarction"[Title/Abstract]	OR	"Hemorrhagic	
5				
6	Stroke"[Title/Abstract]	OR	"Ischemic Stroke"[Title/Abstract]	OR
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8				
9	"Embolic Stroke"[Title/Abstract]	OR	"Thrombotic	
10				
11	Stroke"[Title/Abstract]	OR	"Cardiovascular	
12				
13	Diseases"[Title/Abstract]	OR	"Vascular Diseases"[Title/Abstract]	
14				
15				
16	OR "Carotid Artery Disease*"[Title/Abstract]	OR	"Carotid Artery	
17				
18	Disorder*"[Title/Abstract]	OR	"Carotid Arterial	
19				
20	Disease*"[Title/Abstract]		OR"Carotid	
21				
22	Atheroscleros*"[Title/Abstract]	OR	"Carotid Atherosclerotic	
23				
24	Disease*"[Title/Abstract]	OR	"Internal Carotid Artery	
25				
26	Diseases"[Title/Abstract]	OR	Common Carotid Artery	
27				
28	Diseases[Title/Abstract]	OR	External Carotid Artery	
29				
30	Diseases[Title/Abstract]	OR	External Carotid Arterial	
31				
32	Diseases[Title/Abstract]	OR	"Carotid Artery	
33				
34	Thrombosis"[Title/Abstract]	OR	"Cerebrovascular	
35				
36	Disorder*"[Title/Abstract]	OR	"Intracranial Vascular	
37				
38	Disease*"[Title/Abstract]	OR	"Intracranial Vascular	
39				
40	Disorder*"[Title/Abstract]	OR	"Cerebrovascular	
41				
42	Disease*"[Title/Abstract]	OR	"Brain Vascular	
43				
44	Disorder*"[Title/Abstract]	OR	"Cerebrovascular	
45				
46	Occlusion*"[Title/Abstract]	OR	"Cerebrovascular	
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48	Insufficienc*"[Title/Abstract]	OR	"Basal Ganglia Vascular	
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1	Disease*[Title/Abstract]	OR	"Lenticulostriate
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3	Vasculopath*[Title/Abstract]	OR	Lenticulostriate
4			Vascular
5	Disease*[Title/Abstract]	OR	Vascular
6			Lenticulostriate
7	Diseases[Title/Abstract]	OR	"Basal
8			Ganglia
9	Hemorrhage"[Title/Abstract]	OR	"Putaminal
10			
11	Hemorrhage"[Title/Abstract]	OR	"Cerebral
12			
13	Infarct*[Title/Abstract]	OR	"Left Hemisphere
14			Cerebral
15	Infarction"[Title/Abstract]	OR	"Subcortical
16			
17	Infarction*[Title/Abstract]	OR	"Posterior Choroidal Artery
18			
19	Infarction"[Title/Abstract]	OR	"Anterior Choroidal Artery
20			
21	Infarction"[Title/Abstract]	OR	"Right Hemisphere
22			Cerebral
23	Infarction"[Title/Abstract]	OR	"CADASIL"[Title/Abstract]
24			OR
25	"Multi-Infarct Dementia"[Title/Abstract]	OR	"Anterior Cerebral
26			Artery
27	Infarction"[Title/Abstract]	OR	"Middle Cerebral Artery
28			
29	Infarction"[Title/Abstract]	OR	"Posterior Cerebral Artery
30			
31	Infarction"[Title/Abstract]	OR	"Brain Ischemia*[Title/Abstract]
32			
33	OR "Ischemic Encephalopath*[Title/Abstract]	OR	"Cerebral
34			
35	Ischemia*[Title/Abstract]	OR	"Brain
36			
37	Hypoxia-Ischemia"[Title/Abstract]	OR	"Cerebral Small Vessel
38			
39	Disease*[Title/Abstract]	OR	"Cerebral
40			
41	Microangiopath*[Title/Abstract]	OR	"Intracranial Arterial
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43	Disease*[Title/Abstract]	OR	"Intracranial Arterial
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4	Disorder*"[Title/Abstract]	OR	"Arterial	Brain
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6	Disease*"[Title/Abstract]	OR	Brain	Arterial
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9	Disease*"[Title/Abstract]	OR	Arterial	Brain
10				
11				
12	Disorder*"[Title/Abstract]	OR	"Intracranial	
13				
14	Hemorrhage*"[Title/Abstract]	OR	"Posterior	Fossa
15				
16				
17	Hemorrhage*"[Title/Abstract]	OR	"Brain	
18				
19	Hemorrhage*"[Title/Abstract]	OR	"Cerebral	
20				
21				
22	Hemorrhage"[Title/Abstract]	OR	"Cerebral	Intraventricular
23				
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25	Hemorrhage"[Title/Abstract]	OR	"Hypertensive	Intracranial
26				
27	Hemorrhage"[Title/Abstract]	OR	"Cranial	Epidural
28				
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30	Hematoma"[Title/Abstract]	OR	"Subdural	
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32	Hematoma"[Title/Abstract]	OR	"Pituitary	
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35	Apoplexy"[Title/Abstract]	OR	"Subarachnoid	
36				
37				
38	Hemorrhage"[Title/Abstract]	OR	"Brain	
39				
40	Infarction*"[Title/Abstract]	OR	"Brain Infarct*"[Title/Abstract]	OR
41				
42				
43	"Anterior Circulation Brain Infarction"[Title/Abstract]	OR	"Brain	
44				
45	Venous Infarction*"[Title/Abstract]	OR	"Anterior Cerebral	
46				
47				
48	Circulation Infarction"[Title/Abstract]	OR	"Posterior Circulation	
49				
50	Brain Infarction"[Title/Abstract]	OR	"Lacunar	
51				
52				
53	Stroke*"[Title/Abstract]	OR	"Lacunar Syndrome*"[Title/Abstract]	
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55				
56	OR "Lacunar Infarction*"[Title/Abstract]	OR	"Lacunar	
57				
58	Infarct*"[Title/Abstract]	OR	"Intracranial	
59				
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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]
"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]
"Paraparesis*[Title/Abstract]	OR	"Muscular
Pares*[Title/Abstract]	OR	"Muscle Pares*[Title/Abstract]
"Monopares*[Title/Abstract]	OR	"Lower Extremity
Pares*[Title/Abstract]	OR	"Crural Pares*[Title/Abstract]
"Upper Extremity Pares*[Title/Abstract]	OR	"Brachial
Pares*[Title/Abstract]	OR	"Hemipares*[Title/Abstract]
"Spastic Paraparesis*[Title/Abstract]	OR	"Neurologic Gait
Disorder*[Title/Abstract]	OR	Neurologic Locomotion

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44	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]	
45 46 47	3 #1 OR #2	654,634
48 49 50 51 52	4 "Accidental Falls"[MeSH Terms] OR "Accidents"[MeSH Terms] OR "Accident Prevention"[MeSH Terms]	198,327
53 54 55 56 57 58 59 60	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 Atheroscleros* 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

	<p> 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 </p>	
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	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

	<p>Atheroscleros* 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</p>	
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4	Brain Arterial Disease*	OR Arterial Brain Disorder*
5		OR
6	Intracranial Hemorrhage*	OR Posterior Fossa Hemorrhage*
7		OR
8	Brain Hemorrhage*	OR Cerebral Hemorrhage
9		OR Cerebral
10		Intraventricular Hemorrhage
11		OR Hypertensive Intracranial
12		Hemorrhage
13		OR Cranial Epidural Hematoma
14		OR Subdural
15		Hematoma
16		OR Pituitary Apoplexy
17		OR Subarachnoid
18		Hemorrhage
19		OR Brain Infarction*
20		OR Brain Infarct*
21		OR Anterior
22		Circulation Brain Infarction
23		OR Brain Venous Infarction*
24		OR
25		Anterior Cerebral Circulation Infarction
26		OR Posterior
27		Circulation Brain Infarction
28		OR Lacunar Stroke*
29		OR Lacunar
30		Syndrome*
31		OR Lacunar Infarction*
32		OR Lacunar Infarct*
33		OR
34		Intracranial Vasospasm*
35		OR Intracranial Angiospasm*
36		OR
37		Intracranial Vascular Spasm*
38		OR Cerebral Vasospasm*
39		OR
40		Cerebrovascular Spasm*
41		OR Cerebral Angiospasm*
42		OR
43		Cerebral Artery Spasm*
44		OR Hemiplegia*
45		OR Transient
46		Hemiplegia*
47		OR Monoplegia*
48		OR Post-Ictal Hemiplegia*
49		OR
50		Crossed Hemiplegia*
51		OR Flaccid Hemiplegia*
52		OR Infantile
53		Hemiplegia*
54		OR Spastic Hemiplegia*
55		OR Pareses
56		OR
57		Paraparesis
58		OR Muscular Pares*
59		OR Muscle Pares*
60		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

	<p>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+")</p>	
2	<p>"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 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</p>	38,873

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4		"Cerebrovascular Occlusion*" OR "Cerebrovascular Insufficienc*"
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6		OR "Basal Ganglia Vascular Disease*" OR "Lenticulostriate
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8		Vasculopath*" OR "Lenticulostriate Vascular Disease*" OR
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10		"Vascular Lenticulostriate Diseases" OR "Basal Ganglia
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12		Hemorrhage" OR "Putaminal Hemorrhage" OR "Cerebral
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14		Infarct*" OR "Left Hemisphere Cerebral Infarction" OR
15		
16		"Subcortical Infarction*" OR "Posterior Choroidal Artery
17		
18		Infarction" OR "Anterior Choroidal Artery Infarction" OR "Right
19		
20		Hemisphere Cerebral Infarction" OR "CADASIL" OR
21		
22		"Multi-Infarct Dementia" OR "Anterior Cerebral Artery
23		
24		Infarction" OR "Middle Cerebral Artery Infarction" OR "Posterior
25		
26		Cerebral Artery Infarction" OR "Brain Ischemia*" OR "Ischemic
27		
28		Encephalopath*" OR "Cerebral Ischemia*" OR "Brain
29		
30		Hypoxia-Ischemia" OR "Cerebral Small Vessel Disease*" OR
31		
32		"Cerebral Microangiopath*" OR "Intracranial Arterial Disease*"
33		
34		OR "Intracranial Arterial Disorder*" OR "Arterial Brain Disease*"
35		
36		OR "Brain Arterial Disease*" OR "Arterial Brain Disorder*" OR
37		
38		"Intracranial Hemorrhage*" OR "Posterior Fossa Hemorrhage*"
39		
40		OR "Brain Hemorrhage*" OR "Cerebral Hemorrhage" OR
41		
42		"Cerebral Intraventricular Hemorrhage" OR "Hypertensive
43		
44		Intracranial Hemorrhage" OR "Cranial Epidural Hematoma" OR
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46		"Subdural Hematoma" OR "Pituitary Apoplexy" OR
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	<p>"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</p>	
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	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

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3
4 **PsycINFO (Ovid): from APA PsycInfo1806 to 1966; APA PsycInfo1987 to**
5
6
7 **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

43 **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

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60	'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	
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	<p>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</p>	
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 influence and the risk factors 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	Deng Ning	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	Li Ying	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	Hu Bei	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	

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3	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
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5				Perspectives, satisfaction, self-efficacy, and barriers to aerobic exercise reported by individuals with chronic stroke in a developing country		
6	16	Aguiar, L. T.	2020		no	Irrelevant research object
7						
8				Life-Space Mobility and Relevant Factors in Community-dwelling Individuals with Stroke in Japan: A Cross-sectional Study		
9	17	Tashiro, H.	2019		no	Irrelevant research object
10						
11				Prediction of physical activity level after mild stroke: A 6-month followup of 215 patients in the fall study of gothenburg (fallsgot)		
12	18	Persson, C. U.	2019		no	Conference abstract
13						
14				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]		
15	19	Liu, Tai-Wa	2019		no	Irrelevant research object
16						
17				Participation, Fear of Falling, and Upper Limb Impairment are Associated with High Sitting Time in People with Stroke		
18	20	Hanna, E.	2019		no	Irrelevant outcome indicators
19						
20				Investigation of the relationship between balance and fear of falling and movement in stroke patients		
21	21	Sertel, M.	2018		no	Conference abstract
22						
23	22	Saygili, F.	2018	Relationship between fear of falls, daily living activities, and trunk control in stroke patients	no	Full text not found
24						
25	23	Rafsten, L.	2018	Perceived and assessed balance in patients with stroke within 24 hours after discharge to home	no	Conference abstract
26						
27	24	Mansfield, A.	2018	stroke	no	Handbook
28						
29	25	Larén, A.	2018	Fear of falling in acute stroke: The Fall Study of Gothenburg (FallsGOT)	yes	
30						
31				Participation, fear of falling and upper limb impairment is associated with high sitting time in people with stroke		
32	26	Janssen, H.	2018		no	Duplicate data
33						
34				Fear of falling is independently associated with agoraphobia after mild stroke and transient ischaemic attack		
35	27	Chun, H. Y. Y.	2018		no	Conference abstract
36						
37				Fear of falling is independently associated with agoraphobia after mild stroke and TIA		
38	28	Chun, H. Y. Y.	2018		no	Conference abstract
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3	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
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6	30	Stout, R. D.	2017	Fear of falling for older and stroke-involved adults		Full text not found
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9	31	Oguz, S.	2017	The relationship between objective balance, perceived sense of balance, and fear of falling in stroke patients	no	Irrelevant outcome indicators
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11	32	Ng, S.	2017	Fear of falling in patients with chronic stroke	no	Irrelevant research object
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13	33	Larén, A.	2017	Fear of falling acute after stroke: A part of the fall study in Gothenburg	no	Conference abstract
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16	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
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18	35				no	Conference abstract
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20						
21	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	
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24	37	Nct,	2016	Fear of Falling in Patients With Chronic Stroke	no	Irrelevant research object
25						
26	38	Kavian, M.	2016	The correlation between the standing stability and fear of falling in patients with stroke	no	Full text not found
27						
28	39	Goh, H. T.	2016	Falls and Fear of Falling After Stroke: A Case-Control Study	yes	
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31	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
32						
33	41	Schmid, Arlene A.	2015	Fear of Falling in People With Chronic Stroke	no	Irrelevant outcome indicators
34						
35	42	Schlick, C.	2015	Falls and fear of falling in vertigo and balance disorders: A controlled cross-sectional study	no	Irrelevant outcome indicators
36						
37	43	Loureiro, A. P. C.	2015	Sedentary behaviors in stroke survivors	no	Conference abstract
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3	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
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7	45	Guan, Q.	2015	Multifactor analysis for risk factors involved in the fear of falling in patients with chronic stroke from mainland China	yes	
8						
9	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
10						
11	47	Cho, K.	2015	Risk factors related to falling in stroke patients: a cross-sectional study	no	Irrelevant outcome indicators
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14	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
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16						
17	49	Phadke, C. P.	2014	Relationship between spasticity and balance confidence in persons post-stroke	no	Conference abstract
18						
19	50	Park, J.	2014	Relationships of stroke patients' gait parameters with fear of falling	no	Irrelevant outcome indicators
20						
21	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
22						
23						
24	52	Jalayondeja, C.	2014	Six-month prospective study of fall risk factors identification in patients post-stroke	no	Irrelevant research object
25						
26	53	Da Silva, Carolyn P.	2014	Falling, Balance Confidence, and Fear of Falling After Chronic Stroke	no	Qualitative research
27						
28						
29	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
30						
31						
32	55	Kneebone, I.	2013	Fear of falling: Psychological management after stroke	no	Conference abstract
33						
34	56	Vahlberg, B.	2012	Factors related to mobility and physical activity in individuals one to three years after stroke	no	Conference abstract
35						
36	57	Perez-Jara, Javier	2012	Differences in fear of falling in the elderly with or without dizziness. [References]	no	Irrelevant research object
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39	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
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2	59	Batchelor, F. A.	2012	Falls after stroke	no	Review
3				Fear of falling among people who have		
4	60	Schmid, A. A.	2011	sustained a stroke: A 6-month longitudinal pilot	no	Irrelevant outcome
5				study		indicators
6	61	Matsuda,	2011	Falls in multiple sclerosis	no	Irrelevant research
7		Patricia Noritake				object
8		Akosile,		Relationships between fall indices and physical		
9	62	Christopher	2011	function of stroke survivors in Nigeria...including	no	Irrelevant outcome
10		Olusanjo		commentary by Batchelor F and Bugdayci D		indicators
11				Fear of falling in the elderly with recurrent		
12	63	Zapata, Paloma	2010	dizziness: A descriptive study. [Spanish].	no	Not English/Chinese
13		Olmos		[References]		
14	64	Balash, Y.	2010	Disorders of gait with fear of fall in community	no	Conference abstract
15				dwelling elders		
16		Schmid, Arlene		Consequences of Poststroke Falls: Activity		
17	65	A.	2009	Limitation, Increased Dependence, and the	no	Qualitative research
18				Development of Fear of Falling		
19						
20	66	Schmid, A. A.	2009	Poststroke Fear of Failing in the Hospital Setting	no	Irrelevant outcome
21						indicators
22	67	McGrath, Joanna	2008	Fear of falling after brain injury. [References]	no	Irrelevant research
23		Collicutt				object
24	68	Batchelor, F.	2008	Fear of falling and falls after stroke: the chicken	no	Full text not found
25				or the egg?		
26	69	Andersson, Å G.	2008	Fear of falling in stroke patients: Relationship	no	Full text not found
27				with previous falls and functional characteristics		
28	70	Schmid, A. A.	2007	Fear of falling: An emerging issue after stroke	no	Qualitative research
29	71	Morley, John E	2007	Falls--where do we stand?	no	Irrelevant research
30						object
31				The temporal relationship between falls and		
32	72	Chou, Kee-Lee	2007	fear-of-falling among Chinese older primary-	no	Irrelevant research
33				care patients in Hong Kong.		object
34				The effects of reducing fear of falling on		
35	73	Balash, Y.	2007	locomotion in older adults with a higher level	no	Irrelevant research
36				gait disorder		object
37				The association of balance capacity and falls		
38	74	Belgen, B.	2006	self-efficacy with history of falling in	no	Irrelevant outcome
39				community-dwelling people with chronic stroke		indicators
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2	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
3						
4	76	Watanabe, Y.	2005	Fear of falling among stroke survivors after discharge from inpatient rehabilitation	no	incomplete data
5						
6	77	Rosén, E.	2005	Fear of falling, balance, and gait velocity in patients with stroke	no	Irrelevant outcome indicators
7						
8	78	Giladi, N.	2005	Clinical characteristics of elderly patients with a cautious gait of unknown origin	no	Irrelevant research object
9						
10	79	Stolze, H.	2004	Falls in frequent neurological diseases - Prevalence, risk factors and aetiology	no	Irrelevant research object
11						
12	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
13						
14	81	Strubel, D.	2001	[Dementia and falls]	no	Not English/Chinese
15	82	Karin Hellström	1999	Fear of falling in patients with stroke:a reliability study	no	Irrelevant outcome indicators
16						
17	83	Mahsa Kaviani	2016	The Correlation between the Standing Stability and Fear of Falling in Patients with Stroke	no	Not English/Chinese
18						
19	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
20						
21	85	Thomas Hadjistavropoulos	2011	The Relationship of Fear of Falling and Balance Confidence With Balance and Dual Tasking Performance	no	Irrelevant research object
22						
23	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
24						
25	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
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27	88	Zhou Min	2016	Current status and influencing factors of fear of falling among elderly in patients	no	Irrelevant outcome indicators
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3	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
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6	90	Deng Ning	2016	The status and influencing factors of fear of falling in patients with first ever cerebral infarction	no	Irrelevant outcome indicators
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9	91	Shao Ping	2016	The relationship between fear of falling and anxiety and depression in elderly patients with stroke	no	Irrelevant outcome indicators
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11	92	Arlene A. Schmid	2009	Poststroke Fear of Falling in the Hospital Setting	no	Irrelevant outcome indicators
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14	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	
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#	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 scores	
																				Selecti on	Compar ability	Outco me	NOS 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	
																	0.617 (OR<1)	0.435	0.875						
																	2.Marital status;	2.058	1.165	3.635					
																	3. History of falls;	2.292	1.431	3.671					
																	4.Anxiety;	1.802	1.217	2.669					
																	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 services	59	23	communi ty 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					

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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	4	2	3	9
																2.SwePASS total score ≤24	9.41	5.13	17.25				
																3.SwePASS total score 25-30	2.29	1.36	3.83				
																4.SwePASS total score ≥31	1						
																5.Using a walking aid	3.4	2.12	5.43				
																6.SGPALS score - --physically inactive (ref.)	1						
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 hospital	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	13	62		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 emotion	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)	aged 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				

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6.SwePASS score--- Moderate (25-30)	2.32	0.98	5.52
7.SGPALS score- -Physically inactive (1)	2.04	1.01	4.12

