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# **BMJ Open**

# Global evidence on falls and subsequent social isolation in older adults: A scoping review

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ABSTRACT	Α	BS	TR	Α	$\mathbf{C}'$	I
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- 34 **Objective**: To summarize evidence on falls and subsequent social isolation and/or loneliness in older adults in any setting, including the role of fear of falling, other risk factors, and how the 35 36 COVID-19 context affects this relationship. 37 Methods: MEDLINE, CINAHL, Embase, and Ageline databases were searched from inception 38 until January 11, 2021, in addition to a grey literature search. Studies were eligible for inclusion 39 if the population had a mean age of 60 years or older, they examined falls and subsequent social 40 isolation, loneliness, fear of falling or risk factors, and were primary studies (e.g., experimental, 41 quasi-experimental, observational, qualitative). 42 **Results:** After screening 4,993 citations and 304 full-text articles, 39 studies were included in 43 this review. Most studies included participants with a history of falling, ranging from 11 to 100 44 percent of the study population. Most studies were conducted in Europe (44%) and North America (33%) and were of the cross-sectional study design (66.7%), in the community (79%). 45 46 Studies utilized 15 different scales. Six studies examined risk factors for social isolation and 47 activity restriction associated with fear of falling. Six studies reported mental health outcomes 48 related to falls and subsequent social isolation. No studies evaluated falls and social isolation in 49 the context of COVID-19. 50 **Conclusions:** Consistency in outcome measurement is recommended, as multiple outcomes were 51 used across the included studies. Further research is warranted in this area, given the aging 52 population and the importance of falls and social isolation to the health of older adults. 53 Scoping Review Registration: 10.17605/OSF.IO/2R8HM
- 54 **Word count**: 243/250 (abstract), 2960/3000 (main text)
- 55 Keywords: scoping review, older adults, falling, social isolation, loneliness, fear of falling

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- A robust methodology including a thorough and extensive literature search was used to review the literature in the area.
- There was no date limits or language limits for studies eligible for inclusion in this scoping review.
- Scoping reviews do not assess the quality of included studies and we cannot confirm the directional causality between falls and social isolation.

#### **INTRODUCTION**

Globally, falls are the second leading cause of unintentional injury death, making falls a major public health concern [1]. In Canada, falls are the leading cause of injury-related hospitalizations among adults aged 65 years and older, and 20-30% of older adults experience at least one fall each year [2]. Falls may result in serious health-related consequences including physical (e.g., fractures), physiological (e.g., cognitive decline), and psychological (e.g., anxiety, depressive symptoms, fear of falling, and social isolation) outcomes [3].

Specific to social isolation, this is a priority in Canada, as over 30% older adults are at risk of social isolation [4]. Social isolation among older adults is associated with adverse health outcomes including cognitive decline, depression, anxiety, and dementia [5]. Given the detrimental outcomes associated with both falls and social isolation, there is a need to understand the relationship between falls and subsequent social isolation in older adults. The current scoping review is focused on falling and the subsequent experience of social isolation and/or loneliness and to ascertain whether the COVID-19 context affected the relationship between falls and subsequent social isolation.

#### **METHODS**

#### Protocol and registration

The protocol for this scoping review was developed in accordance with the JBI (formerly Joanna Briggs Institute) guidance for scoping reviews and registered with Open Science Framework [6]. An integrated knowledge translation approach was used [7], whereby colleagues from the Public Health Agency of Canada (YJ, KA, MdG, AGB) co-developed the review and were included as coauthors on this review, along with our patient partner (JB). The results are reported using the

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Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) extension to scoping reviews [8] supplemented by the updated PRISMA 2020 statement [9].

#### Patient and Public Involvement

Through the Strategy for Patient-Oriented Research (SPOR) Evidence Alliance, we worked with a patient partner who provided feedback on our protocol, participated in a full-text screening pilot, provided input for revisions to the draft and final manuscript, and is a coauthor on this paper (JB).

### Search strategy

An experienced information specialist developed our comprehensive literature search strategy, which was peer-reviewed by a second information specialist using the Peer Review of Electronic Search Strategies (PRESS) checklist [10]. MEDLINE, CINAHL, Embase, and Ageline were searched from inception until January 11, 2021 (Appendix 1). References of included studies and relevant reviews were scanned. Grey literature (i.e., unpublished or difficult to locate studies) was searched using the Canadian Agency for Drugs and Technologies in Health's Grey Matters checklist [11].

# Eligibility criteria

The population of interest was studies of older adults, with a mean age of 60 years or older. The core concept examined was the relationship between falls and subsequent social isolation, loneliness. As mentioned in our related systematic review on interventions for social isolation after falling, social isolation and loneliness are distinct concepts [12]. We defined social isolation as including any of the following: decreased number of social contacts, decreased feeling of belonging, reduced or lack of fulfilling relationships, decreased engagement with others, and reduced quality of the members in one's network [12]. We defined loneliness as "the unpleasant

experience that occurs when a person's network of social relations is deficient in some way, either quantitatively or qualitatively"[13]. The context included any community or institutional setting, and for our secondary objective, this was limited to the COVID-19 context (i.e., studies that specified consideration of the COVID-19 pandemic in their work). Studies including participants reporting a history of falling (i.e., regardless of the proportion of the sample who fell), the role of fear of falling in this relationship, as well as any risk or protective factors were considered eligible for inclusion.

Eligible study designs included primary research studies of experimental (e.g., randomized controlled trials), quasi-experimental (eg, non-randomized controlled trials, controlled before and after studies, interrupted time series), observational (e.g., cohort studies, case-control studies, cross-sectional studies), qualitative (phenomenological, ethnography, qualitative interview, etc.) and mixed method (e.g., convergent parallel, embedded, explanatory sequential) design. No restrictions based on study year, language of publication, or study duration were applied.

### Study selection

A screening form was developed based on the eligibility criteria, and those contributing to article reviews/extraction completed a training exercise using 50 citations to ensure adequate agreement was achieved. After achieving 80% agreement during the training exercise, all remaining titles and abstracts identified in the search were screened independently by pairs of reviewers (SMT, AP, JF, GM, AH). All discrepancies were resolved by a third reviewer.

Similarly, a training exercise was completed for screening of full-text articles. After completing two training exercises (achieving 27% and 40% agreement, respectively), and then

revising our screening criteria form for clarity, full-text articles were assigned to independent pairs of reviewers, and any discrepancies were resolved by a third reviewer.

#### Data charting

A charting form was developed to capture data on study characteristics, population characteristics and outcomes of interest. Relevant outcomes included any data illustrating the relationship between falls and subsequent social isolation, including the role of fear of falling, and other risk factors or protective factors. A training pilot exercise was conducted using five studies. After achieving sufficient agreement based on discussion with the team and a systematic review methodologist, full data charting was completed by independent pairs of reviewers and discrepancies were resolved by a third reviewer.

### Analysis and presentation of results

141 The review findings were summarized descriptively using summary tables.

#### **RESULTS**

After screening 4993 citations and 304 full-text articles against our eligibility criteria, 39 studies were identified as eligible for inclusion based on our primary objective for this review (Figure 1). No studies were identified when limiting to the COVID-19 context for our secondary objective.

Study and patient characteristics have been summarized in Table 1 and detailed data are reported

in Appendices 2 and 3.

Table 1: Summary of study and patient characteristics

Characteristics	Number (%)
Study Characteristics (n=39)	
Geographical region	
Asia	5 (12.8%)
Australia	1 (2.5%)
Europe	17 (43.6%)
North America	13 (33.3%)
South America	3 (7.7%)

Study design	
Cohort	6 (13.8%)
Cross-sectional	26 (66.7%)
Qualitative	7 (19.4%)
Study duration	
NA	29 (74.3%)
≤ 1 year	5 (12.8%)
$\geq 1$ year	5 (12.8%)
Patient characteristics	
Mean age	74.9 (range, 65.0 to 95.0)
NR	11 (28.2%)
65.0-69.9 years	4 (10.2%)
70.0-74.9 years	8 (20.5%)
75.0-79.9 years	14 (35.9%)
≥80.0 years	2 (5.1%)
Proportion of female participants	Mean: 65.3% (range, 42.5 to 88.9)
Sample size	Mean: 3043.6 (9 to 43487)
<100	11 (28.2%)
100-499	11 (28.2%)
500-999	3 (7.7%)
1000-1999	4 (10.2%)
2000-5000	4 (10.2%)
>5000	6 (15.4%)
Study setting	
Community	31 (79.4%)
Medical	6 (15.4%)
Nursing home	1 (2.5%)
Multi-site	1 (2.5%)
Participants living alone	44.1% (range, 0 to 100)
Participants with a history of falling	Mean: 50.8% (range, 11.2 to 100)
Not reported*	11 (28.2%)
≤25%	6 (15.4%)
25-40%	10 (25.6%)
40-85%	5 (12.8%)
>85%	7 (17.9%)
Abbreviations: NA, not applicable; *not rep	
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#### Study characteristics

- The publication year for included studies ranged from 1987 to 2020, with more than half
- published since 2010. Most studies were conducted in Europe (17/39, 44%) and North America
- (13/39, 33%). More than half of the studies were cross-sectional study design (66.7%) and 7

qualitative studies were included. Most were conducted in the community (79%). Studies utilized 15 different scales and a variety of self reported responses to assess variables such as social isolation, loneliness. (e.g., 18-item Lubben Social Network Scale, 6-item de Jong-Gierveld Loneliness Scale). Six studies identified risk factors for social isolation and for activity restriction due to fear of falling (Table 2). Six studies reported mental health outcomes (Appendix 4). Table 2: Potential risk factors for social isolation and activity restriction associated with fear of 

## falling

Author, Year	Risk factor	Associated evidence		
Social Isolation after injurious fall				
Nicholson, 2005	Sex (female)	The authors noted a strong positive correlation between injurious falls and social isolation for women ( $\rho$ = -0.5; p=0.01), but this was not significant for men.		
	due to fear of falling			
Zijlstra, 2007	Aged 80 years or older	OR: 1.56 (95% CI, 1.24-1.95)		
	Fair perceived general health Poor perceived general health	OR: 2.92 (95% CI, 2.43-3.52) OR: 5.7 (95% CI, 3.57-9.12)		
Curcio, 2009	Poor perceived health	OR: 1.38 (95% CI, 1.06-1.79)		
	Depression	OR: 1.76 (95% CI, 1.38-2.24)		
	Low social participation	OR: 1.52 (95% CI, 1.20-1.92)		
	Difficulties in activities of daily living	OR: 1.65 (95% CI, 1.16-2.32)		
	Decreased physical activity	OR: 1.35 (95% CI, 1.06-1.70)		
	Polypharmacy	OR: 1.56 (95% CI, 1.14-2.14)		
	Below poverty level	OR: 1.32 (95% CI, 1.05-1.65)		
Dias, 2011	Depression	Chi-square=15.2, p=0.004		
,	Exhaustion (frailty)	Chi-square=9.2, p=0.01		
	Participation in social activities	Chi-square=10.4, p=0.016		
Murphy, 2002	Two or more chronic conditions	ARR: 1.34 (95% CI, 1.08-1.65)		
	Slow-timed physical performance	ARR: 1.44 (95% CI, 1.18-1.75)		

Abbreviations: OR, odds ratio; ARR, adjusted risk ratio

#### Patient characteristics

Across all studies, the total number of included patients was 118,702, with an average of 3,043 patients per study. Their mean age ranged from 65 to 95 years, and approximately 65% of patients were female. Most studies included participants with a history of falling, ranging from 11 to 100 percent of the study population.

#### **Cohort studies**

Among the 39 included studies, six were cohort studies (Appendix 5). Tinetti et al (1998) demonstrated a significant relationship between experiencing multiple non-injurious falls and a decline in social functioning (Regression coefficient = -0.538 (p<0.05)), which was measured using the Social Activity scale, in a sample of 770 older adults after 3 years of follow-up [14]. Similarly, Pin et al. (2016) found that in their cohort of 16,583 participants, individuals who experienced a fall showed decreased social participation after falling (p<0.001), which was no longer statistically significant when frailty was added in the model [15].

Vellas et al. (1987) compared people who fall to people who had not experienced a fall in two populations: a retirement home (n=118) and older adults living at home (n=60) [16]. Among the older adults who lived at home, they noted that fewer fallers were able to maintain the same level of activity after 6 months of follow-up when compared to non-fallers (p<0.02).

Van der Meulen et al. (2014) assessed social participation (using the Frenchay Activities Index) in 260 older adults with low and high levels of concern about falling over a 14-month period [17]. They reported significant differences (specific results not reported) between the

groups, with lower social participation scores in those who had a higher level of concern about falling.

In 4,680 older adults, Yu et al. (2021) reported a statistically significant relationship between the number of falls and loneliness scores (measured using the 3 item University of California, Los Angeles (UCLA) Loneliness Scale) across three time points over a 4-year period (B = 0.008, p<0.05) [18]. A cohort study by Hajek et al. (2020) looked at loneliness (as measured using the Bude and Lantermann scale) and social isolation (measured using the De Jong Gierveld Loneliness Scale) and their link to fear of falling 669 older adults [19]. They compared older adults with an onset of fear of falling, to those whose fear of falling had ended. Their findings revealed that the end of fear of falling was associated with lower loneliness scores ( $\beta = -0.06$ , p<0.05) and other negative psychosocial outcomes (e.g., increased depressive symptoms). Cross-sectional studies related to falls and social isolation

between falls and social isolation or loneliness (Appendix 6).

Quach et al. (2016) examined the relationship between falls and scores on the Social

Of the twenty-six cross-sectional studies included in this review, 11 reported on the relationship

Relationship Index including 8,464 participants [20]. They noted that participants who reported experiencing a fall or multiple falls had a lower social relationship index score (mean, 3.24 and

3.08 respectively) compared to those who had not fallen (mean, 3.34; p<0.0001).

Hajek et al (2017) examined variables associated with a history of falling in 7,808 participants [21]. They found those reporting a fall in the previous 12 months had higher loneliness scores (De Jong Gierveld Loneliness Scale;  $\beta$  = .08, p < .001) and social exclusion scores (Bude and Lantermann scale;  $\beta$  = .08, p < .001) compared to those who had not fallen.

Schnittger et al. (2012) conducted a study in 579 older adults identifying risk factors for different pathways of loneliness – emotional loneliness, social loneliness (both measured using the De Jong Gierveld Loneliness Scale), and social support (measured using the Lubben Social Network Scale) [22]. A history of falls was the only biological variable that was identified as a statistically significant risk factor for inclusion in the model for social support (correlation coefficient= -0.247; p<0.003).