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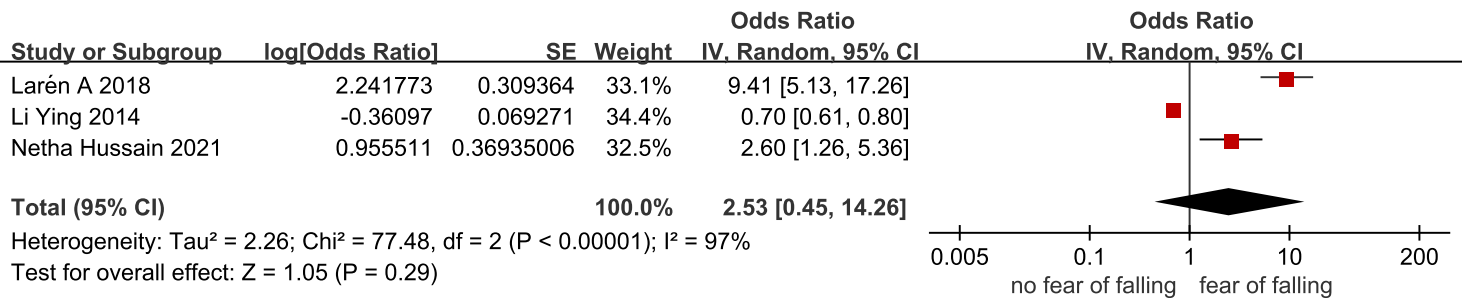
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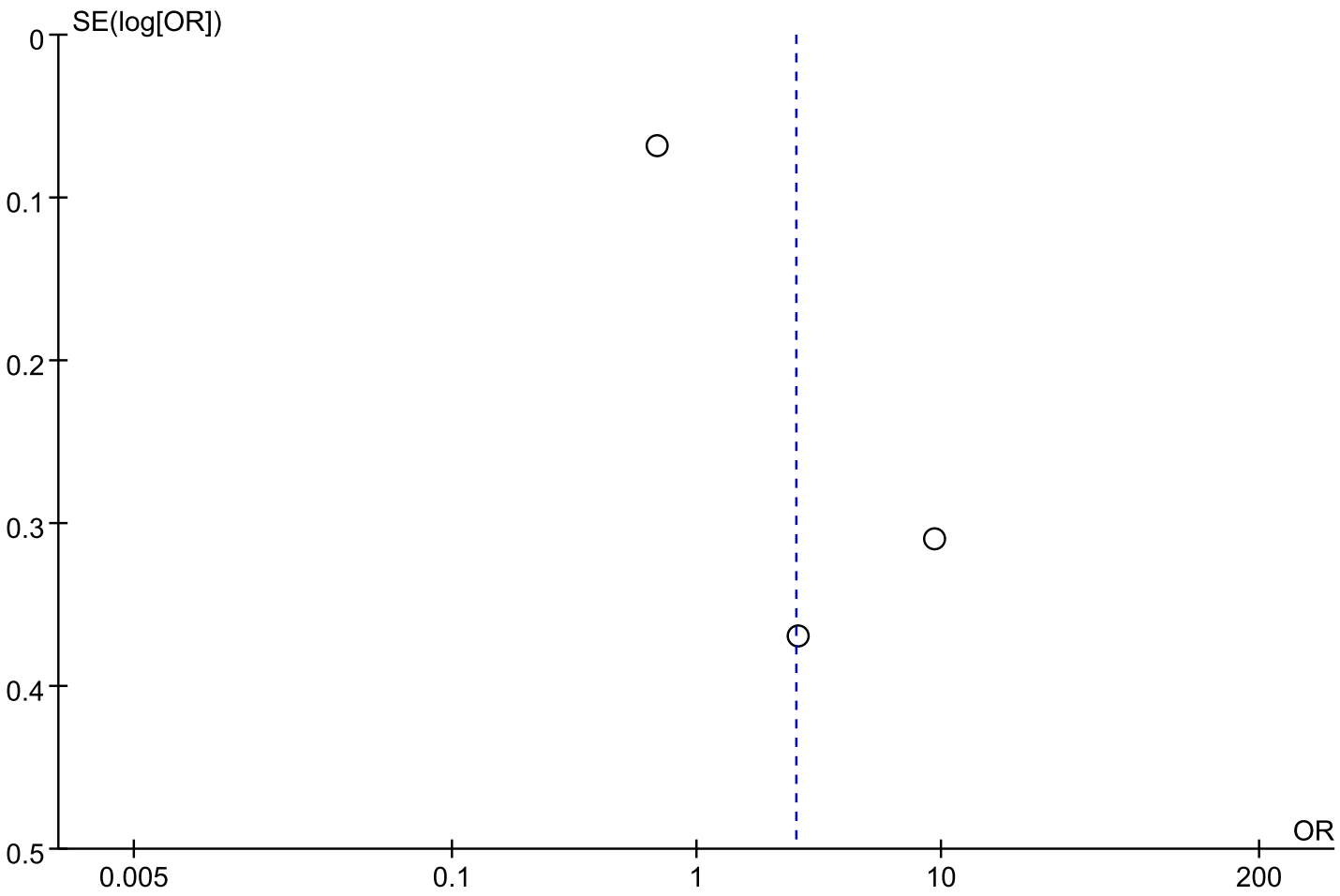
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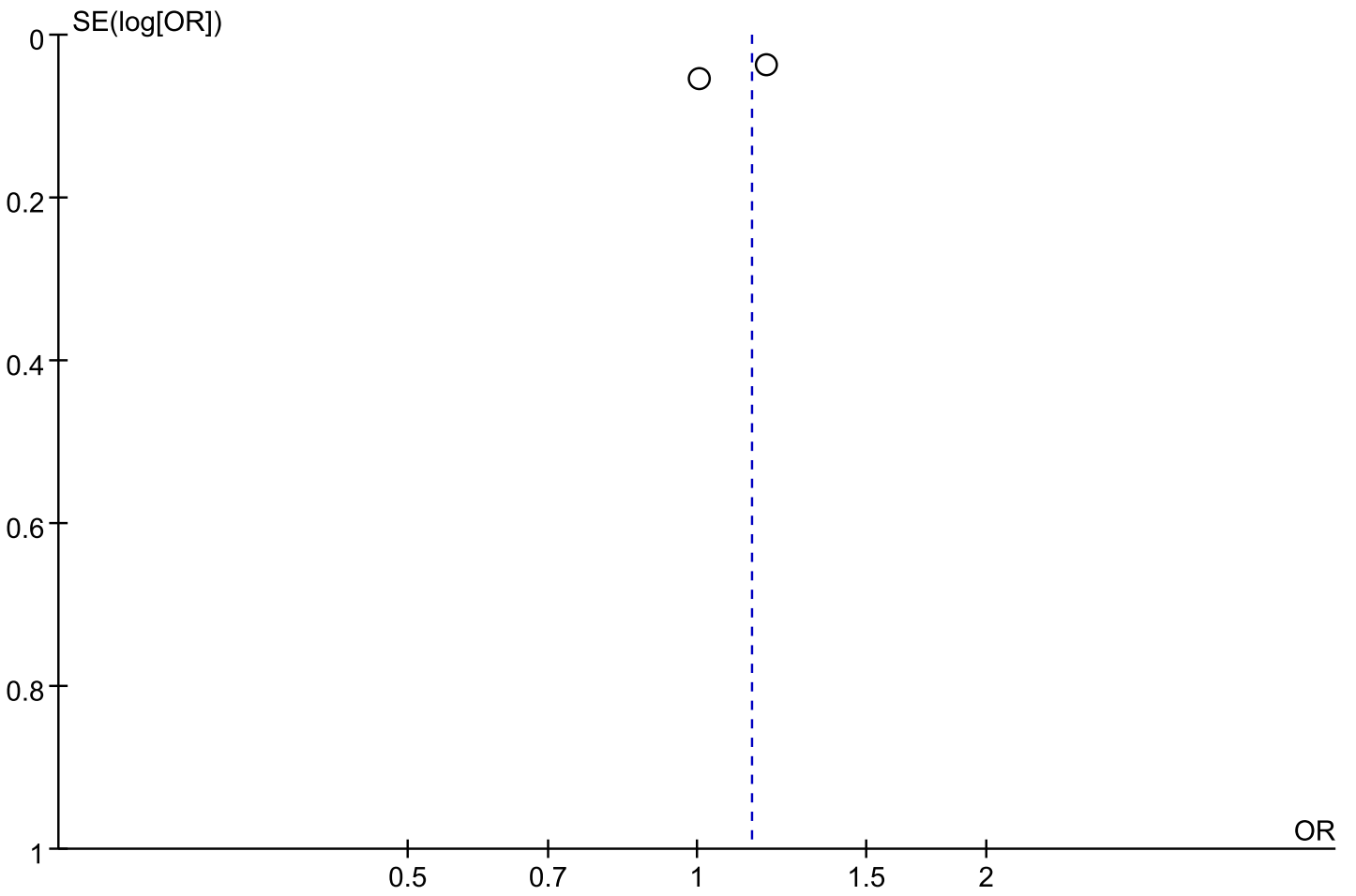


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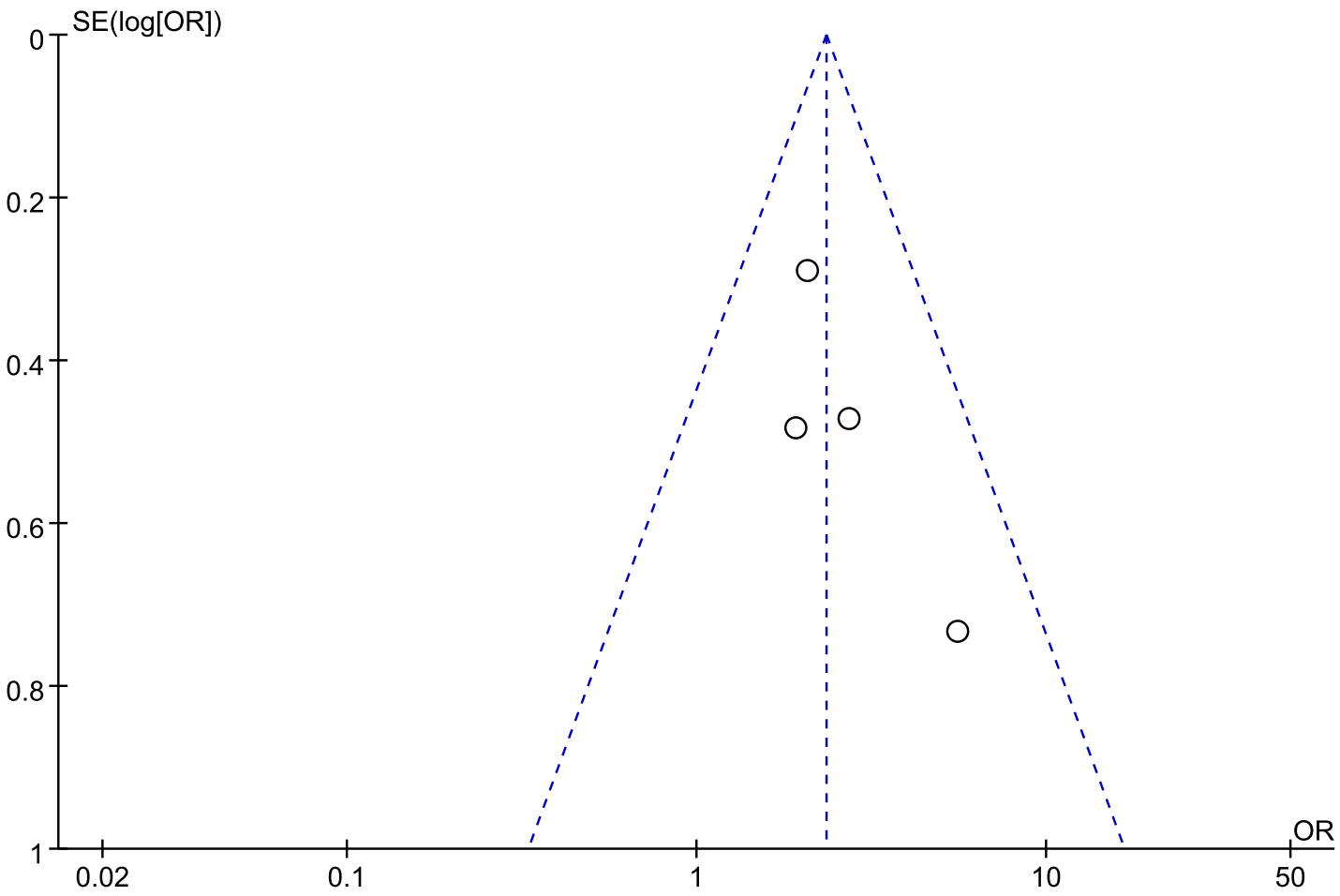
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PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	2
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	NO
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	3
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	3-4
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	4-5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	4
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	4-5
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	5
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	5



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	5
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	6
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	7-9
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	7-9
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	10-12
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	10-12
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	10-12
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	10-12
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	13-14
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	17
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	17
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	18-19

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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

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Article Type:	Original research
Date Submitted by the Author:	11-Apr-2022
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Primary Subject Heading:	Geriatric medicine
Secondary Subject Heading:	Patient-centred medicine
Keywords:	Stroke < NEUROLOGY, GERIATRIC MEDICINE, Neurology < INTERNAL MEDICINE

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Risk Factors for Fear of Falling in Stroke Patients: A Systematic Review and Meta-Analysis

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1 Qi Xie and Ju-Hong Pei contributed equally to this work

Keywords: Risk factors; fear of falling; stroke; systematic review; meta-analysis

Word count: 3,830

Abstract

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

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: 8 studies involving 1,597 participants were selected to analyze risk factors for stroke patients with FoF. The quality of all included studies was assessed and categorized as medium or high quality. Review Manager 5.3 merged the *OR* value and 95% *CI* of the potential risk factors. Meta-regression and Egger's linear regression test were performed by Stata version 15. The risk factors for FoF in stroke patients were female (*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 inter-study heterogeneity in estimated proportions was not attributed to the sampling error. The leave-one-out analysis showed that no single study significantly affected the final pooled results.

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

Keywords: Risk factors; fear of falling; stroke; systematic review; meta-analysis

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 FoF 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-analyze these potential risk factors.
- The variability in methods of assessing risk and reporting the frequency of risk characteristics limited analyses

1 Introduction

Stroke is the second leading cause of death worldwide¹, 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 world⁴. As a result, there were 5.9 million people who died, whereas 102 million people with disability-adjusted life-years (DALYs) 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 control⁵, mental fatigue, depression, and impaired cognitive function^{2 6}. According to the World Health Organization⁷, 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 stroke⁸. Among those who survived a stroke, 22-48% have experienced at least one fall in the hospital⁸⁻¹⁰ or the rehabilitation facility¹¹⁻¹³. There is a reported prevalence of 32–83% for FoF between the first six months and just over four years after stroke onset¹⁴.

A high level of FoF psychology that limits the patient’s active rehabilitation exercise behavior, reduces their mobility, flexibility, and independence, and increases their anxiety and depression¹⁵. The FoF psychology hinders the recovery of the adults’ physical and mental functions, thereby increasing the risk of falling and forming a vicious circle¹⁶.

In clinical practice, identifying FoF risk factors in stroke patients is more helpful in

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4 guiding clinical practice. Many reports have mentioned that identifying the FoF status
5 of stroke patients and strengthening the comprehensive interventions in this field, can
6 plausibly help break the vicious circle, relieve anxiety¹⁷, promote community
7 reintegration¹⁷, and improve the quality of life¹⁹. Some previous studies have proposed
8 the correlation between many potential risk factors and FoF, intervention measures to
9 reduce FoF incidence during stroke, and risk factors for falls in stroke patients²⁰.
10 However, the risk factors identified for FoF in different studies are inconsistent. These
11 reports have neither comprehensively explored sociodemographic, psychological, and
12 physical risk factors, nor included systematic reviews and meta-analyses of risk factors
13 for FoF in stroke patients²¹⁻²³. Therefore, we conducted this systematic review and
14 meta-analysis to identify risk factors for FoF in stroke patients.
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25 **2 Methods**

26 **2.1 Search strategy**

27 We searched PubMed, Embase, Cochrane Library, Web of Science, CINAHL,
28 PsycINFO, Grey literature, and other databases (from inception to July 2021) for
29 studies that identified risk factors for FoF in patients with stroke.
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33 Our search strategy used medical subject heading (MeSH) and natural language text
34 words. The first author designed specific search strategies and peer-reviewed electronic
35 search strategies. The specific search strategy for each database is mentioned in the
36 **Supplementary file 1**. References from relevant papers or reviews were hand-searched
37 for additional studies. For missing relevant data from studies, we contacted the study's
38 authors via email. All studies that were classified as FoF studies were then screened.
39 On 20 July 2021, another search was performed on the previously mentioned database
40 to search the articles published since the initial examination date.
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49 **2.2 Inclusion and exclusion criteria**

50 The inclusion criteria: (1) Published case-control studies, cohort studies, and cross-
51 sectional studies. (2) All participants 18 years and above and clinically diagnosed with
52 either first stroke or recurrent stroke. (3) Studies published in the English or Chinese
53 language. (4) Reported risk factors of FoF in patients with stroke using validated
54 screening tools. (5) The data can be extracted, including the spreadsheet of the pre-test
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4 in the study.

5 The exclusion criteria: (1) Review papers, case reports, meeting abstracts, qualitative
6 studies: (2) Duplicate literature or research with the same data. (3) Research on quality
7 evaluation results is low.
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11 Endnote X9 software was used to remove duplicates and facilitate the screening
12 process. All titles and abstracts were screened for inclusion/exclusion based on the
13 eligibility criteria. The full texts were evaluated if the title and abstract could not
14 accurately identify the possibly eligible studies (**Supplementary file 2**).
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18 19 **2.3 Data extraction and quality assessment**

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21 The literature extraction was independently conducted based on the search, reviewed,
22 and selected according to predefined criteria. The data were collected from studies: first
23 author, year of publication, geographical location, the measured/collected tools, study
24 type, research period, total sample size, sociodemographic data, and risk factors. The
25 *OR/RR* or 95% *CI* was directly extracted from the included studies. All the information
26 was recorded in especially standardized forms. For the missing relevant data of studies,
27 we contacted the study's authors via email; however, if the relevant data could not be
28 obtained, the study was excluded (**Supplementary file 3**).
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37 The methodologic quality assessment of case-control studies and cohort studies were
38 assessed by the Newcastle Ottawa Scale (NOS)²⁴ for the study population (4 items),
39 comparability (1 item), and outcome evaluation (3 items). The scale's total score was
40 kept as 9 points, where 0 to 3 were divided into low-quality research, 4 to 6 were divided
41 into medium quality research, and 7-9 were divided into high-quality research. In
42 addition, the risk of bias in a cross-sectional study was assessed using the instrument
43 Agency for Healthcare Research and Quality (AHRQ)²⁵. The tool had a total of 11 items
44 as follows: If the answer to an object was "No" or "UNCLEAR," the item's score was
45 "0"; if the answer was "Yes," the item score "1", with a total score of 0-11 Points, 0-3
46 points=low quality, 4-7 points=medium quality, 8-11 points=high quality²⁶. The
47 process of study selection, data extraction, and quality assessment were all conducted
48 in duplicate (Q Xie and JH Pei) with third-party adjudication (XM Dou) for
49 disagreements.
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2.4 Statistical analysis

The Stata 15 performed meta-regression and Egger's linear regression test, whereas all other statistical analyses were conducted with the RevMan 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 used²⁷⁻²⁹. The findings were illustrated in the form of forest plots. To assess the risk factors of FoF, the *OR/RR* and associated 95% *CI* were extracted from included studies, and then RevMan 5.3 software was used to merge the *OR/RR* value. Publication bias was identified using a funnel plot and Egger's linear regression test³⁰. When the number of included studies was > 2 , subgroup and meta-regression analyses were performed to explore the sources of heterogeneity based on the following factors: SwePASS score, age, sample size and the number of females. Subgroup analysis and meta-regression were performed after post hoc adjustment. Sensitivity analyses were performed using the leave-one-out method. A p-value of ($p < 0.05$) was the threshold for statistical significance.

2.5 Patient and public involvement

No patient was involved in the study.

3 RESULTS

3.1 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 analyzing the title and abstract, ultimately, 92 publications were selected for the full-text assessment. Finally, eight full-text studies with 1,597 participants were found eligible and included in this meta-analysis.

3.2 Study Characteristics and Methodologic Quality

The included 8 studies were conducted in 3 regions i.e., Asia ($n = 4$), North America ($n = 1$), and Europe ($n = 3$). Among these eight studies, 2 were cross-sectional, 4 were case-control, and 2 were prospective cohort studies. A summary of literature

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4 characteristics used in the analysis is shown in **Table 1**.

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6 The NOS assessed the quality of the case-control studies and prospective cohort
7 studies. The NOS scores ranged from 7 to 9, indicating a high level of studies quality.
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9 In the 2 cross-sectional studies, the AHRQ scores ranged from 4 to 6, indicating a
10 moderate level of quality. The overall score indicated the relatively high quality of the
11 literature included in this study.
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Table. 1 Characteristics of the included studies

Author, year ^a , country	Study design	Sample size (N)	Age, years(Mean ±SD)	Female N (%)	Outcome Ascertainment	Research period	Stroke reference period	Adjusted risk factors ^b	NOS ^{c/} AHRQ ^d scores
Zhang Qin. et al. ³¹ ,2020, china	Cross-sectional study	221	60.13±8.72 ^b	88 (39.8) ^b	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. ³² ,2014, China	Case-control study	170	73.54 ^e Male: 73.0±8.4 Female: 74.2±7.6	76 (44.70) ^b	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 6 meters	9
Yadav, T. et al. ³³ ,2020, India	Case-control study	82	51.6 ± 12.13 ^b	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 ¹⁴ , 2018, Sweden	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, A. et al. ³⁴ .2016, Canada	Case-control study	208	FoF: 68.6 ±11.6 No FoF: 65.3±13.6	FoF:52 (61.9) No FoF:	The single-item question, ABC	October 2009 and September	In-patient stroke rehabilitation	1. Grasp reactions 2. Assists	8

				43 (34.7)		2012				
Goh, H. T. et al. ³⁵ .2016,	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	
China										
Beliz Belgen. et al. ³⁶ .2006,	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	
Sweden										
Netha Hussain. et al. ³⁷ .2021	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	
Sweden										

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

4 Results of the meta-analysis

4.1 Sociodemographic factors

Three of the 8 studies mentioned sociodemographic factors as risk factors for FoF, whereas the two reported predictors were age and female. However, due to the limited number of studies, the ability to assess the publication bias by the funnel plot and Egger's linear regression test was unsuccessful³⁰.

4.1.1 Age

Two studies reported the relationship between age and FoF in stroke patients (2 studies, 500 participants). However, no significant statistically association was observed when entered into a meta-analysis using a fixed-effects model. ($OR=1.00$, 95% CI , 0.98 to 1.03, $p=0.81$, $I^2=82\%$; **Figure. 2a**).

4.1.2 Female

Two studies reported the correlation between females and FoF in stroke patients (2 studies, 741 participants). The analysis revealed the risk of FoF in women with stroke was 2.13 times higher than in men. ($OR=2.13$, 95% CI , 1.47 to 3.09, $p<0.0001$, $I^2=0\%$; **Figure. 2b**).

4.2 Physical factors

4.2.1 Balance ability

Three studies mentioned balance ability as an independent risk factor^{14 32 37} (911 participants) for FoF. 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 was used for detecting clinical heterogeneity from varying tools to define its incidence. Li Ying et al. (2014)³² measured balance with the Berg Balance Scale (BBS), whereas Amanda Larén et al. (2009)¹⁴ and Netha Hussain et al. (2021)³⁷ defined it by using the SwePASS score (postural control). Subgroup analysis of the SwePASS score showed that the risk of FoF was 2.30-5.54 times higher in low balance than with high balance. (**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; $I^2 = 0\%$). The difference between this subgroup was

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4 statistically significant ($p=0.007$). No significant publication bias was detected by
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6 Egger's linear regression test ($p=0.135$).

7 8 **4.2.1 Mobility**

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10 A meta-analysis of the 3 studies on the risk factors of FoF (377 participants) revealed a
11
12 considerable heterogeneity between the studies ($p=0.0003$, $I^2=84\%$). The results
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14 demonstrated a significantly higher incidence of FoF in lower mobility stroke patients
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16 ($OR=1.12$; $95\%CI$, 1.05 to 1.19; **Figure. 3b**). Meta-regression was performed to
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18 explore potential sources of heterogeneity based on an a priori list of factors related to
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20 clinical prognosis³⁸. Univariate meta-regression analysis identified age ($p=0.017$) as a
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22 significant source of heterogeneity. However, due to the limited number of studies, it
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24 was impractical to eliminate the sources of heterogeneity and adjust covariates;
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26 therefore, multivariate meta-regression could not be performed. Due to this meta-
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28 analysis's relatively large sample size, the sensitivity analysis (leave-one-out method)
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30 showed that none of the studies had a significant impact on the final pooled results. In
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32 addition, no publication bias was shown by Egger's linear regression test ($p=0.619$) and
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34 the funnel plot (**Supplementary file 4**).

35 36 **4.3 History of falls**

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38 Experience of falls was listed as an independent risk factor for FoF in 4 studies^{31 32 36 37}
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40 (720 participants). Fixed-effects model analysis revealed that the risk of FoF in stroke
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42 patients with a history of falls was 2.33 times higher than no falls ($OR= 2.33$; $95\%CI$,
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44 1.54 to 3.53; $I^2 = 0\%$; **Figure. 4**). Furthermore, Yuriko Watanabe et al. (2005)
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46 ³⁹reported that 87.9% of those who have experienced a fall would have a FoF for stroke
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48 patients. No publication bias was shown by Egger's linear regression test ($p=0.205$) the
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50 funnel plot (**Supplementary file 5**).

51 52 **4.4 Use of walking aid**

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54 Two studies listed influencing factors between the walking aid for stroke patients and
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56 FoF^{14 37} (741 participants). Amanda Larén et al. (2009)¹⁴ reported valuable insight for
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58 those involved in stroke rehabilitation during the acute phase after stroke. FoF was
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60 associated with the use of a walking aid. Whereas Netha Hussain et al. (2021)³⁷, using

the multivariable regression model, showed that the walking support for FoF was not statistically significant. The results further confirmed that the risk of FoF in stroke patients 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; **Figure. 5**).

4.5 Other risk factors

Only six factors were assessed in more than 1 study and found eligible for meta-analysis. All other risk factors estimated are described narratively based upon the findings of the associated individual study. The significant risk factors of FoF were 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).

Zhang Qin et al. (2020)³¹ and Arlene. A et al. (2011)⁴⁰ 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, T, et al.³³ 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 lower extremity motor function can reduce the chances of belonging to no FoF.

Furthermore, Schinkel-Ivy, et al.³⁴ 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, NJ) to measure gait, where walking velocity and double support time were used as an outcome indicator⁴¹. Data on other risk factors can be found in **Table 2**.

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

Risk factors	<i>OR RR</i>	<i>LL-95%CI</i>	<i>UL-95%CI</i>	<i>p-value</i>
Anxiety ³¹	2.29	1.43	3.67	< 0.001
Depression ³¹	1.80	1.22	2.67	0.003
Marital status ³¹	0.62	0.44	0.88	0.006
Lower limb motor function ³³	1.14	1.00	1.29	0.047
SGPALS score---Physically inactive ³⁷	2.04	1.01	4.12	0.048
Reactive stepping ³⁴				
Grasp reactions	0.98	0.95	1.01	0.23

Assists	0.98	0.96	1.00	0.086
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OR: odds ratio; RR: relative risk; LL: lower limit; UL: upper limit

5 Discussion

This study included observational studies with 1,597 stroke participants. Out of the 8 studies, 2 were cross-sectional studies, 4 were case-control studies, and 2 were prospective cohort studies with a wide range of patient characteristics. Further, 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 8 studies and another meta-analysis on fall risk factors in community stroke survivors²⁰ 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 stroke patients (*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 elderly⁴², our analysis also revealed that the problems of fall history and gait were related to FoF. Further, 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 analyzed. For example, Semra Oguz et al.⁴³ found a strong negative correlation between objective balance (measured by BBS scores) and FES scores ($r = -0.808$); however, there was a strong positive correlation between perceived sense of balance (PSB) and FES score ($r = 0.714$). Further, the present study's balance ability and mobility analysis results were in-concurrence with the study of Kihun Cho et al.⁴⁴, who showed that the FoF and they were moderately correlated (respectively, $r = 0.669$; $r=0.545$). Other studies, such as

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4 Christopher et al.⁴⁵ showed a negative correlation between physical function and fall
5 efficacy ($r=-0.66$). Eun Joo Kim et al.¹⁹ revealed that the physical factors, including the
6 functional ambulation category, hip abductor strength, knee extensor, and ankle plantar
7 flexor had a moderately negative correlation with FoF (respectively $r=-0.673$; $r=-0.534$;
8 $r=-0.478$; $r=-0.501$). Of note, the above results are contrary, which can result from
9 different statistical analyses and research focuses used in these studies. Further, gait
10 speed was related to the ability to maintain balance, where gait disorders limited the
11 independent life of stroke patients⁴⁶. Due to reduced weight transfer capacity and
12 stability, many stroke survivors might find it challenging to maintain their balance⁴⁶. A
13 previous study showed that the stroke patient's gait patterns were slow and required
14 excessive exertion; however, these patient's legs were not well coordinated. Thus,
15 increased foot support time and decreased gait speed in these patients with balance
16 disorders were the risk of falls and increased anxiety⁴⁷. Combined with clinical analysis,
17 stroke mainly occurs in the 60 to 70 years old, where the decline of body function
18 inevitably leads to the FoF. Impaired balance can easily cause patients to fall and thus
19 cause them to be aware of the surrounding environment and the safety of their activities,
20 which eventually increases the patient's psychological tension, worry, and FoF⁴⁸.
21 Therefore, it is vital to explore the relationship between FoF and body function in
22 clinical practice using large-scale prospective studies.

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41 In addition to the factors mentioned in the various studies, elements such as post-
42 stroke psychological factors, long-term sitting, and quality of life research have been
43 studied for the relationship with the FoF. Anxiety & depression ($r=0.400$), energy,
44 mobility, self-care and upper extremity function of quality of life (Pearson correlation
45 coefficients were $r=-0.476$; $r=-0.615$; $r=-0.617$; $r=-0.507$)¹⁹ were correlated with FoF.
46 A significant, moderate, and positive correlation was seen between FES-I and sitting
47 time ($r=0.579$)⁴⁹. The study on differences in gait and balance measures in patients with
48 chronic stroke with the different levels of attention related to falls, showed that patients
49 with chronic strokes and slight concern about falling have better gait and balance
50 capabilities than patients with high levels of concern⁵⁰. Therefore, these results are
51 potentially clinically relevant and would be useful to study if reducing FoF can improve
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4 gait, quality of life, physical function, and balance performance in these patients.
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6 Further, it would also be useful to measure FoF as the assessment of psychological
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8 factors, quality of life, and physical function in these patients. Although stroke itself is
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10 not a direct factor in causing the FoF, as a long-term chronic disease, it indicates that
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12 the patient's body functions are further declining. Importantly, the treatment of long-
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14 term chronic diseases further declines or loses the patient's self-efficacy and self-
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16 confidence in behavioral activities, which eventually leads to FoF. The decreases in
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18 self-esteem can directly cause depression, anxiety, and limited self-care ability and
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20 affect FoF. Additionally, in the recovery stage of the first stroke, the walking function
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22 is the main factor affecting the occurrence of falls. Since most stroke patients have limb
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24 dysfunction, the need to assist in walking during the initial stage of recovery or within
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26 a certain period increases the risk of falls.

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28 Furthermore, there is a particular aspect regarding the causal relationship between
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30 falling and fear of falling. Some studies have confirmed that FoF is an essential
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32 predictor of falls in stroke patients⁵¹⁻⁵³, and several other studies have suggested that
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34 people who have experienced a fall were more likely to have FoF^{54 55}. A recent study
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36 has confirmed that the history of falls in the recent time was a good predictor for the
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38 FoF, but the FoF is a predictor of falls during follow-up only in the unadjusted model⁵⁶.
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40 In the current study, differences were observed among the included studies in terms of
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42 evaluation for the fall history. The fall history was defined as whether a fall was
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44 occurred in the past 6 months, within the past 1 year, or within 6 meters of walking.
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46 During these different periods, the probability of falling in stroke patients was different,
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48 which affects the likelihood of occurrence of FoF⁵⁷.

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50 Considering the global prevalence of stroke-related falls or FoF, this study provided
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52 evidence for developing appropriate preventable measures for decreasing the FoF risk
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54 in stroke patients. The risk factors of FoF for stroke patients in Asia included marital
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56 status, social support status, and payment methods for medical insurance⁵⁸; However,
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58 current guidelines for stroke management provide no specific recommendations for
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60 psychological monitoring or the FoF management⁵⁹. Therefore, more studies are
required for developing effective evaluation methods and treatment strategies against

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4 FoF among stroke patients to improve their physical function, mental health, and quality
5 of life.
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7 This meta-analysis had several significant findings. First, most of the included
8 studies were relatively high quality, with robust evidence. Second, under the premise
9 of a large sample size, the risk factors of falling fear in stroke patients were ensured by
10 quantitative analysis. Hence, our findings may be more convincing compared to the
11 individual studies. Finally, the research data included in this study was adjusted, and
12 the results of the data analysis were not affected by the patient's baseline characteristics.
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19 Despite the above important findings, this study had some limitations. (1) Two of the
20 included reports were cross-sectional studies, and thus the ability to hypothesize
21 etiology was weak. (2) All the included studies were observational studies, and
22 therefore the role of confounding factors should be considered. However, due to the
23 limited number of studies, a multivariate meta-analysis could not be performed to assess
24 the robustness of our findings and analyze the effect size of multiple risk factors at the
25 same time⁶⁰. (3) The effects of the patient's inner anxiety, and depression, as well as
26 the motor function of the lower limbs on the risk of falling fear in stroke patients, have
27 been reported in fewer studies. Therefore, the conclusions may vary for individual
28 studies. (4) This meta-analysis only included English and Chinese studies; thus, it
29 probably missed the relevant studies in other languages, which leads to biases in
30 estimates in Western countries. However, there is currently no evidence suggesting that
31 the meta-analysis of language limitations can lead to such bias^{61 62}. In the end, the
32 analysis was based on the overall research level and not on personal data.
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46 **6 Conclusion**

47 This study is the first systematic analysis for assessing the risk factors for FoF in stroke
48 patients, including the history of falls, walking aids, sociodemographic factors, physical
49 characteristics, and psychological factors. This study results suggest that females,
50 impaired balance, mobility impairment, history of falls, walking aids, anxiety,
51 depression, poor lower limb motor function, and physical inactiveness might be
52 associated with FoF in stroke patients, especially impaired balance. In addition, the
53 collective evidence was primarily consistent, and the effect size of FoF was large. A
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4 comprehensive analysis of these risk factors would help screen and differentiate
5 patients at risk for FoF, thereby helping to prevent and optimize timely interventions.
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7 Overall, there is a paucity of empirical data in this area. Many of the factors identified
8 in general population samples have not been studied in stroke patients. In addition, other
9 risk factors specific to stroke patients (e.g., gait speed and gait-related factors) need to
10 be evaluated to identify stroke patients at risk for FoF. Finally, researchers should
11 explore how some variables (i.e., anxiety and depression) interact with FoF and how to
12 better protect stroke patients from it. This intervention will reduce the personal and
13 financial burden and promote these patients' early recovery.
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21 **Footnotes:**

22 **Supplementary file**

- 23 1. The search strategy of the database.
- 24 2. Literature Selection.
- 25 3. Data extraction.
- 26 4. Funnel plot—Mobility
- 27 5. Funnel plot—History of falls

28 **Contribution statement:**

29 Qi Xie and Ju-Hong Pei contributed equally to this work.

30 Study Design: Qi Xie, Ju-Hong Pei, Xin-Man Dou.

31 Analysis and interpretation of data: Qi Xie, Ju-Hong Pei, Ya-Bin Zhang, Ling Gou.

32 Drafting of the manuscript: Qi Xie, Ju-Hong Pei, Juan-Ping Zhong, Xin-Man Dou.

33 Critical revision of the manuscript: Yu-Jie Su, Xin-Man Dou, Ling Gou, Xing-Lei
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35 Approval of the final version for publication: All the authors.

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12 **Data availability statement:** All data relevant to the study are included in the article
13 or uploaded as supplementary information.
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17 **Patient consent for publication:** Not applicable.
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20 **Ethics and dissemination:** Not applicable.
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Figure legend/caption

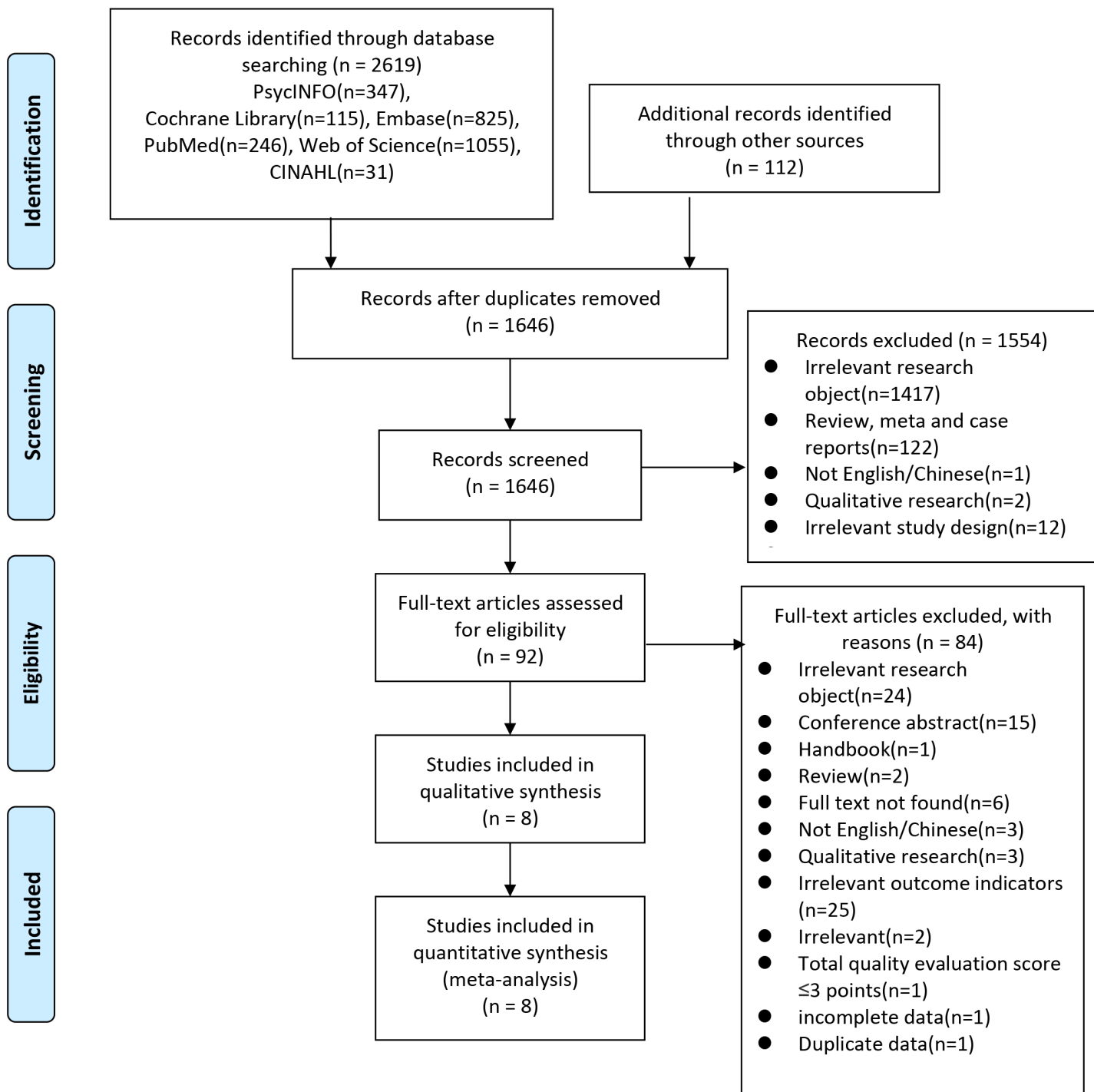
Figure. 1 Flow diagram of study selection in the meta-analysis

Figure. 2 Meta-analyses for sociodemographic factors for 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.

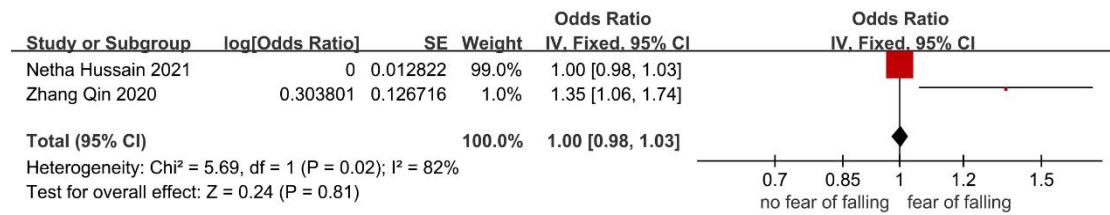
Figure. 3 Meta-analyses for physical risk factors for fear of falling:(a) balance ability, (b) mobility.

Figure. 4 Meta-analyses for history of falls for fear of falling.