Stel et al (2004) reported a statistically significant decline in social activities in 204 older adults who experienced a fall inside their home (OR: 2.6 (95% CI: 1.1-6.5); p<0.05) [23], and Vanden Wyngaert et al. (2020) reported an association between risk of falls and participation in social roles and activities in 154 older adult haemodialysis patients (PROMIS questionnaire;  $R^2$ =0.11; p=0.01) [24]. Finally, Nicholson et al. (2005) reported a strong positive relationship between experiencing an injurious fall and increasing social isolation in a sample of 68 older adults (Lubben Social Network Scale;  $\rho$ = -0.4; p<0.05), and highlighted that this relationship was stronger in women ( $\rho$ = -0.5; p=0.01) [25]. Additionally, they assessed this relationship using both the Family and Friends subscales of the Lubben Social Network Scale and found that the correlation was specific to the Friends subscale ( $\rho$ = -0.43; p<0.05).

lliffe et al. (2007) and Robins et al. (2018) found no statistically significant associations between falls and social isolation using the Lubben Social Network Scale in a sample of 3,139 older adults and the Friendship Scale for social isolation in a sample of 245 older adults, respectively [26, 27]. Similarly, Van Lankveld et al. (2011) and Faria et al. (2020) found no correlation between falls and loneliness, using the De Jong Gierveld Loneliness scale in a sample of 579 older adults, and the UCLA scale in a sample of 48 older adults, respectively [28, 29].

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3	226	Additionally, Finn et al. (2001) noted no difference in scores for the OARS social support scale
5 6	227	when comparing fallers to non-fallers in a nursing home setting (n=49) [30].
7 8	228	Cross-sectional studies related to fear of falling and social isolation
9 10 11	229	Seven studies examined fear of falling linked to falls and social isolation (Appendix 7). Gagnon
12 13	230	et al. (2005) reported a statistically significant positive relationship between fear of falling and
14 15	231	social support in a sample of 105 older adults (measured using the confiding-relationships
16 17 18	232	component of the Bedford Life Events and Difficulties Schedule modified for elderly subjects;
19 20	233	Wald chi-square= 3.77; p=0.05) [31]. Curcio et al. (2009) reported a strong relationship between
21 22	234	fear of falling and low social participation in 1,668 older adults (OR, 1.52; 95% CI, 1.20-1.92;
23 24 25	235	p<0.01) [32]. Petrinec et al. (2020) identified fear of falling as an independent predictor of social
26 27	236	functioning (as measured by the Medical Outcomes Study 36-item Short-Form General Health
28 29	237	Survey; $\beta$ = -0.29) in 108 older adults [33].
30 31	238	Merchant et al. (2020) and Iliffe et al. (2007) showed no statistically significant
32 33 34	239	relationship between fear of falling and social isolation in 493 older adults and 3,139 older
35 36	240	adults, respectively [26, 34]. Ferreira et al. (2018) and Kara et al. (2009) showed no association
37 38	241	between fear of falling and social participation (n=7,935) or fear of falling and loneliness
39 40 41	242	(n=47), respectively [35, 36].
42 43	243	Cross-sectional studies related to falls and activity restriction due to fear of falling
44 45	244	Eight studies examined the relationship between falls and activity restriction due to fear of
46 47 48	245	falling (Appendix 7). Tinetti et al (1994) and Apikomonkon et al. (2003) both reported a
49 50	246	statistically significant decrease in activity due to fear of falling in individuals who experienced a
51 52	247	fall compared to those who had not (n=1,103, chi-square= 13.1, $p < 0.001$ ; and n=546, chi-
53 54 55 56	248	square=5.49, p<0.05, respectively) [37, 38]. Similarly, in 1,668 older adults, Curcio et al. (2009)
57 58		14

demonstrated that those who restricted activity due to fear of falling were more likely to have experienced a fall in the year prior (OR: 1.48 (95%CI, 1.18-1.86); p=0.001) [32], and Mendes da Costa et al. (2012) demonstrated that activity restriction increased in those with multiple falls over the past year (OR, 3.04; 95% CI, 1.70-5.42) [39]. Murphy et al. (2002), and Choi et al. (2015) showed that a history of injurious falls was independently associated with activity restriction due to fear of falling (n=1,064, ARR: 1.36; 95% CI, 1.11-1.66; p=0.003; and n=4,247, OR, 3.03; 95% CI, 1.21-7.54, p=0.008, respectively) [40, 41].

Howland et al. (1998) reported no relationship between the experience of a fall and

Howland et al. (1998) reported no relationship between the experience of a fall and activity restriction in a sample of 266 older adults (OR: 1.094; 95% CI, 0.376-3.177; p=0.869)[42], as did Choi et al. (2015) (OR, 2.12; 95% CI, 0.96-4.67; p=0.062) among 4,247 older adults [41]. Similarly, Merchant et al. (2020) also reported no significant relationship between the number of falls and fear-based activity restriction in 493 older adults (OR, 1.4; 95% CI, 0.94–2.20)[34].

#### Qualitative studies

Seven qualitative studies were included (Appendix 8). All participants interviewed were older adults (n=124), and of that aggregated group, 51 were stroke survivors [43, 44] and 10 were experiencing frailty [45]. Common categories identified across these studies include: activity restriction as a strategy to manage fear of falling, changing behaviours to avoid falling again [43, 45-47], feeling restricted due to reduced mobility after falling [43, 44, 48], increasing dependence on caregivers [43, 45], developing fear of falling [43, 45], feelings of loneliness or isolation [43, 48], and a negative impact on identity or autonomy [47].

#### **DISCUSSION**

We conducted a comprehensive scoping review including 39 studies examining the relationship between falls and subsequent social isolation. We limited the scoping review to studies that identified social isolation after a fall, although many studies investigated the association between social isolation and a subsequent fall; this was due to the request of the commissioning knowledge user. More than half of the studies were published since 2010, suggesting increased interest in the relationship between falls and social isolation in older adults. Social isolation and loneliness were measured using a variety of outcome measures across studies, such as degree of activity, and varying scales for loneliness, social isolation, social participation, social support, etc. This highlights the growing need for consistency in the measurement of social isolation and loneliness to allow for meaningful comparison across studies.

Only a few studies examined risk factors and mental health outcomes related to falls and subsequent social isolation. Risk factors linked to social isolation and activity restriction included age, sex/gender, poor perceived health, poverty, frailty, and comorbidity. Few studies also documented an association between activity restriction due to fear of falling and depression. Our findings suggest the presence of gaps in the literature for these important outcomes, highlighting the need for further research.

We did not identify any studies on falls and subsequent social isolation that were specific to the COVID-19 context, highlighting another gap in the evidence base. Particularly as lockdowns related to the pandemic are likely to cause social isolation for older adults. Closing of community centers could risk deconditioning of older adults and lead to an increase in falls as things re-open.

There are several strengths to our scoping review, such as the use of the JBI guide for the methods, and the PRISMA-ScR for structuring and writing the results. Included studies were

gathered through a thorough and extensive literature search from numerous databases and grey literature sources to ensure relevant studies were included. Several different types of study designs were included, such as cohort, cross-sectional and qualitative studies. However, limitations include that all studies were conducted in middle-high- or high-income economy countries. This suggests that our results may not be generalizable to low- and middle-income countries, highlighting a gap in the literature. It should be noted that as many of the included studies were cross-sectional, we cannot confirm the directional causality between falls and social isolation without more robust research.

In summary, we identified 39 studies examining social isolation after a fall in older adults. We found a dearth of research, particularly examining risk factors and mental health outcomes. Further research is warranted in this area, given the importance of falls and social isolation to the health of older adults.

2				
3 4	306	LIST OF AB	BREVIATIONS	
5 6 7	307	ARR	Absolute Risk Reduction	
8 9	308	CADTH	Canadian Agency for Drugs and Technologies in Health	
10 11	309	CI	Confidence interval	
12 13 14	310	OR	Odds Ratio	
15 16	311	PRESS	Peer Review of Electronic Search Strategies	
17 18 19 20	312	PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses	
21 22 23	313	DECLARAT	IONS	
24 25	314	Funding		
26 27	315	This project w	ras commissioned and funded by the Public Health Agency of Canada	
28 29 30	316	[4500415303] through the query services of the SPOR Evidence Alliance. The SPOR Evidence		
31 32	317	Alliance is sup	oported by the Canadian Institutes of Health Research (CIHR) under Canada's	
33 34	318	Strategy for Pa	atient-Oriented Research (SPOR) initiative, and the generosity of partners from 4	-1
35 36 37	319	public agencie	es and organizations across Canada who have made cash or in-kind contributions.	
38 39	320	Dr. Tricco is f	funded by a Tier 2 Canada Research Chair in Knowledge Synthesis [17-0126-	
40 41	321	AWA], and Di	r. Straus is funded by a Tier 1 Canada Research Chair in Knowledge Translation	
42 43 44	322	[17-0245-SUE	3].	
45 46	323	Ethics approva	<u>al</u>	
47 48	324	Not required.		
49 50	325	Consent for pu	<u>ublication</u>	
51 52 53	326	Not applicable	D.	
54 55 56	327	Availability of	f data and materials	
57 58				18

328	The full dataset is available from the corresponding author upon reasonable request.
329	Conflict of interests
330	All authors do not have any potential (or perceived) conflicts of interest.
331	Author Contribution
332	ACT and ST wrote and revised the final manuscript. All authors revised the manuscript and
333	approved of the final version. ST, AP, AH, JF, GM, JW screened citations and full text articles,
334	abstracted and verified data. ST interpreted results and ST and AP wrote the first draft
335	manuscript. ACT developed the protocol, obtained funding, interpreted results, and edited the
336	manuscript.
337	Role of the funder
338	The funders were co-developers of this research project and contributed to the design of the
339	study and reviewed/approved of the manuscript.
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342	articles. We also thank Katrina Chiu and Faryal Khan for their support with formatting the
343	manuscript and creating tables and appendices.
344	SUPPLEMENTAL FILES
345	Supplemental File 1: PRISMA Checklist
346	Supplemental File 2: Appendices

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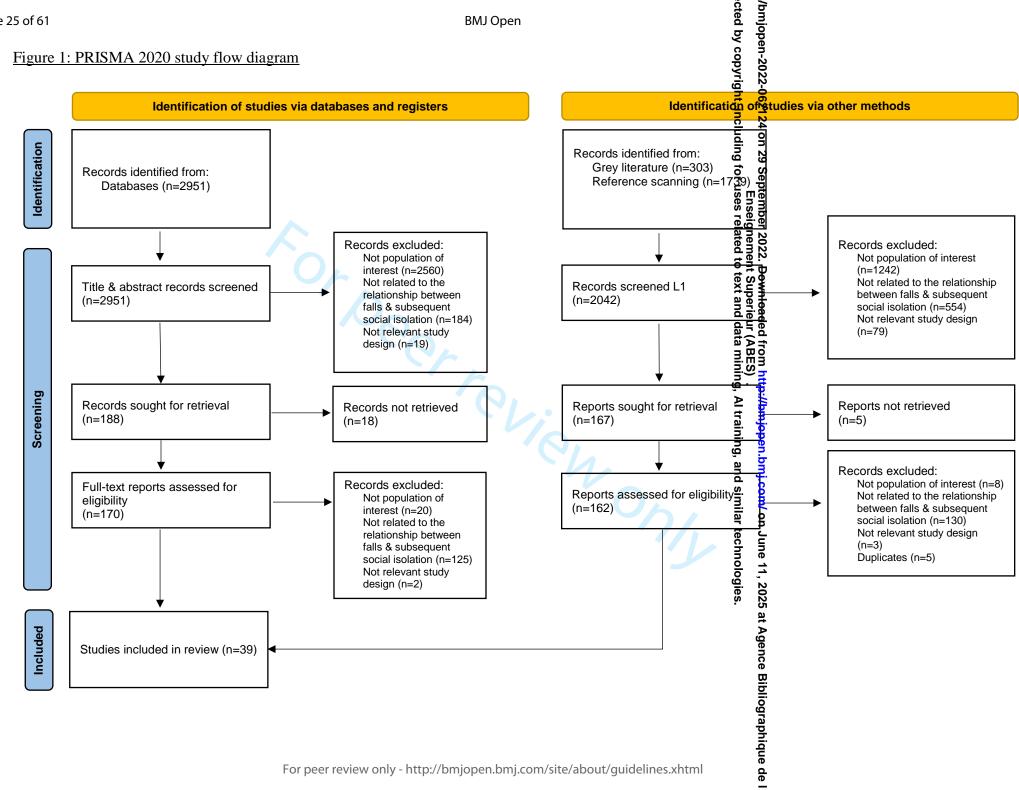
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Figure 1 – PRISMA 2020 study flow diagram.



Figure 1: PRISMA 2020 study flow diagram



# Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	5-6
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	6-7
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Appendix 1
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	7-8
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	7
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	N/A
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Appendix 4-6



SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE#
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	8; Figure 1
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8; Table 1; Appendix 7
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	N/A
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	9-13
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Table 2
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	13-14
Limitations	20	Discuss the limitations of the scoping review process.	14-15
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	15
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	16-17

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.



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<sup>\*</sup> Where sources of evidence (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

<sup>†</sup> A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

<sup>‡</sup> The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

<sup>§</sup> The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

# **Supplementary File 2: Appendices**

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Appendix /: Cross-sectional studies reporting on fear of falling and activity restriction due to fear of falling (n= 15)	

46 47

#### Appendix 1: Literature search strategies

#### Ovid MEDLINE(R) ALL <1946 to Jan 11, 2021>

- Accidental Falls/
- (slip\* or trip\* or stumbl\* or tumbl\*).tw,kf.
- (fall\* or fell or "fall- related" or "near- fall").tw,kf.
- or/1-34
- limit 4 to "all aged (65 and over)"
- exp Aged/ or geriatrics/
- (geriatric\* or elder\* or age\* or "of age" or aging or senior\* or older adult\* or retired or retiree\* or elder\* or pensioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or octogenarian or nonagenarian\* or centenarian\* or sixties or seventies or eighties or nineties).tw,kf.
- 4 and (6 or 7)
- 5 or 8
- Social Isolation/
- 11 loneliness/
- 12 exp social support/
- (social barrier\* or social isolat\* or social support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or connectedness or lonely or loneliness or "feel\* alone\*" or companionship).tw,kf.
- 14 ((lack or absence or minimi\*) adj2 (contact or communication or support\*)).tw,kf.
- 15 or/10-14
- 16 9 and 15
- animals/ not humans/
- 18 16 not 17

#### PsycINFO <1806 to January Week 2 2021>

- falls/
- (slip\* or trip\* or stumbl\* or tumbl\*).tw.
- (fall\* or fell or "fall- related" or "near- fall").tw.
- or/1-34
- limit 4 to "380 aged <age 65 yrs and older>"
- (geriatric\* or elder\* or age\* or "of age" or aging or senior\* or older adult\* or retired or retiree\* or elder\* or pensioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or

octogenarian or nonagenarian\* or centenarian\* or sixties or seventies or eighties or nineties).tw.

7 4 and 6

8 5 or 7

9 social isolation/ or loneliness/ or social support/ or friendship/

10 (social barrier\* or social isolat\* or social support\* or social car\* or

- 10 (social barrier\* or social isolat\* or social support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or confederation or lonely or loneliness
- or "feel\* alone\*" or companionship).tw. a companion Embase Classic+Embase <1947 to 2022 Land and Company 11>

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- 10 or/6-9
- 11 5 and 10
- limit 11 to human

Database: EBM Reviews - Cochrane Database of Systematic Reviews <2005 to January 11, 2021>, EBM Reviews ACP Journal Club <1991 to January 11, 2021>, EBM Reviews - Cocarane Clinical Answers <January 2021>, EBM Reviews - Database of Abstracts of Reviews of Effects <1st Quarter 2016>

- (slip\* or trip\* or stumbl\* or tumbl\*).mp. 5
- 2 (fall\* or fell or "fall- related" or "near- fall").mp.

44

45 46 47

- 1 or 2
- (geriatric\* or elder\* or age\* or "of age" or aging or senior\* or older adult\* or retired or retiree\* or elder\* or pensioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or octogenarian or nonagenarian\* or centenarian\* or sixties or seventies or eighties or nineties).mp.
- 5 3 and 4
- (social barrier\* or social isolat\* or social support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or connectedness or lonely or loneliness or "feel\* alone\*" or companionship).mp.
- 7 ((lack or absence or minimi\*) adj2 (contact or communication or support\*)).mp.
- 6 or 7
- 5 and 8

#### Joanna Briggs Institute EBP Database - < Current to January 11, 2021>

- (slip\* or trip\* or stumbl\* or tumbl\*).mp.
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#### AMED (Allied and Complementary Medicine) <1985 to January 2021>

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  4 (geriatric\* or elder\* or age\* or "of age" of aging or senior\* or older adult\* or retired or retiree\* or elder\* or pansioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or octogenarian or nonagenarian\* or centen arian or sixties or seventies or eighties or nineties).mp. Se
- 5 3 and 4
- (social barrier\* or social isolation\* of wall support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or comparionship).mp. or "feel\* alone\*" or companionship).mp. or "feel\* alone\*" or companionship alone\*" or companionshi
- Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 nt Superieur (ABES) . o text and data mining, Al training, and similar technologies. support\*)).mp.
- 6 or 7
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Appendix 2: Study ( Author, year	Characteristics (n=39) Study title	Journal name	Country	in 12 24 Study design	Study duration	
Apikomonkon,	Fear of falling and fall circumstances in Thailand	NA	Thailand	Stucky design	(months) NA	
2003[26] Chiu, 2011[37]	Psychosocial responses to falling in older Chinese immigrants living in the community	Dissertation Abstracts International Section A: Humanities and Social Sciences	Canada	eptember 2022. Dov Engeignement Sur uses related to te	6	
Choi, 2015[30]	Characteristics associated with fear of falling and activity restriction in South Korean older adults	Journal of Aging and Health	South Korea	र्म क्रिड्युं sectional nd er ea क्रिड्युं sectional	NA	
Curcio, 2009[4]	Activity restriction related to fear of falling among older people in the Colombian Andes Mountain	Journal of Aging and Health	Columbia	a Sectional	NA	
Dias, 2011[5]	Characteristics associated with activity restriction induced by fear of falling in community-dwelling elderly	Revista Brasileira de Fisioterapia	Brazil	at (ABo) ABo) ABo) ABo) ABo) ABo) ABo) ABo) ABo) ABo) ABo)	NA	
Faes, 2010[36]	Qualitative study on the impact of falling in frail older persons and family caregivers: Foundations for an intervention to prevent falls	Aging & Mental Health	Netherlands	Aual Mative	NA	
Faria, 2020[22]	Elderly residents in the community: gaining knowledge to support a rehabilitation nursing program	Revista Brasileira de Enfermagem	Portugal	gross sectional	NA	
Ferreira, 2018[31]	Aspects of social participation and neighborhood perception: ELSI-Brazil	Revista de saude Publica	Brazil	grosssectional	NA	
Finn, 2001[14]	The relationship between falls and fall-related efficacy, depression, and social resources	Dissertation Abstracts International: Section B: The Sciences and Engineering	USA	ar to sectional sectional echnologies.	NA	
Gagnon, 2005[3]	Affective correlates of fear of falling in elderly persons	American Journal of Geriatric Psychiatry	Canada	cross sectional	NA	
Hajek, 2017[20]	The association of falls with loneliness and social exclusion: evidence from the DEAS German Ageing Survey	BMC Geriatrics	Germany	crossectional	NA	

	ВМЈ (	Open		/bmjopen-2022-06ទូ124 on 2 cted by copyright ឯncluding	
Hajek, 2020[13]	What are the psychosocial consequences when fear of falling starts or ends? Evidence from an asymmetric fixed effects analysis based on longitudinal data from the general population	International Journal of Geriatric Psychiatry	Germany	2-068124 on 2	36
Host, 2011[38]	Older people's perception of and coping with falling, and their motivation for fall-prevention programmes	Scandinavian Journal of Public Health	Denmark	ding ual Sative  gual Sative  r uses region	2
Howland, 1998[25]	Covariates of fear of falling and associated activity curtailment	The Gerontological Society of America	USA	Sectional eggs	NA
Iliffe, 2007[16]	Health risk appraisal in older people 2: the implications for clinicians and commissioners of social isolation risk in older people	British Journal of General Practice	England	er 2032ectional	NA
Kara, 2009[28]	Evaluation of home environment and life satisfaction and falling in geriatrics: Examination of its relationship with fear	Physiotherapy Rehabilitation	Turkey	& Sectional Serieu d c	NA
Mendes da Costa, 2012[29]	Fear of falling and associated activity restriction in older people. results of a cross-sectional study conducted in a Belgian town	Archives of Public Health	Belgium	a Sectional BES BES	NA
Merchant, 2020[7]	Relationship between fear of falling, fear-related activity restriction, frailty, and sarcopenia	Journal of the American Geriatrics Society	Singapore	Grosssectional	NA
Meric, 2007[34]	A qualitative study on the perceptions of old individuals regarding the life of the fall and its effect on their daily lives	Turkish Journal of Geriatrics	Turkey	giual Gative	2
Murphy, 2002[1]	Characteristics associated with fear of falling and activity restriction in community-living older Persons	Journal of the American Geriatrics Society	USA	aross-sectional sim	NA
Nakaya, 2013[6]	The association between self-reported history of physical diseases and psychological distress in a community-dwelling Japanese population: the Ohsaki Cohort 2006 Study	European Journal of Public Health	Japan	similatos June 11,	NA
Nicholson, 2005[15]	The relationship between injurious falls, fear of falling, social isolation, and depression	NA	USA	gros Sectional s. 25	NA
Petrinec, 2020[32]	Health-related quality of life of older women religious: negative influence of frailty	Western Journal of Nursing Research	USA	cros <b>g</b> sectional	NA
Pin, 2016[11]	Impact of falling on social participation and social support trajectories in a middle-aged and elderly European sample	Social Science and Medicine - Population Health	Denmark, Sweden, Netherlands, Austria, Germany, France, Belgium,	coho	72

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			Switzerland, Italy, Spain	22-06212 rright, in	
Quach, 2016[19]	Social determinants of falls: The role of social support and depression among community-dwelling older adults	Dissertation Abstracts International: Section B: The Sciences and Engineering	USA	المان	36
Robins, 2018[21]	The association between physical activity and social isolation in community-dwelling older adults	Aging & Mental Health	Australia	e sectional e sectional e sectional	NA
Schmid, 2009[35]	Consequences of poststroke falls: activity limitation, increased dependence, and the development of fear of falling	American Journal of Occupational Therapy	USA	dividentive of text	6
Schnittger, 2012[18]	Risk factors and mediating pathways of loneliness and social support in community-dwelling older adults	Aging & Mental Health	Ireland	and da	NA
Stel, 2004[2]	Consequences of falling in older men and women and risk factors for health service use and functional decline	Age and Ageing	Netherlands	eros esectional	NA
Tinetti, 1998[9]	The effect of falls and fall injuries on functioning in community-dwelling older persons	Journal of Gerontology	USA	sohort r	36
Tinetti, 1994[24]	Fear of falling and fall-related efficacy in relationship to functioning among community-living elders	Journal of Gerontology	USA	sohott trainospen.b	NA
van der Meulen, 2014[10]	Effect of fall-related concerns on physical, mental, and social function in community-dwelling older adults: A prospective cohort study	Journal of American Geriatrics Society	Netherlands	Bohert similarossectional	14
van Lankveld, 2011[17]	Age-related health hazards in old patients with first- time referral to a rheumatologist: A descriptive study	Arthritis	Netherlands	orosa sectional dechinological dechi	NA
Vanden Wyngaert, 2020[23]	Associations between the measures of physical function, risk of falls and the quality of life in haemodialysis patients: a cross-sectional study	BMC Nephrology	Belgium	June 11, 2025 technologies.	
Vellas, 1987[8]	Prospective study of restriction of activity in old people after falls	Age and Ageing	France	cohoont	6
Ward-Griffin, 2004[33]	Falls and fear of falling among community dwelling seniors: the dynamic tension between exercising precaution and striving for independence	Canadian Journal on Aging	Canada	qual tative	NA

Xu, 2019[39] Yu, 2020[12]	Developing a falls prevention program for community-dwelling stroke survivors in Singapore: client and caregiver perspectives  Longitudinal Assessment of the relationships between geriatric conditions and loneliness	Disability and Rehabilitation  Journal of the American Medical Directors	Singapore	-06ative ghtmalk124 on #39 Sept	NA 96
Zijlstra, 2007[27]	Prevalence and correlates of fear of falling, and associated avoidance of activity in the general population of community-living older people	Association Age and Ageing	Netherlands	tember 200	NA
	Prevalence and correlates of fear of falling, and associated avoidance of activity in the general population of community-living older people			e city of 29 September 2022. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Biblic Enseignement Superieur (ABES) .  yright Arcluding for uses delated to text and data mining, Al training, and similar technologies.	

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 Appendix 3: Patient Characteristics (n=39)

			DEMOGRAPI	HIC DATA		124 nclu	
Author, year	Overall	Overall age	Overall age	Overall age	Overall age	gang female 29 50 50	% male
	sample size	(years)	(type)	variance	variance (type)	29 ng	
				(value)		Se	
Apikomonkon,	546	NR	NR	60-94	range	Septemb Ensu	39
2003[26]						ins es	
Chiu, 2011[37]	18	81	mean	71 to 94	range	88° 18° 0	11.1
Choi, 2015[30]	4,247	NR	NR	NR	NR	Marg 75	NR
Curcio, 2009[4]	1668	70.9	mean	7.4	SD	7 2022. D	45.5
Dias, 2011[5]	113	74.5	mean	7	SD	89 ₹ □	15
Faes, 2010[36]	10	70-90	range	NR	NR	® Su Wo W	40
Faria, 2020[22]	48	75	mean	6.8	SD	GG . 672	33.33
Ferreira, 2018[31]	7935	NR	NR	NR	NR	Se spile Se spile Name	43.1
Finn, 2001[14]	49	NR	mean	NR	SD		NR
Gagnon, 2005[3]	105	78.2	mean	8.9	SD	84.76	13.3
Hajek, 2017[20]	7808	73.8	mean	5.9	SD	<u>4</u> 5.20 3	53.8
Hajek, 2020[13]	8836	65.5	mean	10.7	SD	59.4	49.6
Host, 2011[38]	14	77	mean	68-87	range	64.3	35.7
Howland, 1998[25]	266	76.3	mean	7.9	SD	THE ST	23
Iliffe, 2007[16]	3139	NR	NR	65-75+	range	5 <b>3</b> 4.5 <del>5</del>	45.5
Kara, 2009[28]	47	71.7	mean	5.6	SD	Sand	44.7
Mendes da Costa,	501	NR	NR	65-85+	NR	n.bmj.	42.3
2012[29]						ınd <del>j</del> i	
Merchant, 2020[7]	493	73	mean	8	SD	<b>7<u>%</u>.3</b> 🞖	20.7
Meric, 2007[34]	22	NR	NR	65-83+	range	75.6 on	36.4
Murphy, 2002[1]	1064	79.6	mean	5.3	SD	A on	27
Nakaya, 2013[6]	43487	65+	range	NR	NR	5 <b>8</b> .9 <b>∟</b>	46.1
Nicholson, 2005[15]	68	78.5	mean	6.3	SD	6 <b>€</b> 0.4 <b>7</b> 6	39.6
Petrinec, 2020[32]	108	75.6	mean	65–93	range	<b>18</b> 0	0
Pin, 2016[11]	16583	50-95	range	NR	NR	19 2	NR
Quach, 2016[19]	8464	74	mean	7	SD	58.7 <b>25</b>	41.3
Robins, 2018[21]	245	77	mean	6	SD	60 <b>a</b>	40
Schmid, 2009[35]	42	67.5	mean	11.93	SD	NR 🍣	NR
Schnittger, 2012[18]	579	NR	NR	NR	NR	69.1	30.9
Stel, 2004[2]	204	78.7	mean	6.3	SD	54.9 <b>6</b>	45.1
Tinetti, 1998[9]	1103	NR	NR	NR	NR	NR 👺	NR
Tinetti, 1994[24]	1103	79.6	mean	5.2	SD	73 <b>5</b>	27

			Bi	MJ Open		/bmjopen-2022-0 cted by copyrigh	
van der Meulen, 2014[10]	260	77.9	mean	5	SD	72.7 72inc	27.3
van Lankveld, 2011[17]	154	79.2	mean	5.1	SD	<b>a</b> or	21
Vanden Wyngaert, 2020[23]	113	67.5	mean	16	SD	10.5 10.5 10.5 10.5	57.5
Vellas, 1987[8]	178	65-85+	range	NR	NR	7 <b>5</b> .4 <b>8</b>	23.6
Ward-Griffin, 2004[33]	9	81.7	mean	72-92	range	tember 2 Enseigne sestelβit	22.3
Xu, 2019[39]	17	65	mean	7	SD	Serie Serie	55.6
Yu, 2020[12]	4680	74.01	mean	9.69	SD	r 2	43.9
Zijlstra, 2007[27]	4376	77.1	mean	4.9	SD	529.33 72	40.1
		U <sub>A</sub>				2. Do ent S to te	

		SETTING DA	TA	te so Xup Xiyin
Author, year	Setting	Streamlined setting description	Participants living alone (%)	Description of access to caregivers  NR  STATEMENT OF THE COLUMN TO THE COLUMN THE COLUM
Apikomonkon, 2003[26]	Community in 4 provinces of Thailand	Community	9.9	NR dd fron
Chiu, 2011[37]	Community in the Greater Toronto Area, Canada	Community	61	Two respondents with their children. The rest lived alone or only with their spouse. Only seven of 18 respondents at least one grown child living in the same who might provide assistance when needs.
Choi, 2015[30]	Community setting in Korea	Community	NR	NR g g
Curcio, 2009[4]	Community in Columbian Andes Mountains	Community	9.5	NR and
Dias, 2011[5]	Community setting in Brazil	Community	38	NR
Faes, 2010[36]	Home and outpatient clinic in Netherlands	Community + Medical	10	All participants had access to a caregiver (either child or spouse)
Faria, 2020[22]	Urban health unit in northern Portugal	Medical	NR	NR Child or spouse) T Une
Ferreira, 2018[31]	Urban communities in Brazil	Community	NR	
Finn, 2001[14]	Two nursing homes in the Chicago Metropolitan Area, USA	Nursing home	0	In general, they have expered a nursing home because of an inability to adequately care for themselves, and they do not have anyone who can ably assist them, or the lack financial resources.
Gagnon, 2005[3]	Medical or orthopedic wards of 3 hospitals in Toronto, Canada	Medical	65.7	NR nce Bit
Hajek, 2017[20]	Communities in Germany	Community	NR	NR 5
	For peer review o	nly - http://bmjopen.bmj.	com/site/about/gui	NR Graphique delines.xhtml