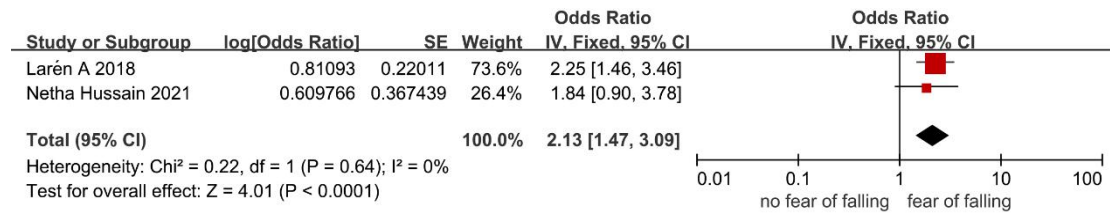
Figure. 5 Meta-analyses for using walking aid for fear of falling.



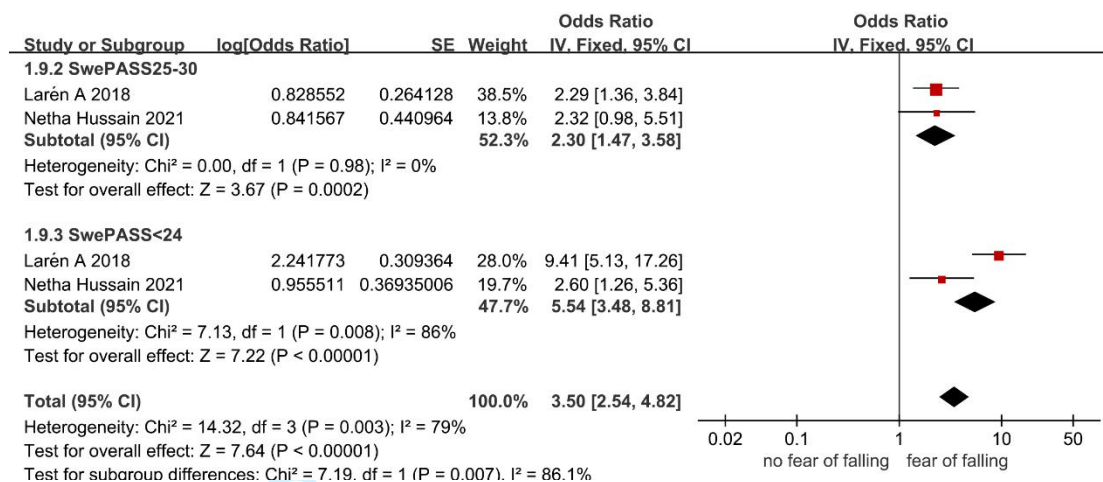
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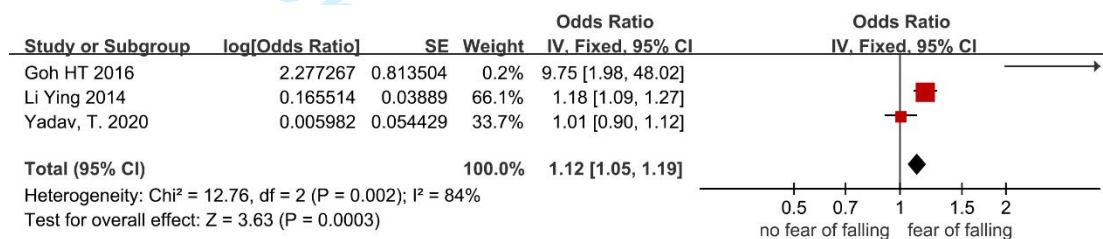
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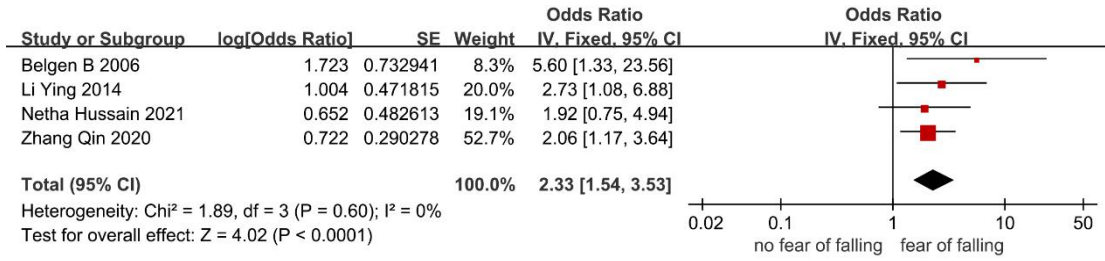


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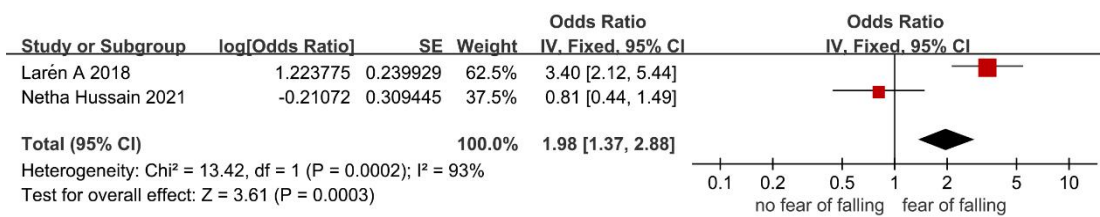


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For peer review only



For peer review only

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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

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4		Infarction"[Title/Abstract]	OR	"Hemorrhagic
5				
6		Stroke"[Title/Abstract]	OR	"Ischemic Stroke"[Title/Abstract]
7				OR
8		"Embolic	Stroke"[Title/Abstract]	OR
9				"Thrombotic
10				
11		Stroke"[Title/Abstract]	OR	"Cardiovascular
12				
13		Diseases"[Title/Abstract]	OR	"Vascular Diseases"[Title/Abstract]
14				
15		OR "Carotid Artery Disease*"[Title/Abstract]	OR	"Carotid Artery
16				
17		Disorder*"[Title/Abstract]	OR	"Carotid Arterial
18				
19		Disease*"[Title/Abstract]		OR"Carotid
20				
21		Atheroscleros*"[Title/Abstract]	OR	"Carotid Atherosclerotic
22				
23		Disease*"[Title/Abstract]	OR	"Internal Carotid Artery
24				
25		Diseases"[Title/Abstract]	OR	Common Carotid Artery
26				
27		Diseases[Title/Abstract]	OR	External Carotid Artery
28				
29		Diseases[Title/Abstract]	OR	External Carotid Arterial
30				
31		Diseases[Title/Abstract]	OR	"Carotid Artery
32				
33		Thrombosis"[Title/Abstract]	OR	"Cerebrovascular
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35		Disorder*"[Title/Abstract]	OR	"Intracranial Vascular
36				
37		Disease*"[Title/Abstract]	OR	"Intracranial Vascular
38				
39		Disorder*"[Title/Abstract]	OR	"Cerebrovascular
40				
41		Disease*"[Title/Abstract]	OR	"Brain Vascular
42				
43		Disorder*"[Title/Abstract]	OR	"Cerebrovascular
44				
45		Occlusion*"[Title/Abstract]	OR	"Cerebrovascular
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47		Insufficienc*"[Title/Abstract]	OR	"Basal Ganglia Vascular
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4	Disease*[Title/Abstract]	OR	"Lenticulostriate	
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6	Vasculopath*[Title/Abstract]	OR	Lenticulostriate	Vascular
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8				
9	Disease*[Title/Abstract]	OR	Vascular	Lenticulostriate
10				
11	Diseases[Title/Abstract]	OR	"Basal	Ganglia
12				
13				
14	Hemorrhage"[Title/Abstract]	OR	"Putaminal	
15				
16				
17	Hemorrhage"[Title/Abstract]	OR	"Cerebral	
18				
19	Infarct*[Title/Abstract]	OR	"Left Hemisphere	Cerebral
20				
21				
22	Infarction"[Title/Abstract]	OR	"Subcortical	
23				
24	Infarction*[Title/Abstract]	OR	"Posterior Choroidal	Artery
25				
26				
27	Infarction"[Title/Abstract]	OR	"Anterior Choroidal	Artery
28				
29				
30	Infarction"[Title/Abstract]	OR	"Right Hemisphere	Cerebral
31				
32	Infarction"[Title/Abstract]	OR	"CADASIL"[Title/Abstract]	OR
33				
34				
35	"Multi-Infarct Dementia"[Title/Abstract]	OR	"Anterior Cerebral	
36				
37	Artery Infarction"[Title/Abstract]	OR	"Middle Cerebral	Artery
38				
39				
40	Infarction"[Title/Abstract]	OR	"Posterior Cerebral	Artery
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42				
43	Infarction"[Title/Abstract]	OR	"Brain Ischemia*[Title/Abstract]	
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45				
46	OR "Ischemic Encephalopath*[Title/Abstract]	OR	"Cerebral	
47				
48	Ischemia*[Title/Abstract]	OR	"Brain	
49				
50	Hypoxia-Ischemia"[Title/Abstract]	OR	"Cerebral Small Vessel	
51				
52				
53	Disease*[Title/Abstract]	OR	"Cerebral	
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56	Microangiopath*[Title/Abstract]	OR	"Intracranial	Arterial
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59	Disease*[Title/Abstract]	OR	"Intracranial	Arterial
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1	Disorder*"[Title/Abstract]	OR	"Arterial	Brain
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3	Disease*"[Title/Abstract]	OR	Brain	Arterial
4				
5	Disease*"[Title/Abstract]	OR	Arterial	Brain
6				
7	Disorder*"[Title/Abstract]	OR	"Intracranial	
8				
9	Hemorrhage*"[Title/Abstract]	OR	"Posterior	Fossa
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11	Hemorrhage*"[Title/Abstract]	OR	"Brain	
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13	Hemorrhage*"[Title/Abstract]	OR	"Cerebral	
14				
15	Hemorrhage"[Title/Abstract]	OR	"Cerebral	Intraventricular
16				
17	Hemorrhage"[Title/Abstract]	OR	"Hypertensive	Intracranial
18				
19	Hemorrhage"[Title/Abstract]	OR	"Cranial	Epidural
20				
21	Hematoma"[Title/Abstract]	OR	"Subdural	
22				
23	Hematoma"[Title/Abstract]	OR	"Pituitary	
24				
25	Apoplexy"[Title/Abstract]	OR	"Subarachnoid	
26				
27	Hemorrhage"[Title/Abstract]	OR	"Brain	
28				
29	Infarction*"[Title/Abstract]	OR	"Brain Infarct*"[Title/Abstract]	OR
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31	"Anterior Circulation Brain Infarction"[Title/Abstract]	OR	"Brain	
32				
33	Venous Infarction*"[Title/Abstract]	OR	"Anterior Cerebral	
34				
35	Circulation Infarction"[Title/Abstract]	OR	"Posterior Circulation	
36				
37	Brain Infarction"[Title/Abstract]	OR	"Lacunar	
38				
39	Stroke*"[Title/Abstract]	OR	"Lacunar Syndrome*"[Title/Abstract]	
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41	OR	"Lacunar Infarction*"[Title/Abstract]	OR	"Lacunar
42				
43	Infarct*"[Title/Abstract]	OR	"Intracranial	
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4	Vasospasm*[Title/Abstract]	OR	Intracranial	
5				
6	Angiospasm*[Title/Abstract]	OR	"Intracranial	Vascular
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9	Spasm*[Title/Abstract]	OR	"Cerebral	
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11				
12	Vasospasm*[Title/Abstract]	OR	"Cerebrovascular	
13				
14	Spasm*[Title/Abstract]	OR	"Cerebral	
15				
16				
17	Angiospasm*[Title/Abstract]	OR	"Cerebral	Artery
18				
19	Spasm*[Title/Abstract]	OR	"Hemiplegia*[Title/Abstract]	OR
20				
21				
22	"Transient		Hemiplegia*[Title/Abstract]	OR
23				
24				
25	"Monoplegia*[Title/Abstract]	OR	"Post-Ictal	
26				
27	Hemiplegia*[Title/Abstract]	OR	"Crossed	
28				
29				
30	Hemiplegia*[Title/Abstract]	OR	"Flaccid	
31				
32	Hemiplegia*[Title/Abstract]	OR	"Infantile	
33				
34				
35	Hemiplegia*[Title/Abstract]	OR	"Spastic	
36				
37	Hemiplegia*[Title/Abstract]	OR	"Pareses"[Title/Abstract]	OR
38				
39				
40	"Paraparesis"[Title/Abstract]	OR	"Muscular	
41				
42				
43	Pares*[Title/Abstract]	OR	"Muscle Pares*[Title/Abstract]	OR
44				
45	"Monopares*[Title/Abstract]	OR	"Lower	Extremity
46				
47				
48	Pares*[Title/Abstract]	OR	"Crural Pares*[Title/Abstract]	OR
49				
50				
51	"Upper Extremity Pares*[Title/Abstract]	OR	"Brachial	
52				
53	Pares*[Title/Abstract]	OR	"Hemipares*[Title/Abstract]	OR
54				
55				
56	"Spastic Paraparesis"[Title/Abstract]	OR	"Neurologic Gait	
57				
58				
59	Disorder*[Title/Abstract]	OR	Neurologic	Locomotion
60				

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44	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]	
45 46 47	3 #1 OR #2	654,634
48 49 50 51 52	4 "Accidental Falls"[MeSH Terms] OR "Accidents"[MeSH Terms] OR "Accident Prevention"[MeSH Terms]	198,327
53 54 55 56 57 58 59 60	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 Atheroscleros* 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

1		
2		
3		
4		Infarction* OR Posterior Choroidal Artery Infarction OR
5		
6		Anterior Choroidal Artery Infarction OR Right Hemisphere
7		
8		
9		Cerebral Infarction OR CADASIL OR Multi-Infarct Dementia OR
10		
11		Anterior Cerebral Artery Infarction OR Middle Cerebral Artery
12		
13		Infarction OR Posterior Cerebral Artery Infarction OR Brain
14		
15		Ischemia* OR Ischemic Encephalopath* OR Cerebral Ischemia*
16		
17		OR Brain Hypoxia-Ischemia OR Cerebral Small Vessel Disease*
18		
19		OR Cerebral Microangiopath* OR Intracranial Arterial Disease*
20		
21		OR Intracranial Arterial Disorder* OR Arterial Brain Disease* OR
22		
23		Brain Arterial Disease* OR Arterial Brain Disorder* OR
24		
25		Intracranial Hemorrhage* OR Posterior Fossa Hemorrhage* OR
26		
27		Brain Hemorrhage* OR Cerebral Hemorrhage OR Cerebral
28		
29		Intraventricular Hemorrhage OR Hypertensive Intracranial
30		
31		Hemorrhage OR Cranial Epidural Hematoma OR Subdural
32		
33		Hematoma OR Pituitary Apoplexy OR Subarachnoid
34		
35		Hemorrhage OR Brain Infarction* OR Brain Infarct* OR Anterior
36		
37		Circulation Brain Infarction OR Brain Venous Infarction* OR
38		
39		Anterior Cerebral Circulation Infarction OR Posterior
40		
41		Circulation Brain Infarction OR Lacunar Stroke* OR Lacunar
42		
43		Syndrome* OR Lacunar Infarction* OR Lacunar Infarct* OR
44		
45		Intracranial Vasospasm* OR Intracranial Angiospasm* OR
46		
47		Intracranial Vascular Spasm* OR Cerebral Vasospasm* OR
48		
49		
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	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

	<p>Atheroscleros* 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</p>	
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1		
2		
3		
4	Brain Arterial Disease*	OR Arterial Brain Disorder*
5		OR
6	Intracranial Hemorrhage*	OR Posterior Fossa Hemorrhage*
7		OR
8	Brain Hemorrhage*	OR Cerebral Hemorrhage
9		OR Cerebral
10	Intraventricular Hemorrhage	OR Hypertensive Intracranial
11		Hemorrhage
12	OR Cranial Epidural Hematoma	OR Subdural
13		Hematoma
14	OR Pituitary Apoplexy	OR Subarachnoid
15		Hemorrhage
16	OR Brain Infarction*	OR Brain Infarct*
17		OR Anterior
18	Circulation Brain Infarction	OR Brain Venous Infarction*
19		OR
20	Anterior Cerebral Circulation	Infarction
21		OR Posterior
22	Circulation Brain Infarction	OR Lacunar Stroke*
23		OR Lacunar
24	Syndrome*	OR Lacunar Infarction*
25		OR Lacunar Infarct*
26		OR
27	Intracranial Vasospasm*	OR Intracranial Angiospasm*
28		OR
29	Intracranial Vascular Spasm*	OR Cerebral Vasospasm*
30		OR
31	Cerebrovascular Spasm*	OR Cerebral Angiospasm*
32		OR
33	Cerebral Artery Spasm*	OR Hemiplegia*
34		OR Transient
35	Hemiplegia*	OR Monoplegia*
36		OR Post-Ictal Hemiplegia*
37		OR
38	Crossed Hemiplegia*	OR Flaccid Hemiplegia*
39		OR Infantile
40	Hemiplegia*	OR Spastic Hemiplegia*
41		OR Pareses
42		OR
43	Paraparesis	OR Muscular Pares*
44		OR Muscle Pares*
45		OR
46	Monopares*	OR Lower Extremity Pares*
47		OR Crural Pares*
48		OR
49	Upper Extremity Pares*	OR Brachial Pares*
50		OR Hemipares*
51		OR
52	Spastic Paraparesis	OR Neurologic Gait Disorder*
53		OR
54		
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	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

	<p>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+")</p>	
2	<p>"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 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</p>	38,873

<p>1 2 3 4 "Cerebrovascular Occlusion*" OR "Cerebrovascular Insufficienc*" 5 6 OR "Basal Ganglia Vascular Disease*" OR "Lenticulostriate 7 8 Vasculopath*" OR "Lenticulostriate Vascular Disease*" OR 9 10 "Vascular Lenticulostriate Diseases" OR "Basal Ganglia 11 12 Hemorrhage" OR "Putaminal Hemorrhage" OR "Cerebral 13 14 Infarct*" OR "Left Hemisphere Cerebral Infarction" OR 15 16 "Subcortical Infarction*" OR "Posterior Choroidal Artery 17 18 Infarction" OR "Anterior Choroidal Artery Infarction" OR "Right 19 20 Hemisphere Cerebral Infarction" OR "CADASIL" OR 21 22 "Multi-Infarct Dementia" OR "Anterior Cerebral Artery 23 24 Infarction" OR "Middle Cerebral Artery Infarction" OR "Posterior 25 26 Cerebral Artery Infarction" OR "Brain Ischemia*" OR "Ischemic 27 28 Encephalopath*" OR "Cerebral Ischemia*" OR "Brain 29 30 Hypoxia-Ischemia" OR "Cerebral Small Vessel Disease*" OR 31 32 "Cerebral Microangiopath*" OR "Intracranial Arterial Disease*" 33 34 OR "Intracranial Arterial Disorder*" OR "Arterial Brain Disease*" 35 36 OR "Brain Arterial Disease*" OR "Arterial Brain Disorder*" OR 37 38 "Intracranial Hemorrhage*" OR "Posterior Fossa Hemorrhage*" 39 40 OR "Brain Hemorrhage*" OR "Cerebral Hemorrhage" OR 41 42 "Cerebral Intraventricular Hemorrhage" OR "Hypertensive 43 44 Intracranial Hemorrhage" OR "Cranial Epidural Hematoma" OR 45 46 "Subdural Hematoma" OR "Pituitary Apoplexy" OR 47 48 49 50 51 52 53 54 55 56 57 58 59 60</p>	
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1
2
3
4 "Subarachnoid Hemorrhage" OR "Brain Infarction*" OR "Brain
5
6 Infarct*" OR "Anterior Circulation Brain Infarction" OR "Brain
7
8 Venous Infarction*" OR "Anterior Cerebral Circulation Infarction"
9
10 OR "Posterior Circulation Brain Infarction" OR "Lacunar Stroke*"
11
12 OR "Lacunar Syndrome*" OR "Lacunar Infarction*" OR "Lacunar
13
14 Infarct*" OR "Intracranial Vasospasm*" OR "Intracranial
15
16 Angiospasm*" OR "Intracranial Vascular Spasm*" OR "Cerebral
17
18 Vasospasm*" OR "Cerebrovascular Spasm*" OR "Cerebral
19
20 Angiospasm*" OR "Cerebral Artery Spasm*" OR "Hemiplegia*"
21
22 OR "Transient Hemiplegia*" OR "Monoplegia*" OR "Post-Ictal
23
24 Hemiplegia*" OR "Crossed Hemiplegia*" OR "Flaccid
25
26 Hemiplegia*" OR "Infantile Hemiplegia*" OR "Spastic
27
28 Hemiplegia*" OR "Pareses" OR "Paraparesis" OR "Muscular
29
30 Pares*" OR "Muscle Pares*" OR "Monopares*" OR "Lower
31
32 Extremity Pares*" OR "Crural Pares*" OR "Upper Extremity
33
34 Pares*" OR "Brachial Pares*" OR "Hemipares*" OR "Spastic
35
36 Paraparesis" OR "Neurologic Gait Disorder*" OR "Neurologic
37
38 Locomotion Disorder*" OR "Neurologic Ambulation Disorder*"
39
40 OR "Neurologic Gait Dysfunction*" OR "Duck Gait" OR
41
42 "Sensorimotor Gait Disorder*" OR "Athetotic Gait OR Broadened
43
44 Gait" OR "Drop Foot Gait" OR "Festinating Gait" OR "Frontal
45
46 Gait" OR "Hemiplegic Gait" OR "Hysterical Gait" OR Reeling
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	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