		BMJ Open	1	/bmjopen-2022-062124 on 29 cted by copyright, including NR NR NR
H : 1 2020[12]			120.0	yright.
Hajek, 2020[13]	Community in Germany	Community	28.9	NR C S
Host, 2011[38]	Copenhagen area in Denmark Communities in Eastern	Community	64.3	NR nc 24
Howland, 1998[25]	Massachusetts	Community	87	NR uding
Iliffe, 2007[16]	Community in London, England	Community	32.8	NR for c
Kara, 2009[28]	Districts of Narlidere, Gülbahçe and Mordoğan in Izmir, Turkey	Community	27.7	NR September 2022. De Finseignement of NR NR NR NR
Mendes da Costa, 2012[29]	Community in Walloon region of Belgium	Community	36.4	NR ed to
Merchant, 2020[7]	Community in northwest region of Singapore	Community	NR	NR texts
Meric, 2007[34]	Geriatric Outpatient of Gülhane Military Medical Academy in Turkey	Medical	13.6	NR Downloaded from ht Superieur (ABES)  NR minin
Murphy, 2002[1]	Community setting in New Haven, Connecticut, USA	Community	70	NR MES)
Nakaya, 2013[6]	Community in Japan	Community	NR	87.3% reported sufficient social support, 12.2% reported lack of social support, 4.2% unknown.
Nicholson, 2005[15]	Community in United States	Community	53.4	NR ti 3
Petrinec, 2020[32]	Cleveland Catholic Diocese in USA	Community	100	Participants were needed caregiver assistance.
Pin, 2016[11]	Communities in 10 European Countries (Denmark, Sweden, The Netherlands, Austria, Germany, France, Belgium, Switzerland, Italy, and Spain)	Community	NR	NR and similar to
Quach, 2016[19]	Communities in USA	Community	23.3	One-third did not have the perceived support with basic personal care (eating or dressing) when needed.
Robins, 2018[21]	Communities in Australia	Community	49	NR
Schmid, 2009[35]	Community in United States	Community	NR	All participants had a caregiver.
Schnittger, 2012[18]	Technology Research for Independent Living (TRIL) clinic at St James's Hospital, Dublin.	Medical	NR	NR Agence
Stel, 2004[2]	Community in three regions in the Netherlands	Community	NR	NR Bibliogra

				-0 gh tt
Tinetti, 1998[9]	Community in New Haven,	Community	NR	I NID - KA
	Connecticut, USA			inc 21 22
Tinetti, 1994[24]	Community in New Haven,	Community	69	NR u o
	Connecticut, USA	-		NR uding
van der Meulen,	Community in the	Community	53.1	
2014[10]	Netherlands			_ 5
van Lankveld, 2011[17]	Community in the	Community	NR	NR G E
	Netherlands	•		NR es reignem NR NR lated
Vanden Wyngaert,	Dialysis centres in Belgium	Medical	NR	NR and
2020[23]				tec
Vellas, 1987[8]	Community in Toulouse,	Community	NR	NR G D
	France			t t So
Ward-Griffin, 2004[33]	Community in Canada (11	Community	77.7	NR t and da
	senior apartment towers and			l loa anc
	in the Health Information and			d de uide
	Promotion Centre)			d f
Xu, 2019[39]	Community rehabilitation	Medical	0	Four family careget (two male) and four maids
	centers in Singapore			(all female) were week. 33% employed a
				maid as a main caregiver.
Yu, 2020[12]	Community in USA	Community	NR	
Zijlstra, 2007[27]	Community in two urban	Community	44	NR Al NB NR traini
	areas in the Netherlands			NR traini
	•			ng,
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				<u>v. ŏ</u>

		FALLS AND FRA	ILTY DATA			<u>s.                                    </u>		
Author, year	Participants with history of falling (%)	List of comorbidities [comorbidity 1 (%), etc.]	Participants with frailty (%)	Frailty scale	Overall frailty score	POVE all Trates	Frailty variance value	Frailty variance type
Apikomonkon, 2003[26]	21	NR	NR	NR	NR	, 2025 ogies.	NR	NR
Chiu, 2011[37]	100	All participants reported having chronic conditions. The most common physical conditions reported were diabetes and hypertension.	NR	NR	NR	NR Agence	NR	NR
Choi, 2015[30]	NR	NR	NR	NR	NR	NR	NR	NR
Curcio, 2009[4]	31.9	Hypertension (53.0), Osteoarthritis (39.2), heart disease (20.2), COPD	NR	NR	NR	NR <b>bi</b> og	NR	NR

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		(16.8), Diabetes Mellitus (13.4), Lower extremities fracture (11.7), Pain in joints (33.1), Dizziness (15.2), Breathlessness (11.4), Hearing impairment (33.0), visual impairment (68.9)				/bmjopen-2022-062124 on 29 Sep		
Dias, 2011[5]	NR	NR	NR	NR	NR	8/TR e	NR	NR
Faes, 2010[36]	100	Cognitive impairment (70%)	NR	NR	NR	S Name	NR	NR
Faria, 2020[22]	25	Cardiovascular diseases (76.6), endocrine diseases (56.8), musculoskeletal diseases (45.7), depression (16.3), respiratory diseases (14.3) and cerebrovascular diseases (9.3).	NR	NR	NR	9 September 2022. Downloaded from Enseignement Superiear (AEE 3 for uses related to text and data mi	NR	NR
Ferreira, 2018[31]	NR	Overweight (women=65.2%, men=59.0%)	NR	NR	NR	ided f e∕dir (A gʻdata	NR	NR
Finn, 2001[14]	51	NR	NR	NR	NR	3/₹2	NR	NR
Gagnon, 2005[3]	100	NR	NR	NR	NR	<u> </u>	NR	NR
Hajek, 2017[20]	17.6	NR	NR	NR	NR	ØNR€	NR	NR
Hajek, 2020[13]	NR	Number of physical illnesses is mean = 2.6, SD = 1.9	NR	NR	NR	XNR/bm)	NR	NR
Host, 2011[38]	100	NR	NR	NR	NR	≣NR₩	NR	NR
Howland, 1998[25]	35	Vision problems (26), stroke (11), dizziness (29)	NR	NR	NR		NR	NR
Iliffe, 2007[16]	11.20	Two or more chronic conditions (59.0%), takes 4 or more meds (33.4%)	NR	NR	NR	QNR.con	NR	NR
Kara, 2009[28]	29.9	NR	NR	NR	NR	NR.	NR	NR
Mendes da Costa, 2012[29]	31.6	NR	NR	NR	NR	NR June 1	NR	NR
Merchant, 2020[7]	mean = 0.4	NR	51.3	FRAIL scale	NR	<u></u>	NR	NR
Meric, 2007[34]	81	NR	NR	NR	NR	NR 2	NR	NR
Murphy, 2002[1]	39.70	Chronic dizziness (24.2), 5 or more medications (35.8), vision impairment (40.5)	NR	NR	NR	NR at Age	NR	NR
Nakaya, 2013[6]	17.3	NR	NR	NR	NR	NR	NR	NR
Nicholson, 2005[15]	100	NR	NR	NR	NR	NR®	NR	NR

		ВМЈ Оре	en			/bmjopen-202		
Petrinec, 2020[32]	NR	Hypertension (60), Cataracts (60), Thyroid disorders (30), Osteoporosis (17), Diabetes (7)	19	Tilburg Frailty Indicator (TFI)	NR	/bmjopen-2022-062124 on 29 Sep	NR	NR
Pin, 2016[11]	2.8	NR	NR	NR	NR	NR <del>0</del>	NR	NR
Quach, 2016[19]	38.0	NR	NR	NR	NR	<u>8</u> 17 0	NR	NR
Robins, 2018[21]	38	Congestive heart failure (4%); Heart disease (33%); stroke (9%); Cancer (25%); diabetes (18%); lung disease (16%); Parkinson's disease (1%)	NR	NR	NR	tember 2022. D Ens¥ignement uses related to	NR	NR
Schmid, 2009[35]	NR	Stroke (100%)	NR	NR	NR	l#\KQ	NR	NR
Schnittger, 2012[18]	NR	NR /	NR	NR	NR	<u>₹</u> \€₹\$	NR	NR
Stel, 2004[2]	100	Dizziness (27.9%), visual impairment (23%)	NR	NR	NR	wn loaded fr	NR	NR
Tinetti, 1998[9]	30.3	NR	NR	NR	NR	a 48 ±	NR	NR
Tinetti, 1994[24]	39	One or more chronic conditions (78%)	NR	NR	NR	3 <b>/#</b>  2	NR	NR
van der Meulen, 2014[10]	55.5	NA	NR	NA	NA	mng.	NA	NA
van Lankveld, 2011[17]	44	Cardiac 36%, hypertension 40%, vascular 25%, respiratory 12%, EENT 21%, upper GI 14%, lower GI 10%, Hepatic 3%, kidney 3%, other GU 16%, neurological 18%, endocrine 21%, psychiatric 8%, Rhuematic disease general (56%), Osteoarthritis (49%), Spondylosis(31%), Rheumatoid arthritis(17%), Arthritis otherwise defined (12%), Gout (6%), Chodrocalcinosis (12%), Osteoporosis (1%), Shoulder problem (6%), Polymyalgia rheumatica (3%), Soft tissue (1%), Carpal tunnel syndrome (2%), Others (6%)	NR	NR	NR	//bmjopen.bmj.com/ on June 11, 2025 a	NR	NR
Vanden Wyngaert, 2020[23]	NR	Cardiovascular disease (74.3%) diabetes (46.0%) musculoskeletal complications (44.2%), Neuropathy (28.3), retinopathy (31.9), respiratory complications (24.8), hepatopathy (17.7), pain (27.4%), depression	NR	NR	NR	NRgence Bibliogra	NR	NR

	BMJ Open  BMJ Open  (23.9%), fatigue (18.6%), anxiety (15.0%), sleep disturbances (12.4%)							
				<u>,                                      </u>		:022-0 :0yrigh		
		(23.9%), fatigue (18.6%), anxiety				621; t, in		
Vellas, 1987[8]	50	(15.0%), sleep disturbances (12.4%)  NR	NR	NR	NR	<u> </u>	NR	NR
Ward-Griffin, 2004[33]	NR	NR NR	NR NR	NR NR	NR NR	NR 2	NR	NR NR
XX 2010[20]	100	a. 1 (1000)	NE	3.7D	3.770	7,770	) ID	NR
Yu, 2020[12]	mean =0.74	The mean number of comorbidities at	NR	NR	NR	ZNR	NR	NR
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		baseline was 2.24 (SD=1.38)				ten En		
Zijlstra, 2007[27]	32.6	NR	NR	NR	NR	S Nak be	NR	NR
		The mean number of comorbidities at baseline was 2.24 (SD=1.38)  NR  For peer review only - http://bmjopen.bm				eptember 2022. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l E Enseignement Superieur (ABES) . r uses related to text and data mining, Al training, and similar technologies.		14
			-	-		<u>е</u>		

	BMJ Open						
Appendix 4: N	Mental health	outcomes related to falls, fear of falling, a	cted by copyright, in and social isolation (n=6)				
Author, Year	Sample	Results	Text description/ interpretation of findings \$\frac{\text{N}}{2}\$				
Murphy, 2002[1]	n=1064	Variables independently associated with activity restriction in participants with fear of falling  Depression (CES-D scale) Adj relative risk: 1.27 (95% CI, 1.00-1.60); p=0.048	"We found that a history of an injurious fall within the past year, slow timed physical performance, two or more chroatic conditions, and depressive symptoms were all independently associated with activity restriction."  **Sociated with activity restriction.**				
Stel, 2004[2]	n=204	Relationship between higher depression score and decline in social activities because of a fall OR: 2.0 (95% CI: 1.2-3.3); p<0.05	"A decline in functional status, social activities was reported more often in respondents will be higher depression score."				
Gagnon, 2005[3]	n=105	Variables associated with fear of falling (Comparing subjects with no/slight fear and subjects with moderate/severe fear)  Depression (Structured Clinical Interview for DSM-IV (SCID))  Wald chi-square= 8.76; p=0.03  Anxiety (Structured Clinical Interview for DSM-IV (SCID)) Wald chi-square= 5.95; p<0.02	"Not only were depressive disorders and depression severity independently associated with fear of fall the strongest association with this fear among the variables that we measured.  Given that this was a cross-sectional stude a causal relationship between depression and fear of falling cannot be interred. [] It is possible, therefore, that in some individuals, fear of falling is an anxious manifestation of depression. However, depression could also be a consequence of activity restriction or social is plation resulting from a fear of falling"  "Depressive disorders and anxiety disorders were significantly associated with categorical fear of falling, independently of these variables"				
Curcio, 2009[4]	n=1668	Variables associated with activity restriction related to fear of falling  Depression OR: 1.76 (95%CI, 1.38-2.24)	"A second model was then constructed with the psychosocial associated factors and other clinical and functional cavariates (see Table 4). After adjustment, functional and clinical factors emeined independently associated with activity restriction related to fear of falling. Only depression and poor perceived health variables emerged as independent factors."				
Dias, 2011[5]	n=113	Variables associated with activity restriction due to fear of falling (compared to no FOF or FOF alone)	"The variables that best discriminated the groups were depression, exhaustion and participation in social activities demonstrated in the diagram (Figure 1). For the grouping obtained hrough the Chi-square				

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		Donuesian	Automatic Interaction Detection (CHAID method, it may be observed
		<b>Depression</b> Chi-square=15.2, p=0.004	that the first distinctive characteristic was depression, evaluated using GDS. Those with positive symptoms for Epression showed 90% chance
		Cni-square=13.2, p=0.004	of restricting activities due to fear of fallight
			of restricting activities due to fear of falling.  Additionally, the presence of depressive symptoms seems to modulate
			the factors that are associated with activit respection due to fear of
			falling. A greater risk for depression has the sociated with inadequate
			evaluation of coping self-efficacy in stress 18 depends of life. It is worth
			noting that the participants of the present $\frac{2}{3}$ who restricted activities
			evaluation of coping self-efficacy in stress the events of life. It is worth noting that the participants of the present who restricted activities by FOF showed lower self-efficacy in relations to the other participants. Thus, it is possible that elders with depressions by the other participants.
			Thus, it is possible that elders with depressing symptoms perceive them
		Uh	selves less capable of performing certain solution, because of that,
			restrict their activities.
			and and
Nakaya,	n=43487	Relationship between history of falling	"We also conducted stratified analyses regarding OR of psychological
2013[6]		and psychological distress	distress according to differences in social war of the status. Almost all
		C. CC instantial and	subjects with a history of physical disease suiding those with history
		Sufficient social support OR, 1.6 (95% CI: 1.3-1.9)	of fall/fracture) were at increased risk of properties of social support."
		p<0.01	T T T T T T T T T T T T T T T T T T T
		Lack of social support	Al training.
		OR, 2.0 (95% CI: 1.4-2.8)	rai
		p<0.01	nin
		F	<u> </u>
Merchant,	n=493	Variables associated with fear of falling	"In our study, FOF and/or FAR were both significantly associated with
2020[7]		alone	<b>depression</b> in univariate and multivariate <b>d</b> ogi dics regression model.
			Those with FOF + FAR were nine times receively to be depressed than
		Depression	those with no FOF. [] Strong links betveen gepressive symptoms with
		OR, 4.90 ( 95% CI, 1.06–22.67)	FOF and/or FAR have been reported in various studies, and their
		p<0.05	association is believed to be bidirectional whose management of one condition would improve the other."
		Variables associated with fear of falling	condition would improve the other.
		+ fear-based activity restriction	condition would improve the other."
		rear-based activity restriction	condition would improve the other."  logies.  at Age
		Depression	at A
		OR, 5.17 ( 95% CI, 1.84–14.54)	ge
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1998[9]

Appendix 5: I	Appendix 5: Findings from included cohort studies (n=6)					
Author, Year	Sample	Results				
Vellas, 1987[8]	n=178  Studied two populations: 1) Individuals living in a retirement home (Fall victims = 59; Non-fallers=59)	Retirement home (n=118) Among the fall victims there was a tendency towards restriction of activity: 3% walked less indoors, 5% went outside less, 4% had no leisure activity, 7% no longer visited their children and 11% no longer visited their friends. The lack of significance (P>0.05) is linked both to the very low level of activity on day 1 of the aged population living in retirement homes and to our small sample.				