1		
2		
3		
4		'carotid arterial disorders':ab,ti OR 'carotid arteriopathy':ab,ti OR
5		
6		'carotid artery dis*':ab,ti OR 'carotid disease':ab,ti OR 'cerebral
7		
8		apoplexia':ab,ti OR 'cerebral artery occlusion':ab,ti OR 'cerebral
9		
10		
11		artery thrombosis':ab,ti OR 'cerebral blood circulation
12		
13		disorder':ab,ti OR 'cerebral blood flow disorder':ab,ti OR
14		
15		
16		'cerebral circulat* disorder':ab,ti OR 'cerebral emboli*':ab,ti OR
17		
18		
19		'cerebral haematoma':ab,ti OR 'cerebral haemorrhage':ab,ti OR
20		
21		
22		'cerebral infarct*':ab,ti OR 'cerebral insult':ab,ti OR 'cerebral
23		
24		isch*emia':ab,ti OR 'cerebral microbleed':ab,ti OR 'cerebral
25		
26		thrombosis':ab,ti OR 'cerebral vascular accident':ab,ti OR
27		
28		
29		
30		'cerebral vascular insufficiency':ab,ti OR 'cerebral
31		
32		vasospasm':ab,ti OR 'cerebro vascular accident':ab,ti OR
33		
34		
35		'cerebrovascular accident':ab,ti OR 'cerebrovascular arrest':ab,ti
36		
37		
38		OR 'cerebrovascular circulation disorder':ab,ti OR
39		
40		'cerebrovascular embolism':ab,ti OR 'cerebrovascular
41		
42		failure':ab,ti OR 'cerebrovascular infarction':ab,ti OR
43		
44		
45		'cerebrovascular injury':ab,ti OR 'cerebrovascular insu*':ab,ti OR
46		
47		
48		'cerebrovascular insu*':ab,ti OR 'cerebrovascular isch*emia':ab,ti
49		
50		
51		OR 'cerebrovascular obliteration':ab,ti OR 'cerebrovascular
52		
53		obstruction':ab,ti OR 'cerebrovascular occlusion':ab,ti OR
54		
55		
56		'cerebrovascular thrombosis':ab,ti OR 'cerebrum embolism':ab,ti
57		
58		
59		OR 'cerebrum vascular accident':ab,ti OR 'corpus callosum
60		

	<p>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</p>	
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						
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5						
6	1	Zhang Qin	2020	Influencing factors of fear of falling in patients with first cerebral infarction in recovery period	yes	
7						
8	2	Song Na	2020	Influencing factors and nursing countermeasures of falling fear in patients with cerebral apoplexy	no	Total quality evaluation score \leq 3 points
9						
10						
11	3	Luo Li-Lei	2020	Research status of falling fear in patients with cerebral infarction	no	Review
12						
13						
14	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
15						
16	5	Li Jing	2019	Study on the influence and the risk factors in Chengdu community post-stroke patients	no	Irrelevant research object
17						
18	6	Sun Hong-Yan	2017	Correlation between fear of falling and quality of life in patients with first stroke	no	Irrelevant research object
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21	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
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23						
24	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
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27	9	Cong Yan	2016	Risk Factors of Falls in Elderly Patients With Stroke and the Experience of Comprehensive Nursing Intervention	no	Irrelevant research object
28						
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30	10	LiYing	2014	The current status and influencing factors of fear of falling among the stroke older patients	yes	
31						
32	11	Guan, Q.	2013	Factors influencing fear of falling in patients with stroke	no	Irrelevant outcome indicators
33						
34	12	HuBei	2009	Risk factors and nursing intervention of falls with stroke patients	no	Irrelevant
35						
36	13	Li Ming-e	2008	Risk factors and nursing intervention for falls in the aged	no	Irrelevant research object
37						
38	14	Yadav, T.	2020	Factors affecting fear of falls in patients with chronic stroke	yes	
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3	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
4						
5				Perspectives, satisfaction, self-efficacy, and barriers to aerobic exercise reported by individuals with chronic stroke in a developing country		
6	16	Aguiar, L. T.	2020		no	Irrelevant research object
7						
8				Life-Space Mobility and Relevant Factors in Community-dwelling Individuals with Stroke in Japan: A Cross-sectional Study		
9	17	Tashiro, H.	2019		no	Irrelevant research object
10						
11				Prediction of physical activity level after mild stroke: A 6-month followup of 215 patients in the fall study of gothenburg (fallsgot)		
12	18	Persson, C. U.	2019		no	Conference abstract
13				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]		
14	19	Liu, Tai-Wa	2019		no	Irrelevant research object
15				Participation, Fear of Falling, and Upper Limb Impairment are Associated with High Sitting Time in People with Stroke		
16	20	Hanna, E.	2019		no	Irrelevant outcome indicators
17				Investigation of the relationship between balance and fear of falling and movement in stroke patients		
18	21	Sertel, M.	2018		no	Conference abstract
19				Relationship between fear of falls, daily living activities, and trunk control in stroke patients		
20	22	Saygili, F.	2018		no	Full text not found
21				Perceived and assessed balance in patients with stroke within 24 hours after discharge to home		
22	23	Rafsten, L.	2018		no	Conference abstract
23				stroke		
24	24	Mansfield, A.	2018		no	Handbook
25				Fear of falling in acute stroke: The Fall Study of Gothenburg (FallsGOT)		
26	25	Larén, A.	2018		yes	
27				Participation, fear of falling and upper limb impairment is associated with high sitting time in people with stroke		
28	26	Janssen, H.	2018		no	Duplicate data
29				Fear of falling is independently associated with agoraphobia after mild stroke and transient ischaemic attack		
30	27	Chun, H. Y. Y.	2018		no	Conference abstract
31				Fear of falling is independently associated with agoraphobia after mild stroke and TIA		
32	28	Chun, H. Y. Y.	2018		no	Conference abstract
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3	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
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6	30	Stout, R. D.	2017	Fear of falling for older and stroke-involved adults		Full text not found
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9	31	Oguz, S.	2017	The relationship between objective balance, perceived sense of balance, and fear of falling in stroke patients	no	Irrelevant outcome indicators
10						
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12	32	Ng, S.	2017	Fear of falling in patients with chronic stroke	no	Irrelevant research object
13						
14	33	Larén, A.	2017	Fear of falling acute after stroke: A part of the fall study in Gothenburg	no	Conference abstract
15						
16	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
17						
18	35				no	Conference abstract
19						
20						
21	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	
22						
23						
24	37	Nct,	2016	Fear of Falling in Patients With Chronic Stroke	no	Irrelevant research object
25						
26	38	Kavian, M.	2016	The correlation between the standing stability and fear of falling in patients with stroke	no	Full text not found
27						
28	39	Goh, H. T.	2016	Falls and Fear of Falling After Stroke: A Case-Control Study	yes	
29						
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31	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
32						
33	41	Schmid, Arlene A.	2015	Fear of Falling in People With Chronic Stroke	no	Irrelevant outcome indicators
34						
35	42	Schlick, C.	2015	Falls and fear of falling in vertigo and balance disorders: A controlled cross-sectional study	no	Irrelevant outcome indicators
36						
37	43	Loureiro, A. P. C.	2015	Sedentary behaviors in stroke survivors	no	Conference abstract
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3	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
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7	45	Guan, Q.	2015	Multifactor analysis for risk factors involved in the fear of falling in patients with chronic stroke from mainland China	yes	
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9	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
10						
11	47	Cho, K.	2015	Risk factors related to falling in stroke patients: a cross-sectional study	no	Irrelevant outcome indicators
12						
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14	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
15						
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17	49	Phadke, C. P.	2014	Relationship between spasticity and balance confidence in persons post-stroke	no	Conference abstract
18						
19	50	Park, J.	2014	Relationships of stroke patients' gait parameters with fear of falling	no	Irrelevant outcome indicators
20						
21	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
22						
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24	52	Jalayondeja, C.	2014	Six-month prospective study of fall risk factors identification in patients post-stroke	no	Irrelevant research object
25						
26	53	Da Silva, Carolyn P.	2014	Falling, Balance Confidence, and Fear of Falling After Chronic Stroke	no	Qualitative research
27						
28						
29	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
30						
31						
32	55	Kneebone, I.	2013	Fear of falling: Psychological management after stroke	no	Conference abstract
33						
34	56	Vahlberg, B.	2012	Factors related to mobility and physical activity in individuals one to three years after stroke	no	Conference abstract
35						
36	57	Perez-Jara, Javier	2012	Differences in fear of falling in the elderly with or without dizziness. [References]	no	Irrelevant research object
37						
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39	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
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2	59	Batchelor, F. A.	2012	Falls after stroke	no	Review
3				Fear of falling among people who have		
4	60	Schmid, A. A.	2011	sustained a stroke: A 6-month longitudinal pilot	no	Irrelevant outcome
5				study		indicators
6	61	Matsuda,	2011	Falls in multiple sclerosis	no	Irrelevant research
7		Patricia Noritake				object
8		Akosile,		Relationships between fall indices and physical		
9	62	Christopher	2011	function of stroke survivors in Nigeria...including	no	Irrelevant outcome
10		Olusanjo		commentary by Batchelor F and Bugdayci D		indicators
11				Fear of falling in the elderly with recurrent		
12	63	Zapata, Paloma	2010	dizziness: A descriptive study. [Spanish].	no	Not English/Chinese
13		Olmos		[References]		
14	64	Balash, Y.	2010	Disorders of gait with fear of fall in community	no	Conference abstract
15				dwelling elders		
16		Schmid, Arlene		Consequences of Poststroke Falls: Activity		
17	65	A.	2009	Limitation, Increased Dependence, and the	no	Qualitative research
18				Development of Fear of Falling		
19						
20	66	Schmid, A. A.	2009	Poststroke Fear of Failing in the Hospital Setting	no	Irrelevant outcome
21						indicators
22	67	McGrath, Joanna	2008	Fear of falling after brain injury. [References]	no	Irrelevant research
23		Collicutt				object
24	68	Batchelor, F.	2008	Fear of falling and falls after stroke: the chicken	no	Full text not found
25				or the egg?		
26	69	Andersson, Å G.	2008	Fear of falling in stroke patients: Relationship	no	Full text not found
27				with previous falls and functional characteristics		
28	70	Schmid, A. A.	2007	Fear of falling: An emerging issue after stroke	no	Qualitative research
29	71	Morley, John E	2007	Falls--where do we stand?	no	Irrelevant research
30						object
31				The temporal relationship between falls and		
32	72	Chou, Kee-Lee	2007	fear-of-falling among Chinese older primary-	no	Irrelevant research
33				care patients in Hong Kong.		object
34				The effects of reducing fear of falling on		
35	73	Balash, Y.	2007	locomotion in older adults with a higher level	no	Irrelevant research
36				gait disorder		object
37				The association of balance capacity and falls		
38	74	Belgen, B.	2006	self-efficacy with history of falling in	no	Irrelevant outcome
39				community-dwelling people with chronic stroke		indicators
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2	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
3						
4	76	Watanabe, Y.	2005	Fear of falling among stroke survivors after discharge from inpatient rehabilitation	no	incomplete data
5						
6	77	Rosén, E.	2005	Fear of falling, balance, and gait velocity in patients with stroke	no	Irrelevant outcome indicators
7						
8	78	Giladi, N.	2005	Clinical characteristics of elderly patients with a cautious gait of unknown origin	no	Irrelevant research object
9						
10	79	Stolze, H.	2004	Falls in frequent neurological diseases - Prevalence, risk factors and aetiology	no	Irrelevant research object
11						
12	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
13						
14	81	Strubel, D.	2001	[Dementia and falls]	no	Not English/Chinese
15	82	Karin Hellström	1999	Fear of falling in patients with stroke:a reliability study	no	Irrelevant outcome indicators
16						
17	83	Mahsa Kaviani	2016	The Correlation between the Standing Stability and Fear of Falling in Patients with Stroke	no	Not English/Chinese
18						
19	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
20						
21	85	Thomas Hadjistavropoulos	2011	The Relationship of Fear of Falling and Balance Confidence With Balance and Dual Tasking Performance	no	Irrelevant research object
22						
23	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
24						
25	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
26						
27	88	Zhou Min	2016	Current status and influencing factors of fear of falling among elderly in patients	no	Irrelevant outcome indicators
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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 scores
																				Selecti on	Compar ability	Outco me	NOS 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 (OR<1)	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 services	59	23	communi ty 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					

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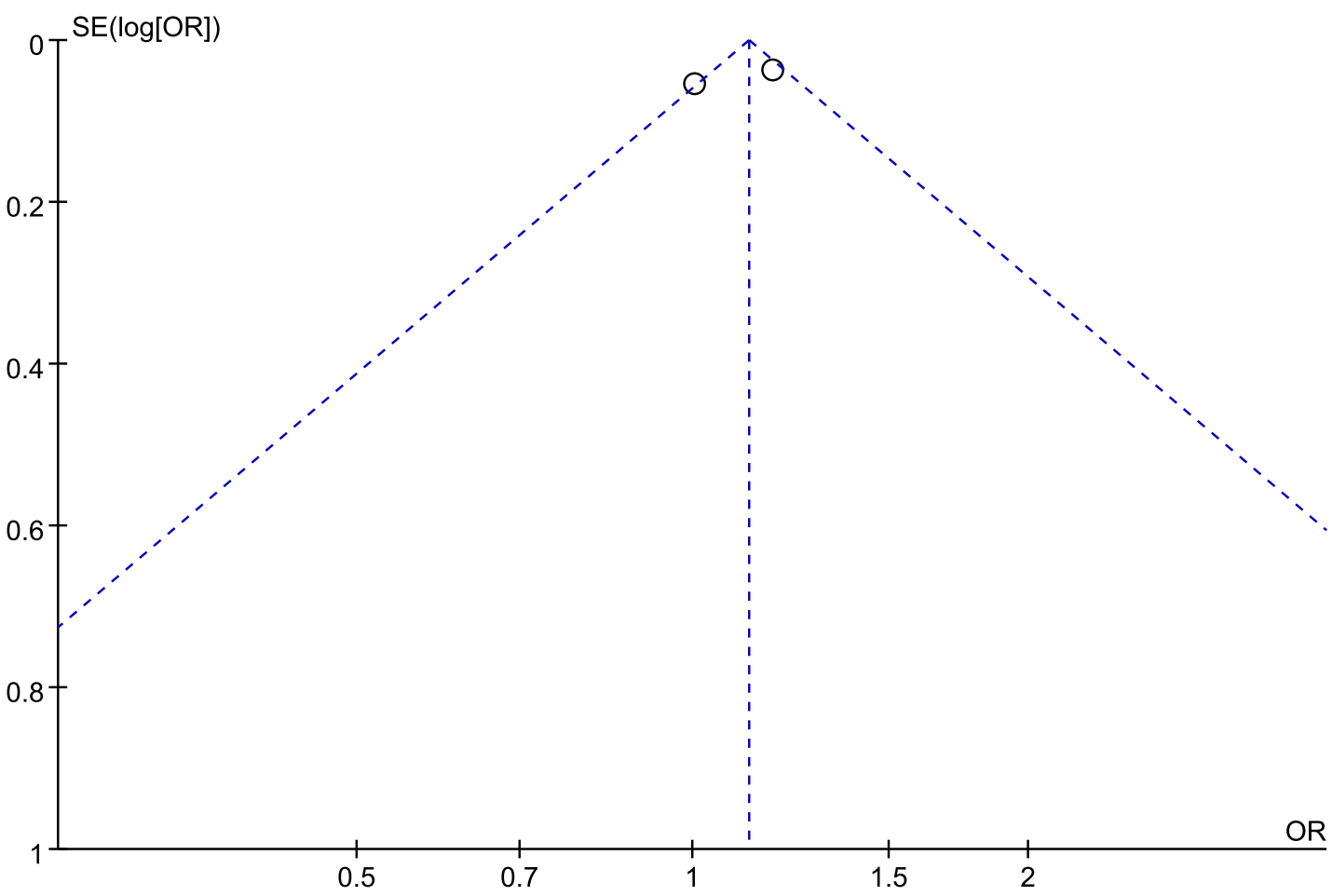
NO. 25	✓	Amanda Larén	2018	The single-item question, The SwePASS, SGPALS, using a walking aid and/or a wheelchair, NIHSS	prospective cohort study	between 1 October 2014 and 30 June 2016.	Sweden	462	the stroke unit of the Sahlgrenska University Hospital (SU)/Östra, Gothenburg, Sweden	237	225	similar participants	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	4	2	3	9
															2.SwePASS total score ≤24	9.41	5.13	17.25					
															3.SwePASS total score 25-30	2.29	1.36	3.83					
															4.SwePASS total score ≥31	1							
															5.Using a walking aid	3.4	2.12	5.43					
															6.SGPALS score--physically inactive (ref.)	1							
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 hospital	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	13	62		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 emotion	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)	aged 60 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 (1)	2.04	1.01	4.12

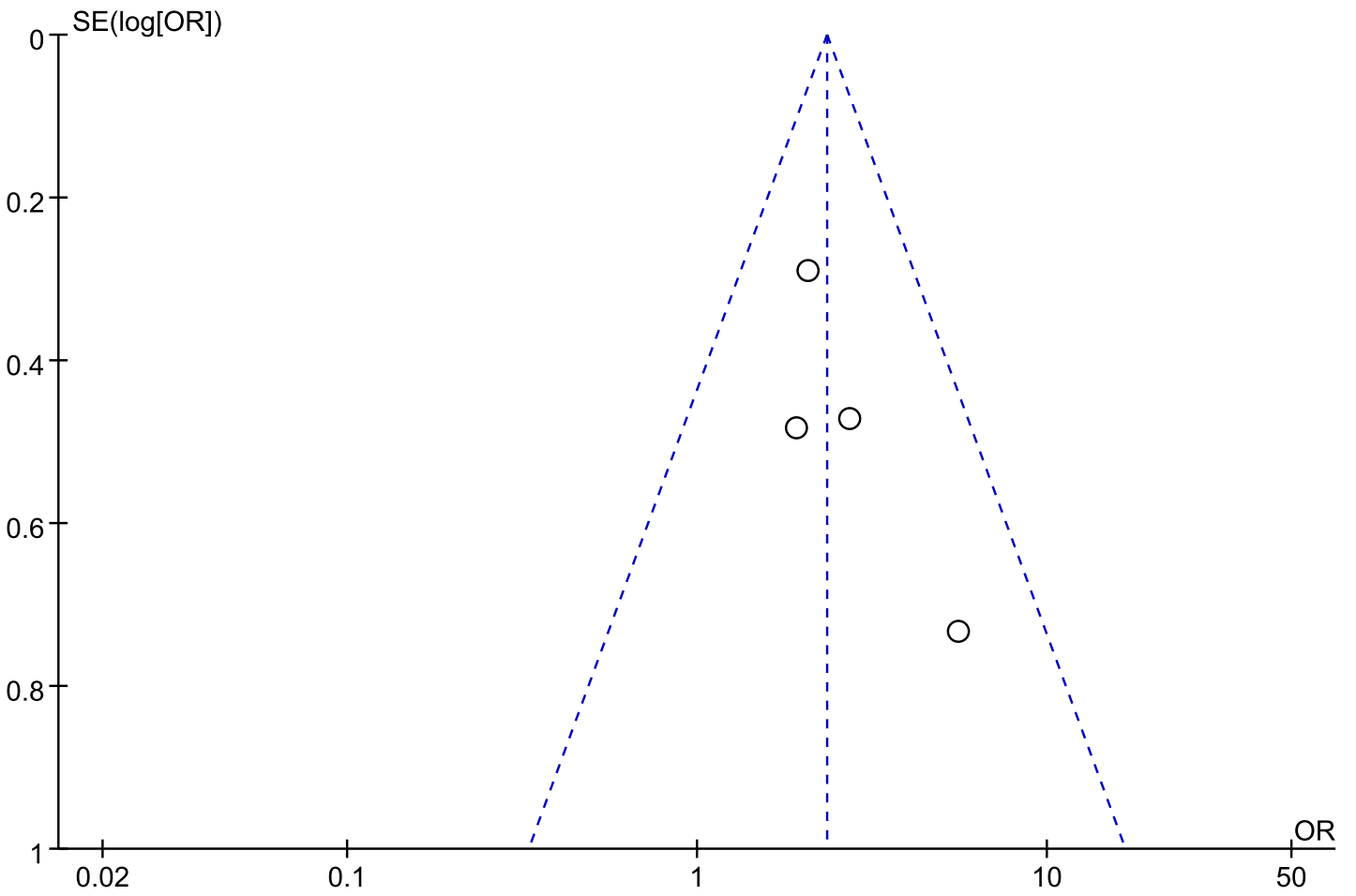
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PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	2
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	NO
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	4
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	6
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	6



PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	6
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	6
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	8
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	7
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	10-13
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	10-13
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	9
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	11-13
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	14
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	17
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	17
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	18

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BMJ Open

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

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Risk Factors for Fear of Falling in Stroke Patients: A Systematic Review and Meta-Analysis

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Keywords: Risk factors; fear of falling; stroke; systematic review; meta-analysis

Word count: 3,867

Abstract

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

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: 8 studies involving 1,597 participants were selected to analyze risk factors for stroke patients with FoF. The quality of all included studies was assessed and categorized 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 stroke patients were female (*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 inter-study 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 stroke patients might be at greater risk for FoF. Future studies are recommended to determine other risk factors specific to stroke patients.

Keywords: Risk factors; fear of falling; stroke; systematic review; meta-analysis

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 FoF in patients with stroke using validated screening tools.
- Searches included published and unpublished sources of literature to reduce the risk of omitting

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4 potentially eligible data.

- 5 ● Many risk factors were examined by a single study, thereby limiting our ability to meta-analyze
6 these potential risk factors.
- 7 ● The variability in methods of assessing risk and reporting the frequency of risk characteristics
8 limited analyses
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16 **1 Introduction**

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18 Stroke is the second leading cause of death worldwide¹, creating a serious burden on
19 caregivers^{2 3}. In 2010, an estimated 16.9 million stroke incidents occurred, increasing
20 the number of 33 million stroke survivors all over the world⁴. As a result, there were
21 5.9 million people who died, whereas 102 million people with disability-adjusted life-
22 years (DALYs) were lost because of the stroke.
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27 On the other hand, it is well known that stroke can cause physical damage, such as
28 weakness, paralysis, sensory disturbances, impaired postural control⁵, mental fatigue,
29 depression, and impaired cognitive function^{2 6}. According to the World Health
30 Organization⁷, a fall is defined as “an event which results in a person coming to rest
31 inadvertently on the ground or floor or other lower level, with or without injury.” Both
32 physical and mental impairments can contribute to a fall, a common complication after
33 a stroke⁸. Among those who survived a stroke, 22-48% have experienced at least one
34 fall in the hospital⁸⁻¹⁰ or the rehabilitation facility¹¹⁻¹³. There is a reported prevalence of
35 32–83% for FoF between the first six months and just over four years after stroke
36 onset¹⁴.
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47 A high level of FoF psychology that limits the patient’s active rehabilitation exercise
48 behavior, reduces their mobility, flexibility, and independence, and increases their
49 anxiety and depression¹⁵. The FoF psychology hinders the recovery of the adults’
50 physical and mental functions, thereby increasing the risk of falling and forming a
51 vicious circle¹⁶.
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57 In clinical practice, identifying FoF risk factors in stroke patients is more helpful in
58 guiding clinical practice. Many reports have mentioned that identifying the FoF status
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4 of stroke patients and strengthening the comprehensive interventions in this field, can
5 plausibly help break the vicious circle, relieve anxiety¹⁷, promote community
6 reintegration¹⁸, and improve the quality of life¹⁹. Some previous studies have proposed
7 the correlation between many potential risk factors and FoF, intervention measures to
8 reduce FoF incidence during stroke, and risk factors for falls in stroke patients²⁰.
9 However, the risk factors identified for FoF in different studies are inconsistent. These
10 reports have neither comprehensively explored sociodemographic, psychological, and
11 physical risk factors, nor included systematic reviews and meta-analyses of risk factors
12 for FoF in stroke patients²¹⁻²³. Therefore, we conducted this systematic review and
13 meta-analysis to identify risk factors for FoF in stroke patients.
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23 **2 Methods**

24 **2.1 Search strategy**

25 We searched PubMed, Embase, Cochrane Library, Web of Science, CINAHL,
26 PsycINFO, Grey literature, and other databases (from inception to July 2021) for
27 studies that identified risk factors for FoF in patients with stroke.
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31 Our search strategy used medical subject heading (MeSH) and natural language text
32 words. The first author designed specific search strategies and peer-reviewed electronic
33 search strategies. The specific search strategy for each database is mentioned in the
34 **Supplementary file 1**. References from relevant papers or reviews were hand-searched
35 for additional studies. For missing relevant data from studies, we contacted the study's
36 authors via email. All studies that were classified as FoF studies were then screened.
37 On 20 July 2021, another search was performed on the previously mentioned database
38 to search the articles published since the initial examination date.
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47 **2.2 Inclusion and exclusion criteria**

48 The inclusion criteria: (1) Published case-control studies, cohort studies, and cross-
49 sectional studies. (2) All participants 18 years and above and clinically diagnosed with
50 either first stroke or recurrent stroke. (3) Studies published in the English or Chinese
51 language. (4) Reported risk factors of FoF in patients with stroke using validated
52 screening tools. (5) The data can be extracted, including the spreadsheet of the pre-test
53 in the study.
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4 The exclusion criteria: (1) Review papers, case reports, meeting abstracts, qualitative
5 studies: (2) Duplicate literature or research with the same data. (3) Research on quality
6 evaluation results is low.
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9 Endnote X9 software was used to remove duplicates and facilitate the screening
10 process. All titles and abstracts were screened for inclusion/exclusion based on the
11 eligibility criteria. The full texts were evaluated if the title and abstract could not
12 accurately identify the possibly eligible studies (**Supplementary file 2**).
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17 **2.3 Data extraction and quality assessment**

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19 The literature extraction was independently conducted based on the search, reviewed,
20 and selected according to predefined criteria. The data were collected from studies: first
21 author, year of publication, geographical location, the measured/collected tools, study
22 type, research period, total sample size, sociodemographic data, and risk factors. The
23 odds ratio (OR) or the Risk Ratio (RR) and its 95% confidence interval (CI) was directly
24 extracted from the included studies. All the information was recorded in especially
25 standardized forms. For the missing relevant data of studies, we contacted the study's
26 authors via email; however, if the relevant data could not be obtained, the study was
27 excluded (**Supplementary file 3**).
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37 The methodologic quality assessment of case-control studies and cohort studies were
38 assessed by the Newcastle Ottawa Scale (NOS)²⁴ for the study population (4 items),
39 comparability (1 item), and outcome evaluation (3 items). The scale's total score was
40 kept as 9 points, where 0 to 3 were divided into low-quality research, 4 to 6 were divided
41 into medium quality research, and 7-9 were divided into high-quality research. In
42 addition, the risk of bias in a cross-sectional study was assessed using the instrument
43 Agency for Healthcare Research and Quality (AHRQ)²⁵. The tool had a total of 11 items
44 as follows: If the answer to an object was "No" or "UNCLEAR," the item's score was
45 "0"; if the answer was "Yes," the item score "1", with a total score of 0-11 Points, 0-3
46 points=low quality, 4-7 points=medium quality, 8-11 points=high quality²⁶. The
47 process of study selection, data extraction, and quality assessment were all conducted
48 in duplicate (Q Xie and JH Pei) with third-party adjudication (XM Dou) for
49 disagreements.
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2.4 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 used²⁷⁻²⁹. The findings were illustrated in the form of forest plots. Publication bias was identified using a funnel plot and Egger's test³⁰. We planned to conduct subgroup and meta-regression analyses based on sample size and proportion of female³¹. 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.

2.5 Patient and public involvement

No patient was involved in the study.

3 RESULTS

3.1 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 analyzing the title and abstract, ultimately, 92 publications were selected for the full-text assessment. Finally, eight full-text studies with 1,597 participants were found eligible and included in this meta-analysis.

3.2 Study Characteristics and Methodologic Quality

The included 8 studies were conducted in 3 regions i.e., Asia ($n = 4$), North America ($n = 1$), and Europe ($n = 3$). Among these eight studies, 2 were cross-sectional, 4 were case-control, and 2 were prospective cohort studies. A summary of literature characteristics used in the analysis is shown in **Table 1**.

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4 The NOS assessed the quality of the case-control studies and prospective cohort
5 studies. The NOS scores ranged from 7 to 9, indicating a high level of studies quality.
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7 In the 2 cross-sectional studies, the AHRQ scores ranged from 4 to 6, indicating a
8 moderate level of quality. The overall score indicated the relatively high quality of the
9 literature included in this study.
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Table. 1 Characteristics of the included studies

Author, year ^a , country	Study design	Sample size (N)	Age, years(Mean ±SD)	Female N (%)	Outcome Ascertainment	Research period	Stroke reference period	Adjusted risk factors ^b	NOS ^{c/} AHRQ ^d scores
Zhang Qin. et al. ³⁴ ,2020, china	Cross-sectional study	221	60.13±8.72 ^b	88 (39.8) ^b	The self-made questionnaire, 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. ³⁵ ,2014, China	Case-control study	170	73.54 ^e Male: 73.0±8.4 Female: 74.2±7.6	76 (44.70) ^b	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 6 meters	9
Yadav, T. et al. ³⁶ ,2020, India	Case-control study	82	51.6 ± 12.13 ^b	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 ¹⁴ , 2018, Sweden	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, A. et al. ³⁷ .2016, Canada	Case-control study	208	FoF: 68.6 ±11.6 No FoF: 65.3±13.6	FoF:52 (61.9) No FoF:	The single-item question, ABC	October 2009 and September	In-patient stroke rehabilitation	1. Grasp reactions 2. Assists	8

				43 (34.7)		2012				
Goh, H. T. et al. ³⁸ .2016,	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	
China										
Beliz Belgen. et al. ³⁹ .2006,	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	
Sweden										
Netha Hussain. et al. ⁴⁰ .2021	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	
Sweden										

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

4 Results of the meta-analysis

4.1 Sociodemographic factors

Three of the 8 studies reported the relationship between sociodemographic factors and FoF, whereas the two reported predictors were age and female. Due to the limited number of studies, the ability to assess the publication bias by the funnel plot and Egger's test was unsuccessful³⁰.

4.1.1 Age

Two studies with 500 participants reported the relationship between age and FoF in stroke patients. 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).

4.1.2 Female

Two studies with 741 participants reported the correlation between females and FoF in stroke patients. 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**).

4.2 Physical factors

4.2.1 Balance ability

Three studies reported the correlation between balance ability and FoF^{14 35 40} (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. Li Ying et al. (2014)³⁵ measured balance ability with the Berg Balance Scale (BBS) score, whereas Amanda Larén et al. (2009)¹⁴ and Netha Hussain et al. (2021)⁴⁰ defined it by using the SwePASS score (postural control). Subgroup analysis of the SwePASS score showed that stroke patients 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

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4 difference was statistically significant ($p=0.007$). There was no evidence of publication
5 bias based on the Egger's test ($p=0.135$).
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7 8 **4.2.1 Mobility**

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10 A meta-analysis using a fixed-effects model included three studies on the risk factors
11 of FoF (377 participants) demonstrated a significantly higher incidence of FoF in lower
12 mobility stroke patients ($OR=1.12$; $95\%CI$, 1.05 to 1.19; **Figure. 3b**) and revealed a
13 considerable heterogeneity between the studies ($p=0.0003$, $I^2=84\%$). Meta-regression
14 was performed to explore potential sources of heterogeneity based on an a priori list of
15 factors related to clinical prognosis³³. Meta-regression analysis showed subgroup
16 effects for age ($p_{interaction}=0.017$), sample size ($p_{interaction}=0.019$) and proportion of
17 female ($p_{interaction}=0.019$). Sensitivity analysis (leave-one-out method) showed that the
18 pooled estimate was stable. In addition, there was no evidence of publication bias
19 according to a funnel plot (**Supplementary file 4**) and the Egger's test ($p=0.619$).
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29 **4.3 History of falls**

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31 Four studies reported the correlation between experience of falls and FoF^{34 35 39 40} (720
32 participants). Furthermore, Yuriko Watanabe et al. (2005)⁴¹ reported that 87.9% of those
33 who have experienced a fall would have a FoF for stroke patients. Fixed-effects model
34 analysis included four studies that revealed that the risk of FoF in stroke patients with
35 a history of falls was 2.33 times higher than no falls ($OR= 2.33$; $95\%CI$, 1.54 to 3.53;
36 $I^2 = 0\%$; **Figure. 4**). There was no evidence of publication bias according to a funnel
37 plot (**Supplementary file 5**) and the Egger's test ($p=0.205$).
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45 **4.4 Use of walking aid**

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47 Two studies listed the relationship between the walking aid for stroke patients and FoF¹⁴
48 ⁴⁰ (741 participants). Amanda Larén et al. (2009)¹⁴ reported valuable insight for those
49 involved in stroke rehabilitation during the acute phase after stroke. FoF was associated
50 with the use of a walking aid. Whereas Netha Hussain et al. (2021)⁴⁰, using the
51 multivariable regression model, showed that the walking support for FoF was not
52 statistically significant. A meta-analysis using a fixed-effects model that included two
53 studies revealed that the risk of FoF in stroke patients who used a walker is 1.98 times
54 that of those who did not use a walker. ($OR= 1.98$; $95\% CI$, 1.37 to 2.88, $I^2=93\%$;
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Figure. 5).**4.5 Other risk factors**

Only six factors were assessed in more than 1 study and found eligible for meta-analysis. All other risk factors estimated are described narratively based upon 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.

Zhang Qin et al. (2020)³⁴ and Arlene. A et al. (2011)⁴² 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, T, et al.³⁶ 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 lower extremity motor function can reduce the chances of belonging to no FoF.

Furthermore, Schinkel-Ivy et al.³⁷ 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, NJ) to measure gait, where walking velocity and double support time were used as an outcome indicator⁴³. Data on other risk factors can be found in **Table 2**.

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 ³⁴	2.29	1.43	3.67	<0.001
Depression ³⁴	1.80	1.22	2.67	0.003
Marital status ³⁴	0.62	0.44	0.88	0.006
Lower limb motor function ³⁶	1.14	1.00	1.29	0.047
SGPALS score---Physically inactive ⁴⁰	2.04	1.01	4.12	0.048
Reactive stepping ³⁷				
Grasp reactions	0.98	0.95	1.01	0.23
Assists	0.98	0.96	1.00	0.086

OR: odds ratio; RR: relative risk; LL: lower limit; UL: upper limit

5 Discussion

This study included observational studies with 1,597 stroke participants. Out of the 8 studies, 2 were cross-sectional studies, 4 were case-control studies, and 2 were prospective cohort studies with a wide range of patient characteristics. Further, 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 8 studies and another meta-analysis on fall risk factors in community stroke survivors²⁰ 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 stroke patients (*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 elderly⁴⁴, our analysis also revealed that the problems of fall history and gait were related to FoF. Further, 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 analyzed. For example, Semra Oguz et al.⁴⁵ found a strong negative correlation between objective balance (measured by BBS scores) and FES scores ($r = -0.808$); however, there was a strong positive correlation between perceived sense of balance (PSB) and FES score ($r = 0.714$). Further, the present study's balance ability and mobility analysis results were in-concurrence with the study of Kihun Cho et al.⁴⁶, who showed that the FoF and they were positively correlated (respectively, $r = 0.669$; $r=0.545$). Other studies, such as Christopher et al.⁴⁷ showed a negative correlation between physical function and fall efficacy ($r=-0.66$). Eun Joo Kim et al.¹⁹ revealed that the physical factors, including the functional ambulation category, hip abductor strength, knee extensor, and ankle plantar

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4 flexor had a negative correlation with FoF (respectively $r=-0.673$; $r=-0.534$; $r=-0.478$;
5 $r=-0.501$). Of note, the above results are contrary, which can result from different
6 statistical analyses and research focuses used in these studies. Further, gait speed was
7 related to the ability to maintain balance, where gait disorders limited the independent
8 life of stroke patients⁴⁸. Due to reduced weight transfer capacity and stability, many
9 stroke survivors might find it challenging to maintain their balance⁴⁸. A previous study
10 showed that the stroke patient's gait patterns were slow and required excessive exertion;
11 however, these patient's legs were not well coordinated. Thus, increased foot support
12 time and decreased gait speed in these patients with balance disorders were the risk of
13 falls and increased anxiety⁴⁹. Combined with clinical analysis, stroke mainly occurs in
14 the 60 to 70 years old, where the decline of body function inevitably leads to the FoF.
15 Impaired balance can easily cause patients to fall and thus cause them to be aware of
16 the surrounding environment and the safety of their activities, which eventually
17 increases the patient's psychological tension, worry, and FoF⁵⁰. Therefore, it is vital to
18 explore the relationship between FoF and body function in clinical practice using large-
19 scale prospective studies.

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35 In addition to the factors mentioned in the various studies, elements such as post-
36 stroke psychological factors, long-term sitting, and quality of life research have been
37 studied for the relationship with the FoF. Anxiety & depression ($r=0.400$), energy,
38 mobility, self-care and upper extremity function of quality of life (Pearson's correlation
39 coefficients were $r=-0.476$; $r=-0.615$; $r=-0.617$; $r=-0.507$)¹⁹ were correlated with FoF.
40 A significantly positive correlation was seen between FES-I and sitting time ($r=0.579$)⁵¹
41 The study on differences in gait and balance measures in patients with chronic stroke
42 with the different levels of attention related to falls, showed that patients with chronic
43 strokes and slight concern about falling have better gait and balance capabilities than
44 patients with high levels of concern⁵². Therefore, these results are potentially clinically
45 relevant and would be useful to study if reducing FoF can improve gait, quality of life,
46 physical function, and balance performance in these patients. Further, it would also be
47 useful to measure FoF as the assessment of psychological factors, quality of life, and
48 physical function in these patients. Although stroke itself is not a direct factor in causing
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4 the FoF, as a long-term chronic disease, it indicates that the patient's body functions
5 are further declining. Importantly, the treatment of long-term chronic diseases further
6 declines or loses the patient's self-efficacy and self-confidence in behavioral activities,
7 which eventually leads to FoF. The decreases in self-esteem can directly cause
8 depression, anxiety, and limited self-care ability and affect FoF. Additionally, in the
9 recovery stage of the first stroke, the walking function is the main factor affecting the
10 occurrence of falls. Since most stroke patients have limb dysfunction, the need to assist
11 in walking during the initial stage of recovery or within a certain period increases the
12 risk of falls.
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21 Furthermore, there is a particular aspect regarding the causal relationship between
22 falling and fear of falling. Some studies have confirmed that FoF is an essential
23 predictor of falls in stroke patients⁵³⁻⁵⁵, and several other studies have suggested that
24 people who have experienced a fall were more likely to have FoF^{56 57}. A recent study
25 has confirmed that the history of falls in the recent time was a good predictor for the
26 FoF, but the FoF is a predictor of falls during follow-up only in the unadjusted model⁵⁸.
27 In the current study, differences were observed among the included studies in terms of
28 evaluation for the fall history. The fall history was defined as whether a fall was
29 occurred in the past 6 months, within the past 1 year, or within 6 meters of walking.
30 During these different periods, the probability of falling in stroke patients was different,
31 which affects the likelihood of occurrence of FoF⁵⁹.
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43 Considering the global prevalence of stroke-related falls or FoF, this study provided
44 evidence for developing appropriate preventable measures for decreasing the FoF risk
45 in stroke patients. The risk factors of FoF for stroke patients in Asia included marital
46 status, social support status, and payment methods for medical insurance⁶⁰; However,
47 current guidelines for stroke management provide no specific recommendations for
48 psychological monitoring or the FoF management⁶¹. Therefore, more studies are
49 required for developing effective evaluation methods and treatment strategies against
50 FoF among stroke patients to improve their physical function, mental health, and quality
51 of life.
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4 This meta-analysis had several significant findings. First, most of the included
5 studies were relatively high quality, with robust evidence. Second, under the premise
6 of a large sample size, the risk factors of falling fear in stroke patients were ensured by
7 quantitative analysis. Hence, our findings may be more convincing compared to the
8 individual studies. Additionally, the research data included in this study was adjusted,
9 and the results of the data analysis were not affected by the patient's baseline
10 characteristics. We also explored the sources of heterogeneity using meta-regression if
11 the analysis included more than two studies. We pre-specified sample size and the
12 proportion of females as the meta-regression variables because we considered that
13 studies with smaller sample size and a larger proportion of females could have a larger
14 impact on FoF³¹. In the post-hoc analyses, we also added age and SwePASS score as
15 potential regressors because previous studies showed that older populations and smaller
16 SwePASS scores could lead to a larger impact on FoF³¹⁻³³.