At home (n=60)

(Social Activity Scale):

2) Individuals

30: Non-

n=1103 at

baseline, 770 at 3

years follow-up

fallers=30)

living at home

(Fall victims =

"The interpersonal relationships of the fallers were very poor: 90% did not belong to any group, 54% never visited their children, 40% never visited anybody."

"A fall may lead to loss of autonomy. Face arising as a result of falls

Text description/ interpretation of findings \$\frac{1}{2}\$

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have been identified by Isaacs and his coconfirms these findings and demonstrates the Striction of activity following a fall without fracture." Doy nt S

"Falls in elderly persons give rise to a deces in activity and social life. The fear of recurrence often leads to 'instituto' alizing' the patient. But, it is difficult to show whether falls are an indication or the cause of the loss of autonomy."

On day 1, the fallers and control group had identical levels of activity. Reported a significant difference in the number of participants who maintained the same level of activity after 6 months, with this number being reduced in fall victims compared to non-fallers (p<0.02)

Regression coefficient = -0.538 (p<0.05)

Effect of having 2 or more noninjurious falls on social functioning

"While there did not appear to be an incressed isk of decline in social functioning among participants experiencing assingle noninjurious fall, repetitive fallers experienced a decline in social functioning in both short- and long-term follow-up analyses. The Stationship between repetitive falling and decline in social functioning remained after adjusting for each category of covariates. Experiencing a serious fall injury, on the the mand, was only marginally

associated with decline in social functioning over the 1-year follow-up, and not at all over the 3-year follow-up. Preferential loss to follow-up of persons experiencing decline in social functioning between the 1- and 3year follow-up interviews might at least partia y explain the lack of relationship between injurious falls and change in social activities."

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Van der Meulen, 2014[10]	n=260 Low level of concern about falling (n=127) High level of concern about falling (n=129) Follow-up = 14 months n=16583	Social participation (Frenchay Activities Index) Low level falling concern: Baseline mean, 39.9 (SD, 7.1) Follow-up mean, 38.8 (SD, 7.6) High level falling concern: Baseline mean, 36.8 (SD, 7) Follow-up mean, 35.7 (SD, 7.7)  p-value = 0.006  Effect of falls on social participation	"High and low levels of fall-related concerns redicted significant differences in ADL dysfunction and social participation that were persistent over 14 months of follow-up. [5] Accompanying effect size estimations were medium (social participation) to large (ADL dysfunction)."  To premier 2022.		
Pin, 2016[11]	n=16583 Fallers (n=411) Non-fallers (n=14205)	Effect of falls on social participation (binary variable based on if they reported performing at least one activity from a prespecifed list of activities)  Model 2 adjusted by time, age, sociodemographic variables and health indicators:  OR, 0.86 [95% CI, 0.76-0.89] (p<0.001)  Model 3 added adjustment for frailty: OR, 0.95 [95% CI, 0.89-1.02] The interaction between initial frailty status and falling was significant (Table 4, Model 7a).  Contrast analyses revealed that the probability of social participation was less among frail people than among people who did not meet any of the frailty criteria in both fallers (χ2 (1)=6.93;p<0.01) and non-fallers (χ2 (1)=41.21; p<0.001)	"Falling significantly decreased the probability of social participation in each of these activities and of participation is least one of them, but only before frailty was introduced into the relationship between falls and social participation. When it is the relationship between falls and social participation. When it is the relationship between falls and social participation. When it is the relationship between falls and social participation. The consideration in multivariate models, the size of the effect formula decreased and was no longer significant."  "Then, we demonstrated the major role of frailty in the relationship between falling and social participation. The construction of the frailty phenotype (Fried et al., 2001; Santos-Egginatori et al., 2009) was based on its physical component. In this manner frailty and falling were very close constructs. They shared similar risk factors, such as mobility disorders or bone density, and they had similar consequences in terms of disability or mortality. Moreover, we showed that they had similar consequences in terms of social participation. Thus, it may be difficult to distinguish between the two concepts and confirm they are analyses showed that the continuity in or disengagement from special activities was due to a long-term process that was amplified by lealth-events, rather than by the falls themselves."		
Yu, 2020[12]	n=4680	Relationship between number of falls and loneliness over 3 time-points (3 item UCLA Loneliness Scale)  Regression coefficient = 0.008, SE = 0.04, p = 0.048;	"Only the number of falls was significantly contented with the loneliness score in the next time point, and more frequent loneliness at the previous wave predicts an increased number of falls in the years [] The results suggest that a vicious circle relationship exists between loneliness and falls. [] An increased number of falls also predicted more frequent loneliness in 4 years. These findings support exidence reported in cross-		

	BMJ Open  BMJ Open  Sectional studies that the occurrence of falls with relationship to the control of the cont				
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		Wave 1-2: $\beta$ =0.030, Wave 2-3: $\beta$ = 0.068	sectional studies that the occurrence of fats was related to social exclusion. [] Older adults who have falken more frequently might choose to avoid risky activities such as going outside of the home and engaging in social activities. This could laid that discrepancy in desired and actual social engagement, which in turn results in more frequent experience of longlings."		
Hajek, 2020[13]	n=8836  In total, 669 individuals changed fear of falling (FOF) status from wave 5 to wave 6. More specifically, while the onset of FOF occurred in 431 individuals, the end of FOF occurred in 238 individuals.	Relationship between fear of falling and loneliness (Bude and Lantermann scale)  Onset of FOF β=0.02, SE=0.02, p=NR End of FOF β=-0.06, SE=0.03, p<0.05  Relationship between fear of falling and social isolation (De Jong Gierveld Loneliness Scale)  Onset of FOF β=0.06, SE=0.03, p<0.1 End of FOF β=0.01, SE=0.04, p=NR	"The end of FOF was associated with red properties of thorough the symptoms (β –1.08, P < .05), decreased loneliness scores as decreased negative affect (β = –0.07, Page 17).  We assume that the end of FOF has the properties to mark a decisive turning point in life for individuals who seems to make a decisive turning point in life for individuals who seems to make a decisive turning point in life for individuals who seems to make a decisive turning point in life for individuals who seems to make a decisive turning point in life for individuals who seems to make a decisive turning point in life for individuals who seems to make a decisive turning point in life for individuals developing feelings of isolation may remain a sociated with decreases in social isolation. The possible explanation may be that even a major life event, such as the end of FOF, does not have the power to reduce social isolation because feelings of isolation may remain a social years ago, may have difficulties of social isolation caused by FOF, several years ago, may have difficulties of the power to reduce social isolation?  The end of FOF was associated with decreases in social isolation and the properties of FOF, does not have the power to reduce social isolation because feelings of isolation may remain a specific properties.  The end of FOF was associated with decreases in social isolation and the properties of FOF, does not have the power to reduce social isolation because feelings of isolation caused by the properties of t	ial  ll ay he hin	
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Appendix 6: C	Cross-sectiona	al studies reporting on falls and social isol	ation/loneliness (n=11)			
Author, Year	Sample	Results	Text description/interpretation of findings 5			
Finn, 2001[14]	n=49	Social Resources (OARS Social Support Scale)  Fallers (n=25) Mean: 2.4 (SD, 1) Non-Fallers (n=24) Mean: 2.0 (SD, 0.78)	"The data from the present study supports the conclusion that the social resources of nursing home residents are the same, regardless of a history of falls that does not change their level of presous functioning. Most nursing home residents are already in a position where they have to rely on others to come to them for visits, outing where they have to rely community-based elderly individuals most like ing home residents do not have the means or capabilities to visit others.			
		p = 0.59	immediate environment. Therefore, regarded for fall-history the social resources available to nursing home resident to dependent on others."			
Stel, 2004[2]	n=204	Relationship between falls inside and decline in social activities because of a fall  OR: 2.6 (95% CI: 1.1-6.5); p<0.05	"A decline in social activities after falling ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls inside. The current study shows ignificantly associated with falls in the current study shows ignificantly associated with falls in the current study shows ignificantly associated with falls in the current study shows ignificantly associated with falls in the current study shows ignificantly associated with falls in the current study shows ignificantly associated with falls in the current study shows ignificantly associated with falls in the current study shows ignificantly associated with falls in the current study shows ignificantly associated with the current study shows ignificantly as a study shows ign			
Nicholson, 2005[15]	n=68	Relationship between injurious falls and social isolation (Lubben Social Network Scale)  Social isolation $\rho$ = -0.4; p<0.05  Female $\rho$ = -0.5; p=0.01  Family Sub Scale of Social Isolation $\rho$ = -0.2; p=0.12	"Results suggest that there is a strong positive relationship between injurious falls and social isolation. Results from this sample suggest that there is an association between lower scores of the LSNS and higher number of injurious falls, which means that increased injurious falls are related to increased social isolation. In the findings for this sample it appears that there may be some direct link between injurious falls and social isolation.  Gender appeared to play a role when examining H4. Males as a group did not show a significant relationship between number of injurious falls and social isolation. The relationship for females as a group was positive and significant. This female sample showed a high Pearson's correlation coefficient (see Table 4). This suggests that injurious falls may trigger some direct link to social isolation in females.  "When examining the family subscale of the LSNS, there was no correlation between injurious falls and social isolation (see Table 3). It is possible that as the participant continues to have injurious falls and becomes less likely to leave the house due to affear of future injurious falls, he/she will eventually become socially is lated. This is not necessarily the case when families are involved:"			

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		Friend Sub Scale of Social Isolation ρ= -0.43; p<0.05	"On the other hand, in the case of the fried correlation between injurious falls and so number of injurious falls was associated visolation. A possible explanation for this phenomenon with family and social isolatincreasing injurious falls may become morthus losing contact with friends. Friends daround the same age as the participant and amount of visits to the participant to make participant suffers as a result of being hon	including Fortuses related to te	isolation, such that a greater agreater degree of social be the opposite of the he participant who has leely to stay in the house participants tend to be tess likely to increase the participant of contact the ound."
Iliffe, 2007[16]	n=3139	Falls and social isolation (Lubben social network scale) Socially isolated (n=368) 13.6% reported multiple falls in the past 12 months Not socially isolated (n=2133) 10.7% reported multiple falls in the past 12 months p=0.11	Multivariate analysis taking into account associations shows a different pattern. The to be associated with depressed mood and memory impairment and perceived poor hassociated. For the other factors [multiple hypothesis, no significant associations in analyses were found.		Sofor social isolation appears is alone, while male sex, the may be weakly is listed in the second
Van Lankveld, 2011[17]	n=154	Relationship of falls with loneliness (De Jong Gierveld Loneliness scale) Correlation coefficient = 0.14 p=not significant	"Health status indicators were unrelated to functioning, and showed low to moderate health hazards."	ing fall Tela Tand simi	and cognitive ations with the remaining
Schnittger, 2012[18]	n=579	Association between history of falls and pathways of loneliness  Emotional loneliness (de Jong-Gierveld Loneliness Scale) Correlation coefficient=0.134 p<0.003  Social loneliness (de Jong-Gierveld Loneliness Scale) Correlation coefficient=0.09 p=not significant	"Interestingly, social support was the only variable, falls history, emerged in the fina relative importance of health factors compthe loneliness models"	tecanologies.	odel; this may indicate the

		вмл О	/bmjopen-2022-062124 on 29
		Social support (Lubben Social Network Scale) Correlation coefficient= -0.247 p<0.003	62124 on 29 : it, including f
Quach, 2016[19]	n=8464  No falls group (n=5249) One fall group (n=1352) At least two falls group (n=1863)	Social Relationship Index [mean (SD)]  No falls: 3.34 (1.32) One fall: 3.24 (1.35) At least two falls: 3.08 (1.35) p<0.0001  Note: this is a cohort study, but the outcomes relevant to our review question are from a cross-sectional survey given to participants at baseline	"Respondents who fell had a higher prevalence of clinically significant depression symptoms, were more often not provided the provided friends living in their neighborhood, were respondents with a services or to be a volunteer, and were less tikely to attend religious services or to be a volunteer, and were less tikely to have perceived support from friends or relatives, when not respondents with a least 2 falls or one fall respectively) tended to be lower than for respondents who did not fall (3.34 score of the social relationship index for fallers (3.08 to be lower than for respondents who did not fall (3.34 score of the social relationship index for fallers (3.08 to be lower than for respondents who did not fall (3.34 score of the social relationship index for fallers (3.08 to be lower than for respondents who did not fall (3.34 score of the social relationship index for fallers (3.08 to be lower than for respondents who did not fall (3.34 score of the social relationship index for fallers (3.08 to be lower than for respondents who did not fall (3.34 score of the social relationship index for fallers (3.08 to be lower than for respondents who did not fall (3.34 score of the social relationship index for fallers (3.08 to be lower than for respondents who did not fall (3.34 score of the social relationship index for fallers (3.08 to be lower than for respondents who did not fall (3.34 score of the social relationship index for fallers (3.08 to be lower than for respondents who did not fall (3.34 score of the social relationship index for fallers (3.08 to be lower than for the social relationship index for fallers (3.08 to be lower than for the social relationship index for fallers (3.08 to be lower than for the social relationship index for fallers (3.08 to be lower than for the social relationship index for fallers (3.08 to be lower than for fallers (3.08 to be lower than for the social relationship index for fallers (3.08 to be lower than for fallers (3.08 to be lower than for fallers (3.08 to be lower than
Hajek, 2017[20]	n=7808	Variables associated with history of falls  Social exclusion (Bude and Lantermann scale) $\beta$ =0.08; SE, -0.02; p<0.001  Loneliness (De Jong Gierveld Loneliness Scale) $\beta$ =0.08; SE, -0.02; p<0.001	Controlling for potential confounders, linear gression analysis showed that reporting a fall in the previous 12 months was associated with higher social exclusion scores ( $\beta$ = .08, p < .001) and higher loneliness scores ( $\beta$ = .08, p < .001). Contrarily, reporting a fall in the preceding 12 months was not associated with the number of important people in regular contact.
Robins, 2018[21]	n=245	Relationship between falls and social isolation (Friendship Scale for social isolation) OR 1.03 (95% CI: 0.66-1.62); p=0.9	No statistically significant association reparted between experiencing a fall in the past 12 months and social isolation.
Faria, 2020[22]	n=48	Relationship between falls and loneliness (UCLA scale) p=0.384	No statistically significant association reported between experiencing a fall in the past 6 months and loneliness

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Vanden	n=113	Variables associated with risk of falls	"Regarding the PROMIS questionnaire, low association	ations were found
Wyngaert,			between measures of the risk of falls and the apprec	ciation of participation
2020[23]		Ability to participate in social roles and	in social roles and activities on the one hand ( $\frac{1}{2}$ 2 = 0	0.11), and depression
		activities	in social roles and activities on the one hand ( $R2 = 0.08$ )"	
		(PROMIS questionnaire) R <sup>2</sup> =0.11; p=0.01	"Domarkahly, the risk of falls on itself weed identified	d as a datarminant of
		K -0.11, p-0.01	difficulties on psycho-social well-being (in Thorses)	sion and social
		Depression	isolation) and of objective health utility [ The state of	sion and social
		$R^2 = 0.08$ ; p=0.01	As such, falls and an increased risk of fall dete	r subjects to continue
			their outdoor social activities, resulting in the second s	n means and location
			of social contact to less stimulating activities (e.g. a	phone call rather
			than a rendezvous point), promoting the right simp	airments in mental
			health and depression"	
			than a rendezvous point), promoting the rest sumulating activities (E. Complete Comp	
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			in social roles and activities on the one hand on the other (R2 = 0.08)"  "Remarkably, the risk of falls on itself was identified difficulties on psycho-social well-being (is remarkable). As such, falls and an increased risk of falls on itself was isolation) and of objective health utility [Section of social contact to less stimulating activities and data mining, and similar technologies.  Alternative of the one hand definition is sufficiently simple of the original properties of social contact to less stimulating activities of social contact to less stimulating activit	
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Appendix 7: Cross-sectional studies reporting on fear of falling and activity restriction due to fear of falling (N=15)

Author, Year	Sample	Results	Text description/ interpretation of finding (N= 15)
Tinetti, 1994[24]	n=1103	Fear of falling (Falls Efficacy Scale – modified so low score corresponds with low confidence or greater fear) Fallers Mean, 79.8 (SD 23.4) Non-fallers Mean, 88.1 (SD 17.9)  p < .0001  Activity restriction because of fear of falling Fallers = 24% Non-fallers = 15% chi-square = 13.1; p < 0.001	In order to examine the impact of recent falls, we also determined the proportion of subjects reporting fear and the mean fall-related efficacy scores separately for subjects who did and did not experience a fall in the year prior to the interview. The proportion of the proportion
Howland, 1998[25]	n=266	Relationship between falls and fear of falling OR: 2.498 (95% CI: 1.013-6.159); p=0.05  Relationship between falls and activity curtailment among those afraid of falling OR: 1.094 (95% CI: 0.376-3.177); p=0.869  Relationship between social support and activity curtailment among those afraid of falling (Social Support Scale) OR: 1.574 (95% CI: 1.082-2.290); p=0.018 Note: Here a higher social support score indicates lower levels of social support	"The contribution of personal falls experience to fear of falling was apparent. Those who suffered a previous fall were more likely to have a fear of falling."  "Surprisingly, neither the degree of fear of falling nor the experience of falls was associated with activity restriction. This finding suggests that activity curtailment is not just associated with extreme levels of fear. The presence of social support was, however, important. Those who could rely on others or talk with friends about falling were least likely to report activity curtailment. Thus, support of family and friends may be an important prerequisite for continuing to remain active even in the face of fear of falling. This support may serve as butter to the potentially debilitating consequences of fear of falling. It is possible this support is manifested as encouragement for remaining active."  "Those who curtailed activities [] did not differ with respect to social integration but were significantly (p = .024) less likely to be able to rely on friends or relatives in times of crisis (social support)"
Murphy, 2002[1]	n=1064	Variables independently associated with activity restriction in participants with fear of falling	"We found that a history of an injurious fall within the past year, slow timed physical performance, two or more chronic conditions, and

		ВМЈ О	depressive symptoms were all independently associated with activity
		Injurious fall Adjusted relative risk (ARR): 1.36 (95% CI, 1.11-1.66); p=0.003  Two or more chronic conditions ARR: 1.34 (95% CI, 1.08-1.65); p=0.007  Slow-timed physical performance ARR: 1.44 (95% CI, 1.18-1.75); p=0.0004	depressive symptoms were all independently associated with activity restriction."  Cluding for uses related to the symptoms were all independently associated with activity restriction.
Apikomonkon, 2003[26]	n=546	Relationship between falls and activity restriction  Chi-square=5.49, p<0.05  Relationship between fear of falling and activity restriction Chi-square=23.27, p<0.001	"Compared with non-fallers, the older person with falls experiences were more likely to have activity restriction was so gated with activity restriction measured by dichotomous question."  "Older people with FOF were more likely to be activity restriction (26% vs 10%). The FOF using the SAFE The experience by dichotomous question."
Gagnon, 2005[3]	n=105	Variables associated with fear of falling (Comparing subjects with no/slight fear and subjects with moderate/severe fear)  Social support (confiding-relationships component of the Bedford Life Events and Difficulties Schedule modified for elderly subjects)  Wald chi-square= 3.77; p=0.05	"The following secondary independent variables were significantly associated with categorical fear of falling dizziness (Wald chi-square 6.58; p 0.01), total number of medications (Wald chi-square 5.40; p 0.02), and social support (Wald chi-square 3.76; p 0.05). (Note: Higher scores mean less support.)"
Zijlstra, 2007[27]	n=4376	Variables significantly associated with avoidance of activity due to fear of falling  Multiple falls in past 6 months  OR: 1.97 (95% CI, 1.52-2.54)	"When fear of falling was added as an additional variable (model 3; Table 3), odds ratios of all variables that showed significance in model 2 decreased. Nevertheless, the association for the highest age group (≥80 years), fair and poor perceived general health and multiple falls with avoidance of activities remained statistically senificant.  Our findings regarding avoidance of activity remained fairly similar when fear of falling was entered into the logister model. Although sometimes, often and very often experiencing are of falling were

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3			Aged 80 years or older	strongly associated with avoidance of activity, igher age (≥80 years),		
4			OR: 1.56 (95% CI, 1.24-1.95)	fair and poor perceived health and multip a fare remained independently		
5				associated with avoidance of activity in continuous nity-living older people.		
6 7			Fair perceived general health	This implies that interventions aimed at reducing avoidance of activity		
8			OR: 2.92 (95% CI, 2.43-3.52)	should not focus on fear of falling alone, but on other modifiable factors, like falls, as well"		
9			OR. 2.92 (93% CI, 2.43-3.32)	like falls, as well"  Enseignemel r uses related t		
10				es i		
11			Poor perceived general health	rela Rela		
12			OR: 5.7 (95% CI, 3.57-9.12)	tec		
13				<b>^</b> 7		
14	Iliffe,	n=3139	Relationship between fear of falling and	Multivariate analysis taking into account distinguistically significant		
15	2007[16]		social isolation	associations shows a different pattern. The self-social isolation appears		
16			(Lubben Social Network Scale)	to be associated with depressed mood and alone, while male sex,		
17			OR: 1.21 (95%CI, 0.88-1.65)	associated. For the other factors [(fear of Bulke)] listed in the second		
18			OK. 1.21 (7570CI, 0.00-1.05)	hypothesis no significant associations in hivardate or multivariate		
19				memory impairment and perceived poor least the may be weakly associated. For the other factors [(fear of hypothesis, no significant associations in hypothesis, no significant associations in hypothesis were found.		
20	Curcio,	n=1668	Variables associated with activity	"Those who had activity restriction related to gear of falling were		
21 22	2009[4]		restriction related to fear of falling	significantly more likely to have had a fall within the past year, with a		
23				trend to suffer recurrent falls and injurious falls"		
24			At least 1 fall in past year	ain.		
25			OR: 1.48 (95% CI, 1.18-1.86); p=0.001	"Table 3 shows the bivariate relationships between activity restriction		
26				related to fear of falling and psychosocial factors. Activity restriction		
27			Low social participation	related to fear of falling had a strong biva ateassociation with poor		
28			OR: 1.52 (95%CI, 1.20-1.92); p<0.01	perceived health, depression, low social participation, and poor life satisfaction."		
29			p<0.01	Satisfaction.		
30				"A second model was then constructed with the psychosocial associated		
31			Poor perceived health	factors and other clinical and functional cevarates (see Table 4). After		
32			OR: 1.38 (95% CI, 1.06-1.79)	adjustment, functional and clinical factors emained independently		
33				associated with activity restriction related far of falling. Only		
34				depression and poor perceived health variables merged as independent		
35				factors."		
36			Difficulties in activities of daily living	"logistic regression analyses for activity restriction related to fear of		
37			OR: 1.65 (95%CI, 1.16-2.32)	falling. In the first model, 19 demographic, functional, and health-related		
38			OK. 1.03 (7370CI, 1.10-2.32)	variables with p values less than .05 derived from the bivariate analysis		
39 40			Decreased physical activity	were entered into the logistic regression as independent variables.		
40 41			OR: 1.35 (95%CI, 1.06-1.70)	Difficulties in ADL, decreased physical activis, polypharmacy, and		
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		Polypharmacy OR: 1.56 (95% CI, 1.14-2.14)  Below poverty level OR: 1.32 (95% CI, 1.05-1.65)	extreme poverty were independently associated with activity restriction related to fear of falling. A second model was then constructed with the psychosocial associated factors and other linigal and functional covariates (see Table 4). After adjustment functional and clinical factors remained independently associated with activity restriction related to fear of falling."
Kara, 2009[28]	n=47	Relationship between fear of falling and loneliness (Philadelphia Geriatric Center Morale Scale) ρ= 0.258; p=Not significant	When the correlation between the fear of the Philadelphia Geriatric Center Morale Scatter examined, no correlations were found (Table 5).
Dias, 2011[5]	n=113	Variables associated with activity restriction due to fear of falling (compared to no FOF or FOF alone)  Fear of falling intensity Mean 3.4 (SD, 0.9); p<0.0  Depression Chi-square=15.2, p=0.004	"The three groups were statistically different relation to FOF evaluated using the question about fear intensity. The group that reported FOF and activity restriction demonstrated higher leaves of fear when compared with the other groups"  "The variables that best discriminated the groups were depression, exhaustion and participation in social activities, demonstrated in the diagram (Figure 1). For the grouping obtained through the Chi-square Automatic Interaction Detection (CHAID) method, it may be observed that the first distinctive characteristic was gepts sion, evaluated using GDS. Those with positive symptoms for Expression showed 90% chance
		Exhaustion Chi-square=9.2, p=0.01	of restricting activities due to fear of falling. Additionally, the presence of depressive symptoms seems to modulate the factors that are associated with activity restriction due to fear of falling. A greater risk for depression has been associated with inadequate
		Participation in social activities Chi-square=10.4, p=0.016	evaluation of coping self-efficacy in stres and events of life. It is worth noting that the participants of the present and who restricted activities by FOF showed lower self-efficacy in relation to the other participants. Thus, it is possible that elders with depressive symptoms perceive them selves less capable of performing certain asks and, because of that, restrict their activities.  Out of the elders that did not have depressive symptoms, those who had positive result for exhaustion of the frailty phenotype had 78% chance of restricting activities due to fear of falling."  "Out of the ones who did not show positive result for exhaustion, the other distinctive characteristic was participation in social activities.  Those who stopped performing activities had activities due to fear of falling.

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			studied sample; however this variable did not show association with activity restriction in the bivariate analysis. It is possible that this difference in relation to the participation is social activities only occurs for a subgroup and not for the whole sample.
Mendes da Costa, 2012[29]	n=501	Relationship between activity restriction due to fear of falling and number of falls in past 12 months  2 or more falls OR, 3.04 (95% CI, 1.70-5.42)  1 fall OR, 1.33 (95% CI, 0.66-2.68)	"activity restriction was increased signification with age and with the number of falls within the past 12 months, activity methods the past 12 months, activity restriction was increased significant with age and with the number of falls within the past 12 months, activity methods the past 12 months, activity restriction was increased significant with age and with the number of falls within the past 12 months, activity restriction was increased significant with age and with the number of falls within the past 12 months, activity and the past 12 months and the past 1
Choi, 2015[30]	n=4247	Relationship between falls and fear- induced activity restriction  Previous fall experiences OR, 2.12 [95% CI, 0.96-4.67] p=0.062 Injurious falls OR, 3.03 [95% CI, 1.21-7.54] p=0.008	Characteristics independently associated restriction were low socioeconomic status restriction were low socioeconomic status restriction with activities of daily living, and restriction with activities of daily living, and restriction were low socioeconomic status restriction
Ferreira, 2018[31]	n=7935	Relationship between fear of falling because of sidewalk defects and social participation OR 1.01 (95% CI: 0.99-1.04)	"As in the univariate analysis, the fear of milling because of defects in sidewalks and the perception of violence associated with social participation."
Petrinec, 2020[32]	n=108	Relationship between fear of falling and social functioning (Medical Outcomes Study 36-item Short-Form General Health Survey) $\beta$ = -0.29	"Fear of falls was an independent predict of for thole physical, physical functioning, and social functioning."
Merchant, 2020[7]	n=493	Variables associated with fear of falling alone  Number of falls	"The multivariate logistics regression in Table 2 shows that female sex $(OR = 3.54; 95\% CI = 1.82-6.90)$ , number of dedications $(OR = 1.28; 95\% CI = 1.03-13.60)$ , prefrail or frail $(OR = 2.77; 95\% CI = 1.26-3.73)$ , depression $(OR = 4.90; 95\% CI = 1.06-22.67)$ and number of falls in the

OR, 2.13 ( 95% CI, 1.20–3.78) p<0.05
Social isolation OR, 0.99 ( 95% CI, 0.51–1.89)

p=not significant

Variables associated with fear of falling + fear-based activity restriction

Number of falls OR, 1.4 (95% CI, 0.94–2.20) p=not significant

Social isolation OR, 1.7 (95% CI, 0.82–3.55) p=not significant

Sarcopenia OR, 8.13 (95% CI, 1.52–43.41) past 12 months (OR = 2.13; 95% CI = 1.20-3 \( \frac{1}{12} \) were significantly associated with FOF. Only sarcopenia (OR = \( \frac{1}{12} \) \(

"History of falling is a well-known risk for FOF and/or FAR as persons who have experienced falls are more lakely to develop fear. However, three-quarters of those with FOF + FAR had never experienced a fall of the study"

"Social isolation is another factor that is properly studied. In our study, one in three older adults with FOF + FAR and at risk of social isolation compared with one in five with no FOF" and one of the compared with one in five with no FOF and one of the compared with one in five with no FOF and one of the compared with one in five with no FOF and or FAR in both univariate and multivariate and save analysis."