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29 Despite the above important findings, this study had some limitations. (1) Two of the
30 included reports were cross-sectional studies, and thus the ability to hypothesize
31 etiology was weak. (2) All the included studies were observational studies, and
32 therefore the role of confounding factors should be considered. However, due to the
33 limited number of studies, a multivariate meta-analysis could not be performed to assess
34 the robustness of our findings and analyze the effect size of multiple risk factors at the
35 same time⁶². (3) The effects of the patient's inner anxiety, and depression, as well as
36 the motor function of the lower limbs on the risk of falling fear in stroke patients, have
37 been reported in fewer studies. Therefore, the conclusions may vary for individual
38 studies. (4) This meta-analysis only included English and Chinese studies; thus, it
39 probably missed the relevant studies in other languages, which leads to biases in
40 estimates in Western countries. However, there is currently no evidence suggesting that
41 the meta-analysis of language limitations can lead to such bias^{63 64}. In the end, the
42 analysis was based on the overall research level and not on personal data.

56 **6 Conclusion**

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

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18 Overall, there is a paucity of empirical data in this area. Many of the factors identified
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20 in general population samples have not been studied in stroke patients. In addition, other
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22 risk factors specific to stroke patients (e.g., gait speed and gait-related factors) need to
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24 be evaluated to identify stroke patients at risk for FoF. Finally, researchers should
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26 explore how some variables (i.e., anxiety and depression) interact with FoF and how to
27
28 better protect stroke patients from it. This intervention will reduce the personal and
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30 financial burden and promote these patients' early recovery.

31 **Footnotes:**

32 **Supplementary file**

- 33 1. The search strategy of the database.
- 34 2. Literature Selection.
- 35 3. Data extraction.
- 36 4. Funnel plot—Mobility
- 37 5. Funnel plot—History of falls

38 **Contribution statement:**

39 Qi Xie and Ju-Hong Pei contributed equally to this work

40 Study Design: Qi Xie, Ju-Hong Pei, Xin-Man Dou.

41 Analysis and interpretation of data: Qi Xie, Ju-Hong Pei, Ya-Bin Zhang, Ling Gou.

42 Drafting of the manuscript: Qi Xie, Ju-Hong Pei, Juan-Ping Zhong, Xin-Man Dou.

43 Critical revision of the manuscript: Yu-Jie Su, Xin-Man Dou, Ling Gou, Xing-Lei
44 Wang, Li Ma.

45 Approval of the final version for publication: All the authors.

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7

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21 **Data availability statement:** All data relevant to the study are included in the article
22 or uploaded as supplementary information.
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26 **Patient consent for publication:** Not applicable.
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29 **Ethics and dissemination:** Not applicable.
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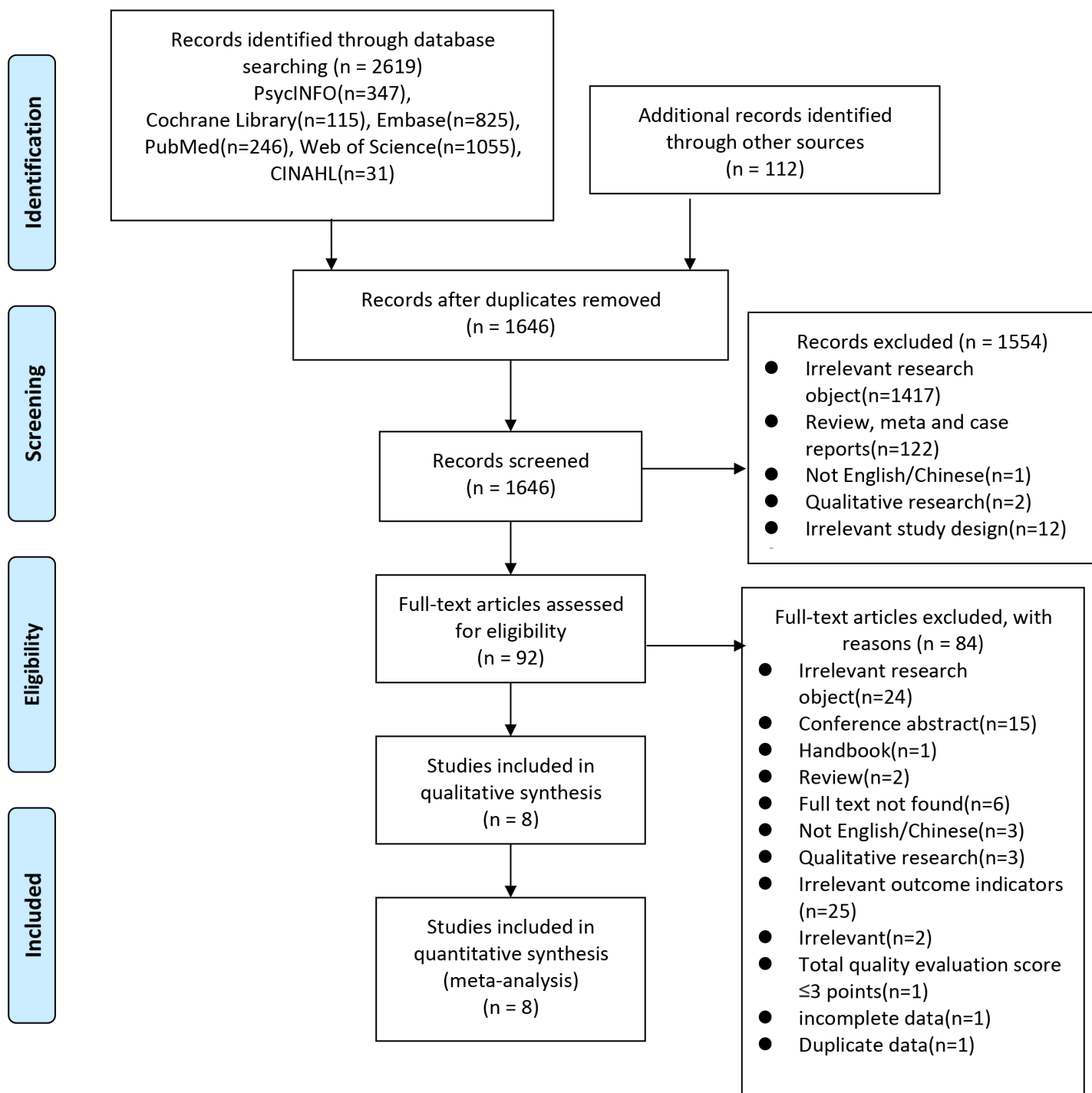
Figure. 1 Flow diagram of study selection in the meta-analysis

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.

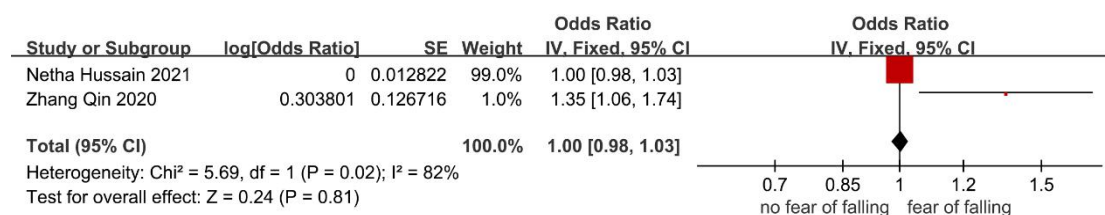
Figure. 3 Meta-analyses for the association between physical risk factors and fear of falling:(a) balance ability, (b) mobility.

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

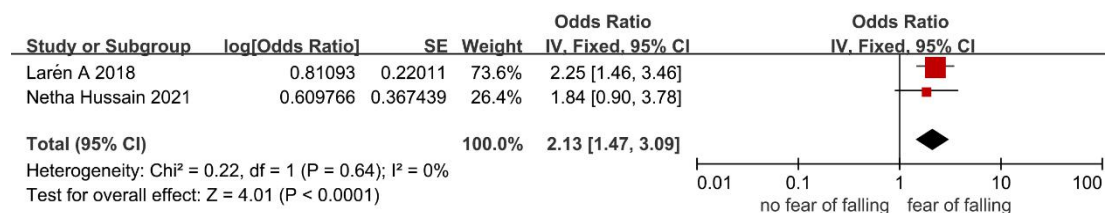
Figure. 5 Meta-analyses for the association between using walking aid and fear of falling.



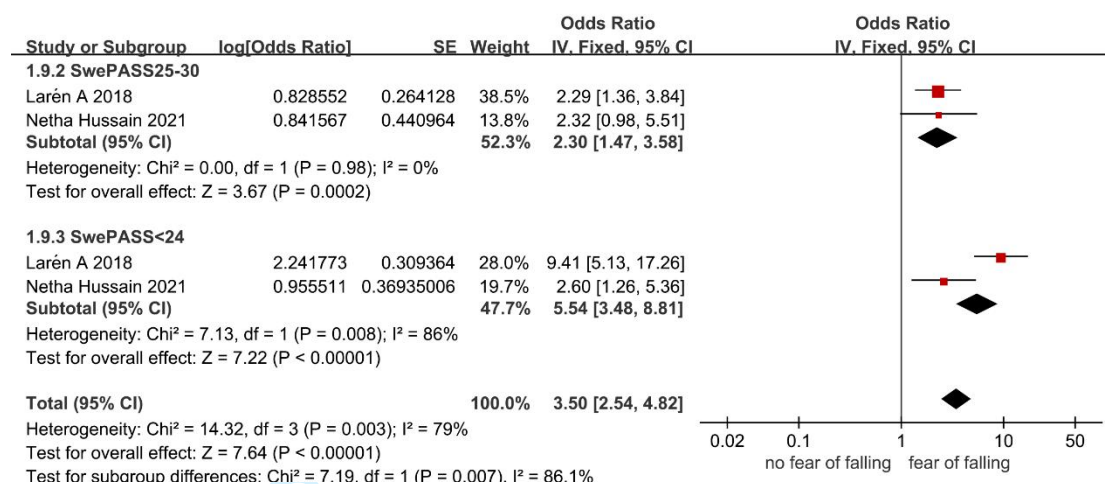
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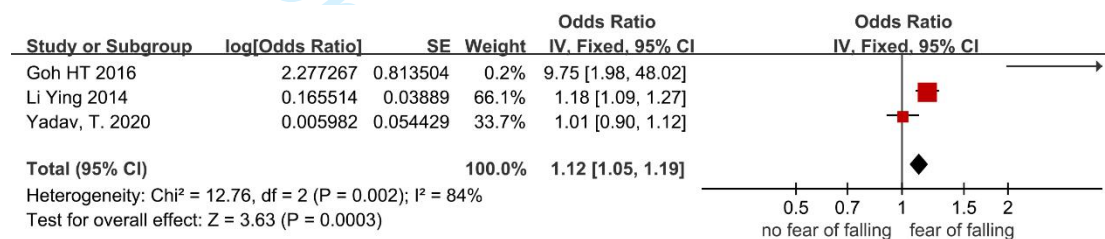
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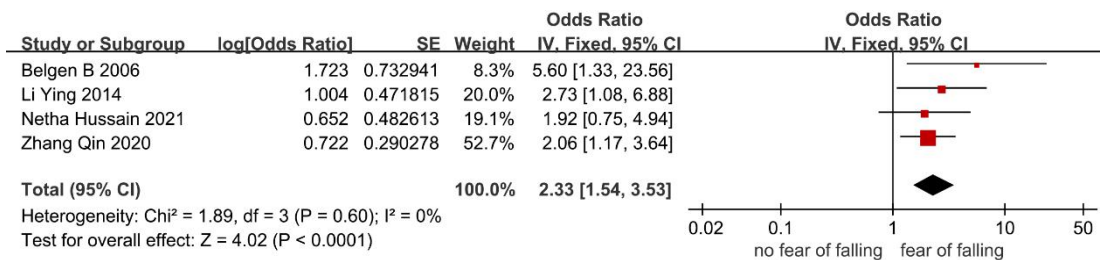


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#	searches	results
1	"Stroke"[MeSH Terms] OR "Carotid Artery Diseases"[MeSH Terms] OR "Cerebrovascular Disorders"[MeSH Terms] OR "Basal Ganglia Cerebrovascular Disease"[MeSH Terms] OR "Cerebral Infarction"[MeSH Terms] OR "Brain Ischemia"[MeSH Terms] 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

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4	Infarction"[Title/Abstract]	OR	"Hemorrhagic	
5				
6	Stroke"[Title/Abstract]	OR	"Ischemic Stroke"[Title/Abstract]	OR
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9	"Embolic Stroke"[Title/Abstract]	OR	"Thrombotic	
10				
11	Stroke"[Title/Abstract]	OR	"Cardiovascular	
12				
13	Diseases"[Title/Abstract]	OR	"Vascular Diseases"[Title/Abstract]	
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15				
16	OR "Carotid Artery Disease*"[Title/Abstract]	OR	"Carotid Artery	
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18	Disorder*"[Title/Abstract]	OR	"Carotid Arterial	
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20	Disease*"[Title/Abstract]		OR"Carotid	
21				
22	Atheroscleros*"[Title/Abstract]	OR	"Carotid Atherosclerotic	
23				
24	Disease*"[Title/Abstract]	OR	"Internal Carotid Artery	
25				
26	Diseases"[Title/Abstract]	OR	Common Carotid Artery	
27				
28	Diseases[Title/Abstract]	OR	External Carotid Artery	
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30	Diseases[Title/Abstract]	OR	External Carotid Arterial	
31				
32	Diseases[Title/Abstract]	OR	"Carotid Artery	
33				
34	Thrombosis"[Title/Abstract]	OR	"Cerebrovascular	
35				
36	Disorder*"[Title/Abstract]	OR	"Intracranial Vascular	
37				
38	Disease*"[Title/Abstract]	OR	"Intracranial Vascular	
39				
40	Disorder*"[Title/Abstract]	OR	"Cerebrovascular	
41				
42	Disease*"[Title/Abstract]	OR	"Brain Vascular	
43				
44	Disorder*"[Title/Abstract]	OR	"Cerebrovascular	
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46	Occlusion*"[Title/Abstract]	OR	"Cerebrovascular	
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48	Insufficienc*"[Title/Abstract]	OR	"Basal Ganglia Vascular	
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1	Disease*[Title/Abstract]	OR	"Lenticulostriate
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3	Vasculopath*[Title/Abstract]	OR	Lenticulostriate
4			Vascular
5	Disease*[Title/Abstract]	OR	Vascular
6			Lenticulostriate
7	Diseases[Title/Abstract]	OR	"Basal
8			Ganglia
9	Hemorrhage"[Title/Abstract]	OR	"Putaminal
10			
11	Hemorrhage"[Title/Abstract]	OR	"Cerebral
12			
13	Infarct*[Title/Abstract]	OR	"Left Hemisphere
14			Cerebral
15	Infarction"[Title/Abstract]	OR	"Subcortical
16			
17	Infarction*[Title/Abstract]	OR	"Posterior Choroidal Artery
18			
19	Infarction"[Title/Abstract]	OR	"Anterior Choroidal Artery
20			
21	Infarction"[Title/Abstract]	OR	"Right Hemisphere
22			Cerebral
23	Infarction"[Title/Abstract]	OR	"CADASIL"[Title/Abstract]
24			OR
25	"Multi-Infarct Dementia"[Title/Abstract]	OR	"Anterior Cerebral
26			Artery
27	Infarction"[Title/Abstract]	OR	"Middle Cerebral Artery
28			
29	Infarction"[Title/Abstract]	OR	"Posterior Cerebral Artery
30			
31	Infarction"[Title/Abstract]	OR	"Brain Ischemia*[Title/Abstract]
32			
33	OR "Ischemic Encephalopath*[Title/Abstract]	OR	"Cerebral
34			
35	Ischemia*[Title/Abstract]	OR	"Brain
36			
37	Hypoxia-Ischemia"[Title/Abstract]	OR	"Cerebral Small Vessel
38			
39	Disease*[Title/Abstract]	OR	"Cerebral
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41	Microangiopath*[Title/Abstract]	OR	"Intracranial Arterial
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43	Disease*[Title/Abstract]	OR	"Intracranial Arterial
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4	Disorder*"[Title/Abstract]	OR	"Arterial	Brain
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6	Disease*"[Title/Abstract]	OR	Brain	Arterial
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9	Disease*"[Title/Abstract]	OR	Arterial	Brain
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11				
12	Disorder*"[Title/Abstract]	OR		"Intracranial
13				
14	Hemorrhage*"[Title/Abstract]	OR	"Posterior	Fossa
15				
16				
17	Hemorrhage*"[Title/Abstract]		OR	"Brain
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19	Hemorrhage*"[Title/Abstract]		OR	"Cerebral
20				
21				
22	Hemorrhage"[Title/Abstract]	OR	"Cerebral	Intraventricular
23				
24				
25	Hemorrhage"[Title/Abstract]	OR	"Hypertensive	Intracranial
26				
27	Hemorrhage"[Title/Abstract]	OR	"Cranial	Epidural
28				
29				
30	Hematoma"[Title/Abstract]		OR	"Subdural
31				
32	Hematoma"[Title/Abstract]		OR	"Pituitary
33				
34				
35	Apoplexy"[Title/Abstract]		OR	"Subarachnoid
36				
37				
38	Hemorrhage"[Title/Abstract]		OR	"Brain
39				
40	Infarction*"[Title/Abstract]	OR	"Brain Infarct*"[Title/Abstract]	OR
41				
42				
43	"Anterior Circulation Brain Infarction"[Title/Abstract]	OR	"Brain	
44				
45	Venous Infarction*"[Title/Abstract]	OR	"Anterior Cerebral	
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47				
48	Circulation Infarction"[Title/Abstract]	OR	"Posterior Circulation	
49				
50	Brain Infarction"[Title/Abstract]		OR	"Lacunar
51				
52				
53	Stroke*"[Title/Abstract]	OR	"Lacunar Syndrome*"[Title/Abstract]	
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55				
56	OR "Lacunar Infarction*"[Title/Abstract]		OR	"Lacunar
57				
58	Infarct*"[Title/Abstract]		OR	"Intracranial
59				
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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]
"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]
"Paraparesis*[Title/Abstract]	OR	"Muscular
Pares*[Title/Abstract]	OR	"Muscle Pares*[Title/Abstract]
"Monopares*[Title/Abstract]	OR	"Lower Extremity
Pares*[Title/Abstract]	OR	"Crural Pares*[Title/Abstract]
"Upper Extremity Pares*[Title/Abstract]	OR	"Brachial
Pares*[Title/Abstract]	OR	"Hemipares*[Title/Abstract]
"Spastic Paraparesis*[Title/Abstract]	OR	"Neurologic Gait
Disorder*[Title/Abstract]	OR	Neurologic Locomotion

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44	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]	
45 46 47	3 #1 OR #2	654,634
48 49 50 51 52	4 "Accidental Falls"[MeSH Terms] OR "Accidents"[MeSH Terms] OR "Accident Prevention"[MeSH Terms]	198,327
53 54 55 56 57 58 59 60	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
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	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 Atheroscleros* 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

	<p> 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 </p>	
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	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

1		
2		
3		
4	Atheroscleros*	OR Carotid Atherosclerotic Disease*
5		OR
6	Internal Carotid Artery Diseases	OR Common Carotid Artery
7		Diseases
8		OR External Carotid Artery Diseases
9		OR External
10		Carotid Arterial Diseases
11		OR Carotid Artery Thrombosis
12		OR
13	Cerebrovascular Disorder*	OR Intracranial Vascular Disease*
14		OR Intracranial Vascular Disorder*
15		OR Cerebrovascular
16		Disease*
17		OR Brain Vascular Disorder*
18		OR Cerebrovascular
19		Occlusion*
20		OR Cerebrovascular Insufficienc*
21		OR Basal Ganglia
22		Vascular Disease*
23		OR Lenticulostriate Vasculopath*
24		OR
25	Lenticulostriate Vascular Disease*	OR Vascular Lenticulostriate
26		Diseases
27		OR Basal Ganglia Hemorrhage
28		OR Putaminal
29		Hemorrhage
30		OR Cerebral Infarct*
31		OR Left Hemisphere
32		Cerebral Infarction
33		OR Subcortical Infarction*
34		OR Posterior
35		Choroidal Artery Infarction
36		OR Anterior Choroidal Artery
37		Infarction
38		OR Right Hemisphere Cerebral Infarction
39		OR
40	CADASIL	OR Multi-Infarct Dementia
41		OR Anterior Cerebral
42		Artery Infarction
43		OR Middle Cerebral Artery Infarction
44		OR
45	Posterior Cerebral Artery Infarction	OR Brain Ischemia*
46		OR
47	Ischemic Encephalopath*	OR Cerebral Ischemia*
48		OR Brain
49		Hypoxia-Ischemia
50		OR Cerebral Small Vessel Disease*
51		OR
52	Cerebral Microangiopath*	OR Intracranial Arterial Disease*
53		OR
54	Intracranial Arterial Disorder*	OR Arterial Brain Disease*
55		OR
56		
57		
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1		
2		
3		
4	Brain Arterial Disease*	OR Arterial Brain Disorder*
5		OR
6	Intracranial Hemorrhage*	OR Posterior Fossa Hemorrhage*
7		OR
8	Brain Hemorrhage*	OR Cerebral Hemorrhage
9		OR Cerebral
10		Intraventricular Hemorrhage
11		OR Hypertensive Intracranial
12		Hemorrhage
13		OR Cranial Epidural Hematoma
14		OR Subdural
15		Hematoma
16		OR Pituitary Apoplexy
17		OR Subarachnoid
18		Hemorrhage
19		OR Brain Infarction*
20		OR Brain Infarct*
21		OR Anterior
22		Circulation Brain Infarction
23		OR Brain Venous Infarction*
24		OR
25		Anterior Cerebral Circulation Infarction
26		OR Posterior
27		Circulation Brain Infarction
28		OR Lacunar Stroke*
29		OR Lacunar
30		Syndrome*
31		OR Lacunar Infarction*
32		OR Lacunar Infarct*
33		OR
34		Intracranial Vasospasm*
35		OR Intracranial Angiospasm*
36		OR
37		Intracranial Vascular Spasm*
38		OR Cerebral Vasospasm*
39		OR
40		Cerebrovascular Spasm*
41		OR Cerebral Angiospasm*
42		OR
43		Cerebral Artery Spasm*
44		OR Hemiplegia*
45		OR Transient
46		Hemiplegia*
47		OR Monoplegia*
48		OR Post-Ictal Hemiplegia*
49		OR
50		Crossed Hemiplegia*
51		OR Flaccid Hemiplegia*
52		OR Infantile
53		Hemiplegia*
54		OR Spastic Hemiplegia*
55		OR Pareses
56		OR
57		Paraparesis
58		OR Muscular Pares*
59		OR Muscle Pares*
60		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