"Prefrailty, frailty, and sarcopenia have strained analysis."

and/or FAR in both univariate and multivariate and multivariate and multivariate and multivariate and multivariate and similar technologies."

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Appendix 8:	Relevant findings fr	BMJ Open  om qualitative studies (n=7)  Results  BMJ Open  oppright, including
Author, Year	Qualitative analysis approach, and sample size	Results  Cluding 29
Ward-Griffin, 2004[33]	Phenomenological approach n=9	"Restricting activities was a second strategy identified by the participants, which involved avoiding certain social activities or/and physical environments. Participants used this strategy when they ranged to "play it safe" in times of inclement weather or in situations where ambulation might be difficult. Programs used the conditions seemed to heighten their awareness and fear of falling. As Sarah explained, "I do not fear alling, except around steps. They terrify me to death [along with] scaffolding around the town—that bother he is the sidewalk—that bothers me. And I am restricted to the house when there's fresh second in the ground." Similarly Wilfred stated, "When it's really, really icy, and I don't have to go out, I don't drive the car. I don't go out either."
Meric, 2007[34]	Analysis approach not reported n=22	"After having a falling experience, elderly individuals had behavioral changes, which receives the competency of achieving daily life activities, such as staying away from the crowded environments not going outside alone, acting very slowly, not able to do daily activities alone:  " I can't go out anymore. I haven't been out alone for 2 years, there are always people and to me." (75; woman).  " I take my man's arm on the street, I can't get out much in case I fall into the street." woman)."
Schmid, 2009[35]	Latent content analysis	"Quotes regarding the subsequent consequences of poststroke falls categorized interpolation three themes:  (1) limiting activity and participation, (2) increasing dependence, and (3) developing the fear of falling"
	n=42	"Limiting activity: Because falling became common for some participants, talk abourtragegies for the prevention of future falls was common and emerged naturally during interviews. A significant consequence was the choice to limit everyday life activities at home and in the community to help manage and pregent falls"
		"Increasing dependence: Participants discussed their dependence on assistive devices used as walkers, canes, and wheelchairs to reduce falls and feel secure in their environment. Some participants indicated use of the furniture, walls, or people as alternative assistive devices. Many discussed dependence on care were for maintaining balance and preventing falls. Participants easily became isolated because they were fearful to move about their own home, becoming increasingly dependent."
		"Developing fear of falling: This initial experience of falling with stroke onset was a numatic event that consequently resulted in participants expressing fear that future falls would mean having mother stroke. They also discussed the subsequent development of fear of falling and the fear of being left of the floor for hours at a time. Participants described genuine fear of falling and fear about being hurt as well as the subsequent impact on function and independence. Some participants discussed falls becoming a frequent event and a common and pervasive concern; fear, worry, and concern became a daily consequence of poststroke falls. Some participants were fearful that they would fall while out in the community and addressed the embarressment of a public fall. They were concerned about how they looked while walking around and seemed to be warried about the stigma related to falls and decreased mobility. Managing falls and fear of falling in everyday life became an important aspect of poststroke adjustment."

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Faes, 2010[36]	Grounded theory approach n=10	"Patients described social withdrawal and attributed this to their fear of falling and the loss of physical capabilities after falling. Patients recognised that they became (more) dependent on the caregiver after falling. One patient experienced social benefits from her fall, since she now receives more attention from her children"  "P#1 I can't travel anymore because of my limited mobility. I injured my leg in a fall of the consequence of the consequence of fall of the consequence of fall of the consequence of falls in cognitively uning the stairs."  "Furthermore, our findings confirmed the consequences of falls in cognitively uning the fear of falling and physical limitations"
Chiu, 2011[37]	Focussed ethnographic approach n=18	"Following their initial fall, it appeared that changes occurred in individuals' independently with help from —hourly maids during the rehabilitation period or for longer, recreational activities usually with second priority and were soon discontinued. Mah-Jong, one of the most popular tile games among Chinese was time. Other social activities mentioned included Cantonese opera, who teering within their communities, and dim sum with friends. After a fall, these activities were interrupted in two main reasons: 1) lack of transportation means and 2) lower mobility capabilities. Feelings of loneliness are set the respondents felt that they were cut off from their friends."  "Intuitive changes included modifications made to personal behaviours. Avoidance behaviour was reported as an intuitive change. Specifically, fallers would avoid outdoor activities. Other intuitive hanges include being more careful ("taking care") when walking and slowing down."
Host, 2011[38]	Phenomenographic approach n=14	"Others stopped doing certain activities to avoid falling and they did not choose activities that made them scared and nervous and caused bodily pain. They thus perceived that physical activity was not good and therefore stopped the activity. The families and the general practitioner (GP) supported their chicago Conversely, some felt that it was a loss if they had to stop activities they had enjoyed because it increased their sk of falling."  "Fall accidents had implications for older people's identity and autonomy, and the confidence is old lead to social isolation."  "Conversely, social interaction in the context of participation in fall-prevention activities was not always welcomed because it placed the respondents in a context in which they did not like to see themselves."  "For others, support from professionals was important in how they coped with falls and their prevention. The GP was a good support when they needed knowledge about appropriate and applicable preventive activities."
Xu, 2019[39]	Thematic analysis	Identified theme of restricted mobility and social participation.
	n=17	<u>                                     </u>

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"Stroke participants felt that they were restricted after the fall, pa this affected their mobility functions and degree of social particip	copyrign		20022-0
"Stroke participants felt that they were restricted after the fall, pa this affected their mobility functions and degree of social particip I am getting worse, especially my balance. I used to walk for a shor There was a big difference I used to walk with walking stick. But Last time I could take public transport, go to [central area] and take	articularly around I contion:  It distance outsides ut I have not been a walk, now it's	but ble	g reduced balance, and now I can't. (S7) to walk since that fall. (S8) fricult for me. (S1)"
"Stroke participants felt that they were restricted after the fall, paths affected their mobility functions and degree of social particip. I am getting worse, especially my balance. I used to walk for a sho There was a big difference I used to walk with walking stick. Bit Last time I could take public transport, go to [central area] and take	r uses related to tex	Enseignement Su	antember 2022 Down
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## Global evidence on falls and subsequent social isolation in older adults: A scoping review

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- **Background:** Falls are a leading cause of injury-related hospitalizations among adults aged 65
- years and older and may result in social isolation.
- **Objective**: To summarize evidence on falls and subsequent social isolation and/or loneliness in
- older adults through a scoping review.
- Eligibility criteria: Studies were eligible for inclusion if the population had a mean age of 60
- years or older, they examined falls and subsequent social isolation, loneliness, fear of falling or
- risk factors, and were primary studies (e.g., experimental, quasi-experimental, observational,
- qualitative).
- Sources of evidence: MEDLINE, CINAHL, Embase, Ageline, and grey literature from
- inception until January 11, 2021.
- **Charting methods:** A screening and charting form was developed and pilot-tested.
- Subsequently, two reviewers screened citations and full-text articles, and charted the evidence.
- **Results:** After screening 4,993 citations and 304 full-text articles, 39 studies were included in
- this review. Participants had a history of falling (range: 11 to 100%). Most studies were
- conducted in Europe (44%) and North America (33%) and were of the cross-sectional study
- design (66.7%), in the community (79%). Studies utilized 15 different scales. Six studies
- examined risk factors for social isolation and activity restriction associated with fear of falling.
- Six studies reported mental health outcomes related to falls and subsequent social isolation.
- **Conclusions:** Consistency in outcome measurement is recommended, as multiple outcomes were
- used across the included studies. Further research is warranted in this area, given the aging
- population and the importance of falls and social isolation to the health of older adults.
- Scoping Review Registration: 10.17605/OSF.IO/2R8HM

- **Word count**: 246/250 (abstract), 2981/3000 (main text)
- **Keywords**: scoping review, older adults, falling, social isolation, loneliness, fear of falling
- 26 Strengths and Limitations of this Study:
  - A robust methodology including a thorough and extensive literature search was used to review the literature in the area.
  - There was no date limits or language limits for studies eligible for inclusion in this scoping review.
  - Scoping reviews do not assess the quality of included studies and we cannot confirm the directional causality between falls and social isolation.

### **INTRODUCTION**

Addressing social isolation in older adults is a growing priority in Canada, as over 30% older adults are at risk of social isolation [1]. Social isolation among older adults is associated with adverse health outcomes including cognitive decline, depression, anxiety, and dementia [2]. Globally, falls are the second leading cause of unintentional injury death, making falls a major public health concern [3]. In Canada, falls are the leading cause of injury-related hospitalizations among adults aged 65 years and older, and 20-30% of older adults experience at least one fall each year [4]. Falls may result in serious health-related consequences including physical (e.g., fractures), physiological (e.g., cognitive decline), and psychological (e.g., anxiety, depressive symptoms, fear of falling, and social isolation) outcomes [5].

Given the detrimental outcomes associated with both falls and social isolation, there is a need to understand the relationship between falls and subsequent social isolation in older adults. The current scoping review is focused on falling and the subsequent experience of social isolation and/or loneliness and to ascertain whether the COVID-19 context affected the relationship between falls and subsequent social isolation.

## **METHODS**

- Protocol and registration
- The protocol for this scoping review was developed in accordance with the JBI (formerly Joanna
- Briggs Institute) guidance for scoping reviews and registered with Open Science Framework [6].
- An integrated knowledge translation approach was used [7], whereby colleagues from the Public
- Health Agency of Canada (YJ, KA, MdG, AGB) co-developed the review. The results are
- reported using the Preferred Reporting Items for Systematic Reviews and Meta-analysis
- (PRISMA) extension to scoping reviews [8] supplemented by PRISMA 2020 [9].

- Patient and Public Involvement
- Through the Strategy for Patient-Oriented Research (SPOR) Evidence Alliance, we collaborated
- closely with a patient partner who provided feedback on our protocol, participated in full-text
- screening piloting, and provided input on the manuscript (JB).
- Search strategy
- An experienced librarian developed our comprehensive literature search strategy, which was
- peer-reviewed by a second information specialist using the Peer Review of Electronic Search
- Strategies (PRESS) checklist [10]. MEDLINE, CINAHL, Embase, and Ageline were searched
- from inception until January 11, 2021 (Appendix 1). References of included studies and relevant
- reviews were scanned. Grey literature (i.e., unpublished or difficult to locate studies) was
- searched using the Canadian Agency for Drugs and Technologies in Health's Grey Matters
- checklist [11].
- Eligibility criteria
- The population of interest were older adults with a mean age of 60 years or older. The concept
- was the relationship between falls and subsequent social isolation or loneliness. As mentioned in
- our related systematic review on interventions for social isolation after falling, social isolation
- and loneliness are distinct concepts [12]. Social isolation included a decrease in any of the
- following: number of social contacts, feeling of belonging, fulfilling relationships, engagement
- with others, and quality of their personal network [12]. We defined loneliness as "the unpleasant
- experience that occurs when a person's network of social relations is deficient in some way,
- either quantitatively or qualitatively" [13]. For our primary objective, the context included any
- community or institutional setting. For our secondary objective, we limited the context to include
- studies that specified their consideration of the COVID-19 pandemic. Studies including

participants reporting a history of falling (i.e., regardless of the proportion of the sample who fell), the role of fear of falling in this relationship, as well as any risk (e.g. medication use, frailty) or protective (e.g. exercise, gait or balance training) factors were considered eligible for inclusion.

Eligible study designs included primary research studies of experimental (e.g., randomized controlled trials), quasi-experimental (e.g. non-randomized controlled trials, controlled before and after studies, interrupted time series), observational (e.g., cohort studies, case-control studies, cross-sectional studies), qualitative (phenomenological, ethnography, qualitative interview, etc.) and mixed method (e.g., convergent parallel, embedded, explanatory sequential) design. No restrictions based on study year, language of publication, or study duration were applied.

## Study selection

A screening form was developed and a pilot-test using 50 citations was completed with 80% agreement, and subsequently, all remaining titles and abstracts were screened independently by pairs of reviewers (SMT, AP, JF, GM, AH). Discrepancies were resolved by a third reviewer.

Similarly, two pilot-tests were completed for full-text article screening (achieving 27% and 40% agreement, respectively), screening criteria were revised, and subsequently, full-text articles were assigned to independent pairs of reviewers. Discrepancies were resolved by a third reviewer.

# Data charting

A charting form was developed to capture data on study characteristics, population characteristics and outcomes of interest. Relevant outcomes included any data illustrating the relationship between falls and subsequent social isolation, including the role of fear of falling,

and other risk factors or protective factors. A pilot-test was conducted using five studies,
sufficient agreement was achieved, and subsequently, full data charting was completed by
independent pairs of reviewers. Discrepancies were resolved by a third reviewer.

# Analysis and presentation of results

The review findings were summarized descriptively using summary tables.

#### RESULTS

in Appendices 2 and 3.

After screening 4993 citations and 304 full-text articles against our eligibility criteria, 39 studies were identified as eligible for inclusion based on our primary objective for this review (Figure 1). No studies were identified when limiting to the COVID-19 context for our secondary objective. Study and patient characteristics have been summarized in Table 1 and detailed data are reported

Table 1: Summary of study and patient characteristics

Characteristics	Number (%)
Study Characteristics (n=39)	
Geographical region	
Asia	5 (12.8%)
Australia	1 (2.5%)
Europe	17 (43.6%)
North America	13 (33.3%)
South America	3 (7.7%)
Study design	
Cohort	6 (13.8%)
Cross-sectional	26 (66.7%)
Qualitative	7 (19.4%)
Study duration	
NA	29 (74.3%)
$\leq 1$ year	5 (12.8%)
≥ 1 year	5 (12.8%)
Patient characteristics	
Mean age	74.9 (range, 65.0 to 95.0)
NR	11 (28.2%)
65.0-69.9 years	4 (10.2%)
70.0-74.9 years	8 (20.5%)
75.0-79.9 years	14 (35.9%)

≥80.0 years	2 (5.1%)
Proportion of female participants	Mean: 65.3% (range, 42.5 to 88.9)
Sample size	Mean: 3043.6 (9 to 43487)
<100	11 (28.2%)
100-499	11 (28.2%)
500-999	3 (7.7%)
1000-1999	4 (10.2%)
2000-5000	4 (10.2%)
>5000	6 (15.4%)
Study setting	
Community	31 (79.4%)
Medical	6 (15.4%)
Nursing home	1 (2.5%)
Multi-site	1 (2.5%)
Participants living alone	44.1% (range, 0 to 100)
Participants with a history of falling	Mean: 50.8% (range, 11.2 to 100)
Not reported*	11 (28.2%)
≤25%	6 (15.4%)
25-40%	10 (25.6%)
40-85%	5 (12.8%)
>85%	7 (17.9%)
Abbreviations: NA, not applicable; *not rep	ported for the overall sample

## Study characteristics

> The publication year for included studies ranged from 1987 to 2020, with more than half published since 2010. Most studies were conducted in Europe (17/39, 44%) and North America (13/39, 33%). More than half of the studies were cross-sectional study design (66.7%) and 7 qualitative studies were included. Most were conducted in the community (79%). Studies utilized 15 different scales and a variety of self reported responses to assess variables such as social isolation, loneliness. (e.g., 18-item Lubben Social Network Scale, 6-item de Jong-Gierveld Loneliness Scale). Six studies identified risk factors for social isolation and for activity restriction due to fear of falling (Table 2). Six studies reported mental health outcomes (Appendix 4).