	<p>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+")</p>	
2	<p>"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 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</p>	38,873

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60	"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	
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4 "Subarachnoid Hemorrhage" OR "Brain Infarction*" OR "Brain
5
6 Infarct*" OR "Anterior Circulation Brain Infarction" OR "Brain
7
8 Venous Infarction*" OR "Anterior Cerebral Circulation Infarction"
9
10 OR "Posterior Circulation Brain Infarction" OR "Lacunar Stroke*"
11
12 OR "Lacunar Syndrome*" OR "Lacunar Infarction*" OR "Lacunar
13
14 Infarct*" OR "Intracranial Vasospasm*" OR "Intracranial
15
16 Angiospasm*" OR "Intracranial Vascular Spasm*" OR "Cerebral
17
18 Vasospasm*" OR "Cerebrovascular Spasm*" OR "Cerebral
19
20 Angiospasm*" OR "Cerebral Artery Spasm*" OR "Hemiplegia*"
21
22 OR "Transient Hemiplegia*" OR "Monoplegia*" OR "Post-Ictal
23
24 Hemiplegia*" OR "Crossed Hemiplegia*" OR "Flaccid
25
26 Hemiplegia*" OR "Infantile Hemiplegia*" OR "Spastic
27
28 Hemiplegia*" OR "Pareses" OR "Paraparesis" OR "Muscular
29
30 Pares*" OR "Muscle Pares*" OR "Monopares*" OR "Lower
31
32 Extremity Pares*" OR "Crural Pares*" OR "Upper Extremity
33
34 Pares*" OR "Brachial Pares*" OR "Hemipares*" OR "Spastic
35
36 Paraparesis" OR "Neurologic Gait Disorder*" OR "Neurologic
37
38 Locomotion Disorder*" OR "Neurologic Ambulation Disorder*"
39
40 OR "Neurologic Gait Dysfunction*" OR "Duck Gait" OR
41
42 "Sensorimotor Gait Disorder*" OR "Athetotic Gait OR Broadened
43
44 Gait" OR "Drop Foot Gait" OR "Festinating Gait" OR "Frontal
45
46 Gait" OR "Hemiplegic Gait" OR "Hysterical Gait" OR Reeling
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	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

	<p>'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</p>	
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	<p>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</p>	
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 \leq 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 influence and the risk factors 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	

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2						
3	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
4						
5				Perspectives, satisfaction, self-efficacy, and barriers to aerobic exercise reported by individuals with chronic stroke in a developing country		
6	16	Aguiar, L. T.	2020		no	Irrelevant research object
7						
8				Life-Space Mobility and Relevant Factors in Community-dwelling Individuals with Stroke in Japan: A Cross-sectional Study		
9	17	Tashiro, H.	2019		no	Irrelevant research object
10						
11				Prediction of physical activity level after mild stroke: A 6-month followup of 215 patients in the fall study of gothenburg (fallsgot)		
12	18	Persson, C. U.	2019		no	Conference abstract
13				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]		
14	19	Liu, Tai-Wa	2019		no	Irrelevant research object
15				Participation, Fear of Falling, and Upper Limb Impairment are Associated with High Sitting Time in People with Stroke		
16	20	Hanna, E.	2019		no	Irrelevant outcome indicators
17				Investigation of the relationship between balance and fear of falling and movement in stroke patients		
18	21	Sertel, M.	2018		no	Conference abstract
19				Relationship between fear of falls, daily living activities, and trunk control in stroke patients		
20	22	Saygili, F.	2018		no	Full text not found
21				Perceived and assessed balance in patients with stroke within 24 hours after discharge to home		
22	23	Rafsten, L.	2018		no	Conference abstract
23				stroke		
24	24	Mansfield, A.	2018		no	Handbook
25				Fear of falling in acute stroke: The Fall Study of Gothenburg (FallsGOT)		
26	25	Larén, A.	2018		yes	
27				Participation, fear of falling and upper limb impairment is associated with high sitting time in people with stroke		
28	26	Janssen, H.	2018		no	Duplicate data
29				Fear of falling is independently associated with agoraphobia after mild stroke and transient ischaemic attack		
30	27	Chun, H. Y. Y.	2018		no	Conference abstract
31				Fear of falling is independently associated with agoraphobia after mild stroke and TIA		
32	28	Chun, H. Y. Y.	2018		no	Conference abstract
33						
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3	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
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6	30	Stout, R. D.	2017	Fear of falling for older and stroke-involved adults		Full text not found
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9	31	Oguz, S.	2017	The relationship between objective balance, perceived sense of balance, and fear of falling in stroke patients	no	Irrelevant outcome indicators
10						
11	32	Ng, S.	2017	Fear of falling in patients with chronic stroke	no	Irrelevant research object
12						
13	33	Larén, A.	2017	Fear of falling acute after stroke: A part of the fall study in Gothenburg	no	Conference abstract
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16	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
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18	35				no	Conference abstract
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21	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	
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24	37	Nct,	2016	Fear of Falling in Patients With Chronic Stroke	no	Irrelevant research object
25						
26	38	Kavian, M.	2016	The correlation between the standing stability and fear of falling in patients with stroke	no	Full text not found
27						
28	39	Goh, H. T.	2016	Falls and Fear of Falling After Stroke: A Case-Control Study	yes	
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31	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
32						
33	41	Schmid, Arlene A.	2015	Fear of Falling in People With Chronic Stroke	no	Irrelevant outcome indicators
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35	42	Schlick, C.	2015	Falls and fear of falling in vertigo and balance disorders: A controlled cross-sectional study	no	Irrelevant outcome indicators
36						
37	43	Loureiro, A. P. C.	2015	Sedentary behaviors in stroke survivors	no	Conference abstract
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3	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
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7	45	Guan, Q.	2015	Multifactor analysis for risk factors involved in the fear of falling in patients with chronic stroke from mainland China	yes	
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9	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
10						
11	47	Cho, K.	2015	Risk factors related to falling in stroke patients: a cross-sectional study	no	Irrelevant outcome indicators
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14	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
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17	49	Phadke, C. P.	2014	Relationship between spasticity and balance confidence in persons post-stroke	no	Conference abstract
18						
19	50	Park, J.	2014	Relationships of stroke patients' gait parameters with fear of falling	no	Irrelevant outcome indicators
20						
21	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
22						
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24	52	Jalayondeja, C.	2014	Six-month prospective study of fall risk factors identification in patients post-stroke	no	Irrelevant research object
25						
26	53	Da Silva, Carolyn P.	2014	Falling, Balance Confidence, and Fear of Falling After Chronic Stroke	no	Qualitative research
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29	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
30						
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32	55	Kneebone, I.	2013	Fear of falling: Psychological management after stroke	no	Conference abstract
33						
34	56	Vahlberg, B.	2012	Factors related to mobility and physical activity in individuals one to three years after stroke	no	Conference abstract
35						
36	57	Perez-Jara, Javier	2012	Differences in fear of falling in the elderly with or without dizziness. [References]	no	Irrelevant research object
37						
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39	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
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1	59	Batchelor, F. A.	2012	Falls after stroke	no	Review
2				Fear of falling among people who have		
3	60	Schmid, A. A.	2011	sustained a stroke: A 6-month longitudinal pilot	no	Irrelevant outcome
4				study		indicators
5						
6	61	Matsuda,	2011	Falls in multiple sclerosis	no	Irrelevant research
7		Patricia Noritake				object
8		Akosile,		Relationships between fall indices and physical		
9	62	Christopher	2011	function of stroke survivors in Nigeria...including	no	Irrelevant outcome
10		Olusanjo		commentary by Batchelor F and Bugdayci D		indicators
11				Fear of falling in the elderly with recurrent		
12	63	Zapata, Paloma	2010	dizziness: A descriptive study. [Spanish].	no	Not English/Chinese
13		Olmos		[References]		
14	64	Balash, Y.	2010	Disorders of gait with fear of fall in community	no	Conference abstract
15				dwelling elders		
16				Consequences of Poststroke Falls: Activity		
17	65	Schmid, Arlene	2009	Limitation, Increased Dependence, and the	no	Qualitative research
18		A.		Development of Fear of Falling		
19						
20	66	Schmid, A. A.	2009	Poststroke Fear of Failing in the Hospital Setting	no	Irrelevant outcome
21						indicators
22	67	McGrath, Joanna	2008	Fear of falling after brain injury. [References]	no	Irrelevant research
23		Collicutt				object
24	68	Batchelor, F.	2008	Fear of falling and falls after stroke: the chicken	no	Full text not found
25				or the egg?		
26	69	Andersson, Å G.	2008	Fear of falling in stroke patients: Relationship	no	Full text not found
27				with previous falls and functional characteristics		
28	70	Schmid, A. A.	2007	Fear of falling: An emerging issue after stroke	no	Qualitative research
29	71	Morley, John E	2007	Falls--where do we stand?	no	Irrelevant research
30						object
31				The temporal relationship between falls and		
32	72	Chou, Kee-Lee	2007	fear-of-falling among Chinese older primary-	no	Irrelevant research
33				care patients in Hong Kong.		object
34				The effects of reducing fear of falling on		
35	73	Balash, Y.	2007	locomotion in older adults with a higher level	no	Irrelevant research
36				gait disorder		object
37				The association of balance capacity and falls		
38	74	Belgen, B.	2006	self-efficacy with history of falling in	no	Irrelevant outcome
39				community-dwelling people with chronic stroke		indicators
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2	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
3						
4	76	Watanabe, Y.	2005	Fear of falling among stroke survivors after discharge from inpatient rehabilitation	no	incomplete data
5						
6	77	Rosén, E.	2005	Fear of falling, balance, and gait velocity in patients with stroke	no	Irrelevant outcome indicators
7						
8	78	Giladi, N.	2005	Clinical characteristics of elderly patients with a cautious gait of unknown origin	no	Irrelevant research object
9						
10	79	Stolze, H.	2004	Falls in frequent neurological diseases - Prevalence, risk factors and aetiology	no	Irrelevant research object
11						
12	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
13						
14	81	Strubel, D.	2001	[Dementia and falls]	no	Not English/Chinese
15	82	Karin Hellström	1999	Fear of falling in patients with stroke:a reliability study	no	Irrelevant outcome indicators
16						
17	83	Mahsa Kaviani	2016	The Correlation between the Standing Stability and Fear of Falling in Patients with Stroke	no	Not English/Chinese
18						
19	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
20						
21	85	Thomas Hadjistavropoulos	2011	The Relationship of Fear of Falling and Balance Confidence With Balance and Dual Tasking Performance	no	Irrelevant research object
22						
23	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
24						
25	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
26						
27	88	Zhou Min	2016	Current status and influencing factors of fear of falling among elderly in patients	no	Irrelevant outcome indicators
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3	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
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6	90	Deng Ning	2016	The status and influencing factors of fear of falling in patients with first ever cerebral infarction	no	Irrelevant outcome indicators
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9	91	Shao Ping	2016	The relationship between fear of falling and anxiety and depression in elderly patients with stroke	no	Irrelevant outcome indicators
10						
11	92	Arlene A. Schmid	2009	Poststroke Fear of Falling in the Hospital Setting	no	Irrelevant outcome indicators
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14	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	
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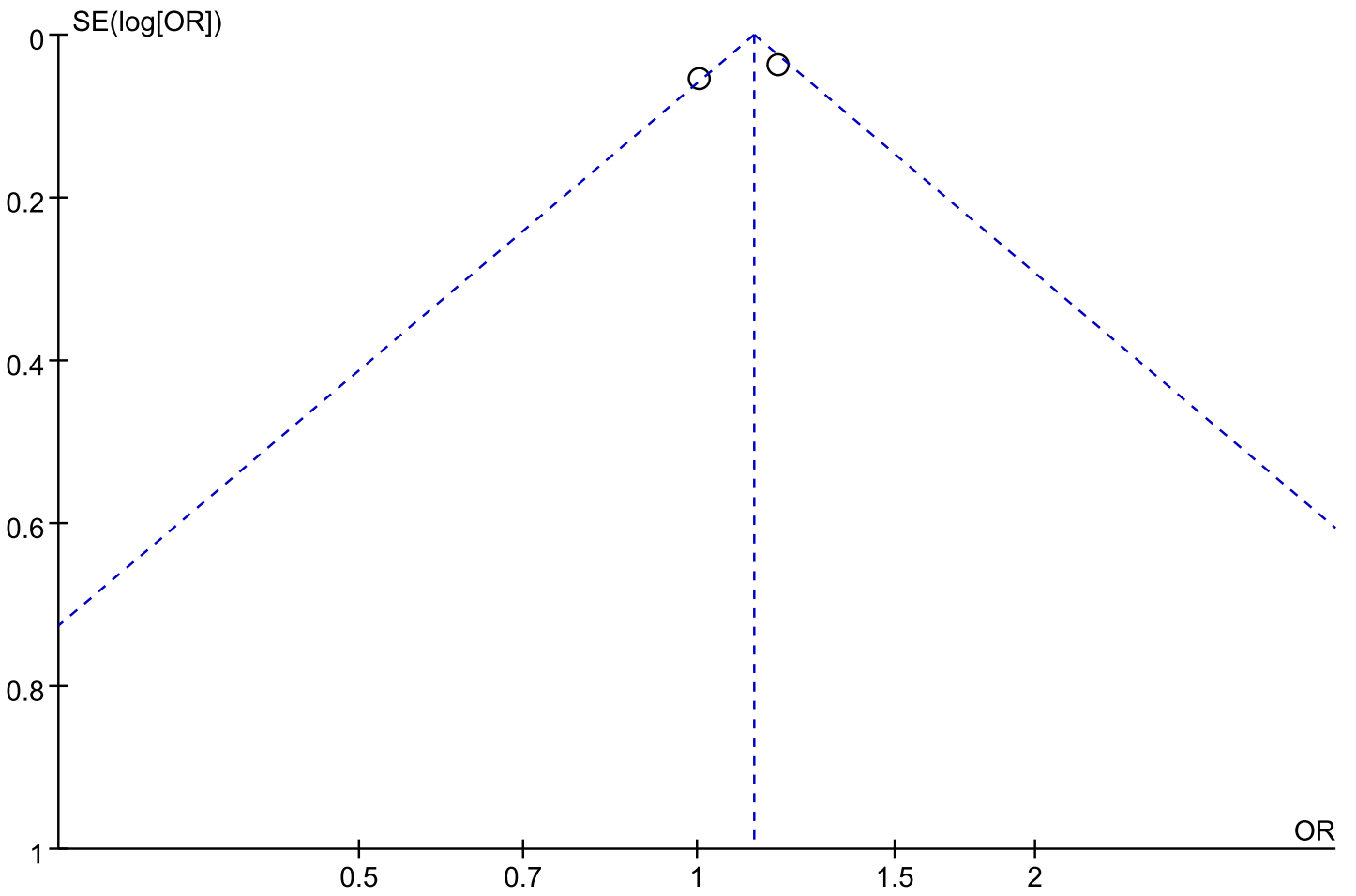
#	Including (✓ or ×)	Author	Year	Measuring tools	Study design	Research period	Country	Total sample size	Sample source of experimental group	Experimental group (N)	Control group (N)	Sample source of control group	Age, years (Mean±SD)	Female (N, %)	Stroke reference period	Adjusted risk factors	OR	LL-95%CI	UL-95%CI	Quality evaluation of NOS				Quality evaluation of AHRQ scores
																				Selecti on	Compar ability	Outco me	NOS 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 (OR<1)	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 services	59	23	communi ty 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					

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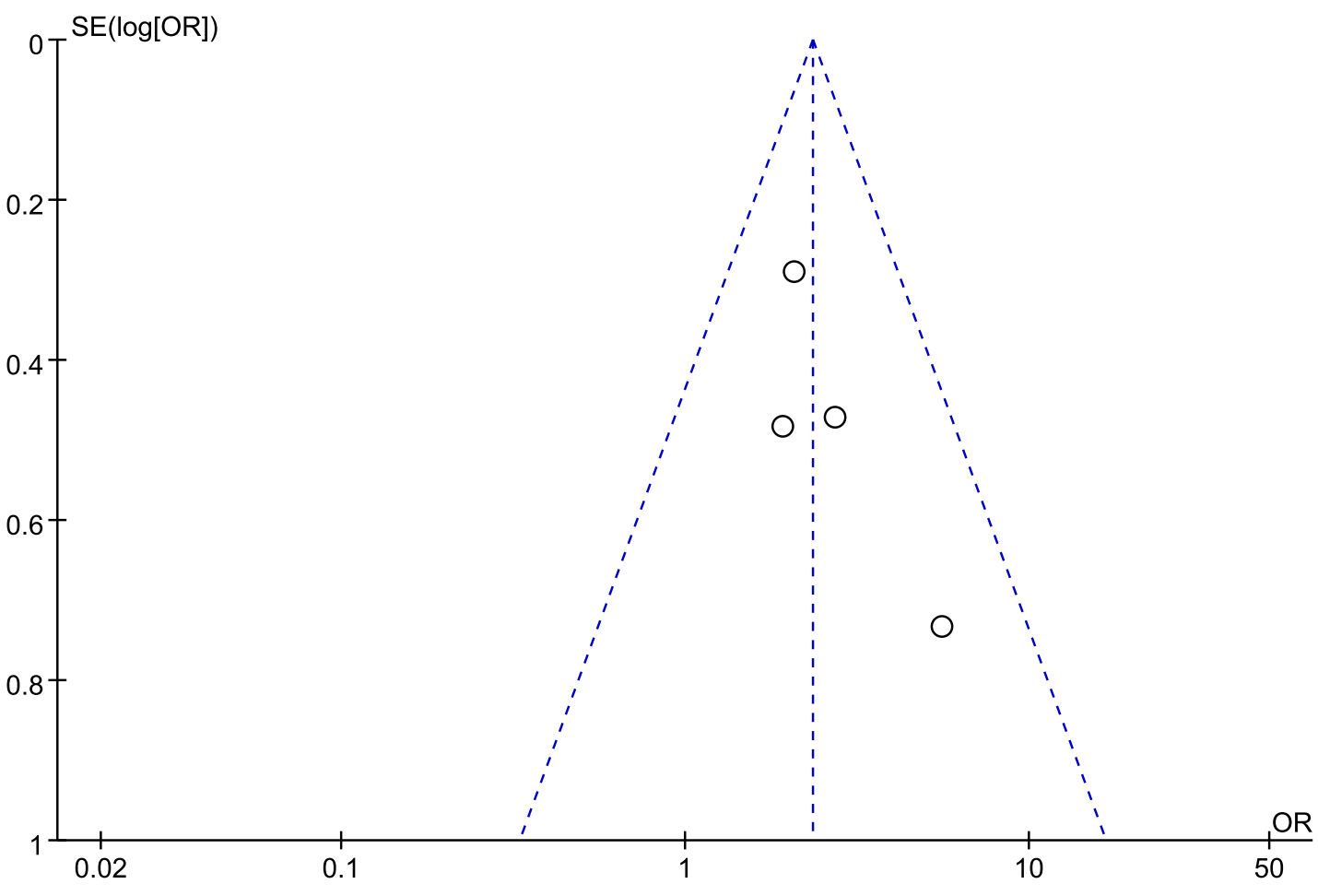
6.SwePASS score--- Moderate (25-30)	2.32	0.98	5.52
7.SGPALS score- -Physically inactive (1)	2.04	1.01	4.12

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PRISMA 2009 Checklist

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Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	2
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	NO
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	4
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	6
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I ²) for each meta-analysis.	6



PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	6
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	6
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	8
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	7
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	10-12
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	10-12
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	9
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	11-12
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	13
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	16
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	16
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	18

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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