Table 2: Potential risk factors for social isolation and activity restriction associated with fear of

## 125 falling

Author, Year	Risk factor	Associated evidence		
Social Isolation after injurious fall				
Nicholson, 2005	Sex (female)	The authors noted a strong positive		
		correlation between injurious falls and social		
		isolation for women ( $\rho$ = -0.5; p=0.01), but		
		this was not significant for men.		
Activity Restriction	due to fear of falling			
Zijlstra, 2007	Aged 80 years or older	OR: 1.56 (95% CI, 1.24-1.95)		
	Fair perceived general health	OR: 2.92 (95% CI, 2.43-3.52)		
	Poor perceived general health	OR: 5.7 (95% CI, 3.57-9.12)		
Curcio, 2009	Poor perceived health	OR: 1.38 (95% CI, 1.06-1.79)		
	Depression	OR: 1.76 (95% CI, 1.38-2.24)		
	Low social participation	OR: 1.52 (95% CI, 1.20-1.92)		
	Difficulties in activities	OR: 1.65 (95% CI, 1.16-2.32)		
	of daily living			
	Decreased physical	OR: 1.35 (95% CI, 1.06-1.70)		
	activity			
	Polypharmacy	OR: 1.56 (95% CI, 1.14-2.14)		
	Below poverty level	OR: 1.32 (95% CI, 1.05-1.65)		
Dias, 2011	Depression	Chi-square=15.2, p=0.004		
	Exhaustion (frailty)	Chi-square=9.2, p=0.01		
	Participation in social	Chi-square=10.4, p=0.016		
	activities			
Murphy, 2002	Two or more chronic	ARR: 1.34 (95% CI, 1.08-1.65)		
	conditions			
	Slow-timed physical	ARR: 1.44 (95% CI, 1.18-1.75)		
	performance			
Merchant, 2020	Sarcopenia	OR, 8.13 (95% CI, 1.52–43.41)		

Abbreviations: OR, odds ratio; ARR, adjusted risk ratio

# 127 <u>Patient characteristics</u>

- Across all studies, the number of included patients was 118,702, with an average of 3,043
- patients per study. Their mean age ranged from 65 to 95 years. Approximately 65% of patients

were female. Most studies included participants with a history of falling, ranging from 11% to 100% of the study population.

## **Cohort studies**

Among the 39 included studies, six were cohort studies (Appendix 5). Tinetti et al (1998) demonstrated a significant relationship between multiple non-injurious falls and a decline in social functioning (Regression coefficient = -0.538 (p<0.05)), measured using the Social Activity scale, in a sample of 770 older adults after 3 years of follow-up [14]. Similarly, Pin et al. (2016) found that in their cohort of 16,583 participants, those who fell showed decreased social participation after falling (p<0.001), which was no longer statistically significant when frailty was added in the model [15].

Vellas et al. (1987) compared people who fall versus those who did not in two populations: a retirement home (n=118) and older adults living at home (n=60) [16]. Among the older adults who lived at home, they noted that fewer fallers were able to maintain the same level of activity after 6 months of follow-up when compared to non-fallers (p<0.02).

Van der Meulen et al. (2014) assessed social participation (using the Frenchay Activities Index) in 260 older adults with low and high levels of concern about falling over 14-months [17]. They reported significant differences (specific results not reported) between the groups, with lower social participation scores in those who had a higher level of concern about falling.

In 4,680 older adults, Yu et al. (2021) reported a significant relationship between the number of falls and loneliness scores (measured using the 3 item University of California, Los Angeles (UCLA) Loneliness Scale) across three time points over 4-years (B = 0.008, p<0.05) [18]. A cohort study by Hajek et al. (2020) looked at loneliness (as measured using the Bude and Lantermann scale) and social isolation (measured using the De Jong Gierveld Loneliness Scale)

and their link to fear of falling 669 older adults [19]. They compared older adults with an onset of fear of falling, to those who had no fear. Their findings revealed that the end of fear of falling was associated with lower loneliness scores ( $\beta = -0.06$ , p<0.05) and other negative psychosocial outcomes (e.g., increased depressive symptoms).

### Cross-sectional studies related to falls and social isolation

Of the twenty-six cross-sectional studies included in this review, 11 reported on the relationship between falls and social isolation or loneliness (Appendix 6).

Quach et al. (2016) examined the relationship between falls and scores on the Social Relationship Index including 8,464 participants [20]. They noted that participants who reported experiencing a fall or multiple falls had a lower social relationship index score (mean, 3.24 and 3.08 respectively) compared to those who had not fallen (mean, 3.34; p<0.0001).

Hajek et al (2017) examined variables associated with a history of falling in 7,808 participants [21]. They found those reporting a fall in the previous 12 months had higher loneliness scores (De Jong Gierveld Loneliness Scale;  $\beta$  = .08, p < .001) and social exclusion scores (Bude and Lantermann scale;  $\beta$  = .08, p < .001) compared to those who had not fallen.

Schnittger et al. (2012) conducted a study in 579 older adults identifying risk factors for different pathways of loneliness – emotional loneliness, social loneliness (both measured using the De Jong Gierveld Loneliness Scale), and social support (measured using the Lubben Social Network Scale) [22]. A history of falls was the only biological variable that was identified as a statistically significant risk factor for inclusion in the model for social support (correlation coefficient= -0.247; p<0.003).

Stel et al (2004) reported a statistically significant decline in social activities in 204 older adults who experienced a fall inside their home (OR: 2.6 (95% CI: 1.1-6.5); p<0.05) [23], and

Vanden Wyngaert et al. (2020) reported an association between risk of falls and participation in social roles and activities in 154 older adult haemodialysis patients (PROMIS questionnaire;  $R^2$ =0.11; p=0.01) [24]. Finally, Nicholson et al. (2005) reported a strong positive relationship between experiencing an injurious fall and increasing social isolation in a sample of 68 older adults (Lubben Social Network Scale;  $\rho$ = -0.4; p<0.05), and highlighted that this relationship was stronger in women ( $\rho$ = -0.5; p=0.01) [25]. Additionally, they assessed this relationship using both the Family and Friends subscales of the Lubben Social Network Scale and found that the correlation was specific to the Friends subscale ( $\rho$ = -0.43; p<0.05).

Iliffe et al. (2007) and Robins et al. (2018) found no statistically significant associations between falls and social isolation using the Lubben Social Network Scale in a sample of 3,139 older adults and the Friendship Scale for social isolation in a sample of 245 older adults, respectively [26, 27]. Similarly, Van Lankveld et al. (2011) and Faria et al. (2020) found no correlation between falls and loneliness, using the De Jong Gierveld Loneliness scale in a sample of 579 older adults, and the UCLA scale in a sample of 48 older adults, respectively [28, 29]. Additionally, Finn et al. (2001) noted no difference in scores for the OARS social support scale when comparing fallers to non-fallers in a nursing home setting (n=49) [30].

Cross-sectional studies related to fear of falling and social isolation

Seven studies examined fear of falling linked to falls and social isolation (Appendix 7). Gagnon et al. (2005) reported a statistically significant positive relationship between fear of falling and social support in a sample of 105 older adults (measured using the confiding-relationships component of the Bedford Life Events and Difficulties Schedule modified for elderly subjects; Wald chi-square= 3.77; p=0.05) [31]. Curcio et al. (2009) reported a strong relationship between fear of falling and low social participation in 1,668 older adults (OR, 1.52; 95% CI, 1.20-1.92;

p<0.01) [32]. Petrinec et al. (2020) identified fear of falling as an independent predictor of social functioning (as measured by the Medical Outcomes Study 36-item Short-Form General Health Survey;  $\beta$ = -0.29) in 108 older adults [33].

Merchant et al. (2020) and Iliffe et al. (2007) showed no statistically significant

relationship between fear of falling and social isolation in 493 older adults and 3,139 older adults, respectively [26, 34]. Ferreira et al. (2018) and Kara et al. (2009) showed no association between fear of falling and social participation (n=7,935) or fear of falling and loneliness (n=47), respectively [35, 36]. Cross-sectional studies related to falls and activity restriction due to fear of falling Eight studies examined the relationship between falls and activity restriction due to fear of falling (Appendix 7). Tinetti et al (1994) and Apikomonkon et al. (2003) both reported a statistically significant decrease in activity due to fear of falling in individuals who experienced a fall compared to those who had not (n=1,103, chi-square= 13.1, p < 0.001; and n=546, chisquare=5.49, p<0.05, respectively) [37, 38]. Similarly, in 1,668 older adults, Curcio et al. (2009) demonstrated that those who restricted activity due to fear of falling were more likely to have experienced a fall in the year prior (OR: 1.48 (95%CI, 1.18-1.86); p=0.001) [32], and Mendes da Costa et al. (2012) demonstrated that activity restriction increased in those with multiple falls over the past year (OR, 3.04; 95% CI, 1.70-5.42) [39]. Murphy et al. (2002), and Choi et al. (2015) showed that a history of injurious falls was independently associated with activity restriction due to fear of falling (n=1,064, ARR: 1.36; 95% CI, 1.11-1.66; p=0.003; and n=4,247, OR, 3.03; 95% CI, 1.21-7.54, p=0.008, respectively) [40, 41].

Howland et al. (1998) reported no relationship between the experience of a fall and activity restriction in a sample of 266 older adults (OR: 1.094; 95% CI, 0.376-3.177; p=0.869)

[42], as did Choi et al. (2015) (OR, 2.12; 95% CI, 0.96-4.67; p=0.062) among 4,247 older adults [41]. Similarly, Merchant et al. (2020) also reported no significant relationship between the number of falls and fear-based activity restriction in 493 older adults (OR, 1.4; 95% CI, 0.94– 2.20) [34]. 

### Qualitative studies

Seven qualitative studies were included (Appendix 8). All participants interviewed were older adults (n=124), including 51 stroke survivors [43, 44] and 10 experiencing frailty [45]. Common categories identified across these studies were activity restriction to manage fear of falling, changing behaviours to avoid falling [43, 45-47], feeling restricted due to reduced mobility after falling [43, 44, 48], increasing dependence on caregivers [43, 45], developing fear of falling [43, 45], feelings of loneliness or isolation [43, 48], and a negative impact on identity or autonomy [47].

#### **DISCUSSION**

We conducted a comprehensive scoping review including 39 studies examining the relationship between falls and subsequent social isolation. We limited the scoping review to studies that identified social isolation after a fall, this was due to the request of the commissioning knowledge user. More than half of the studies were published since 2010, suggesting increased interest in the relationship between falls and social isolation in older adults. Social isolation and loneliness were measured using a variety of outcome measures across studies, such as degree of activity, and varying scales for loneliness, social isolation, social participation, social support, etc. This highlights the growing need for consistency in the measurement of social isolation and loneliness to allow for meaningful comparison across studies. Cornwall et al. (2009) highlight previous efforts to consolidate different measures of social isolation and build off this work.

They combined multiple measures of social isolation to develop two scales that measure distinct dimensions of social isolation – social disconnectedness and perceived isolation [49].

Only a few studies examined risk factors and mental health outcomes related to falls and subsequent social isolation. Risk factors linked to social isolation and activity restriction included age, sex/gender, poor perceived health, poverty, frailty, and comorbidity. Few studies also documented an association between activity restriction due to fear of falling and depression. Our findings suggest the presence of gaps in the literature for these important outcomes, highlighting the need for further research. No randomized trials exploring interventions for social isolation after a fall were identified in our scoping review, highlighting another gap in the literature and an area for future research to explore.

We did not identify any studies on falls and subsequent social isolation that were specific to the COVID-19 context, highlighting another gap in the evidence base. A scoping review by Kasar et al. (2021) suggests that older adults face increased social isolation as a result of pandemic-related restrictions, which can result in increased loneliness and reduced quality of life [50]. They also highlighted how technology can be used to deliver virtual or tele-health support services, and to allow older adults stay connected with their social networks [50]. A systematic review by Larson et al. (2021) assessed the impact of COVID-19 lockdowns on physical activity in older adults and reported that most studies demonstrated a decline in physical activity or an increase in sedentary behaviours in this population. The effectiveness of physical activity and exercise in preventing falls and fractures in older adults is well-established in the literature [51-53]. A decline in physical activity in older adults could lead to sarcopenia, and an increased risk of falls or fractures [53].

There are several strengths to our scoping review, such as the use of the JBI guide, and the PRISMA-ScR. A comprehensive literature search was conduced and several different types of study designs were included. However, limitations include that all studies were conducted in middle-high- or high-income economy countries. This suggests that our results may not be generalizable to low- and middle-income countries, highlighting a gap in the literature. Many of the included studies were cross-sectional and we cannot confirm the directional causality between falls and social isolation without more robust research.

In summary, we found a dearth of research, particularly examining risk factors and mental health outcomes related to social isolation and falling older adults. Further research is warranted in this area, given the importance of falls and social isolation to the health of older adults.

1 2											
3	278	LIST OF ABBREVIATIONS									
5 6	279	ARR Absolute Risk Reduction									
7 8	280	CADTH Canadian Agency for Drugs and Technologies in Health									
9 10 11	281	CI	Confidence interval								
12 13	282	OR	Odds Ratio								
14 15	283	PRESS	Peer Review of Electronic Search Strategies								
16 17 18	284	PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses								
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42 43	294	[17-0245-SU	B].								
44 45	295	Ethics approv	v <u>al</u>								
46 47	296	Not required.									
48 49 50	297	Consent for publication									
51 52	298	Not applicab	le.								
53 54	299	Availability of	of data and materials								
55 56 57											
58 50				18							

300	The full dataset is available from the corresponding author upon reasonable request.
301	Conflict of interests
302	All authors do not have any potential (or perceived) conflicts of interest.
303	<u>Author Contribution</u>
304	ACT obtained funding for this study. SMT, ACT, YJ, MdG, and KA conceptualized the study.
305	SMT drafted the protocol, with input from ACT, YJ, MdG, KA, JB, JW, and SES. SMT oversaw
306	screening, full-text review, and data abstraction. SMT, AP, JF, GM, AH, and JB screened
307	citations and full text articles, abstracted and verified data. SMT and ACT interpreted results,
308	and SMT, AP, and ACT drafted the manuscript and revised the final version of the manuscript.
309	JF, GM, AH, YJ, MdG, KA, AGB, JB, JW, and SES critically reviewed the manuscript. All
310	authors approved of the final version.
311	Role of the funder
312	The funders were co-developers of this research project and contributed to the design of the
313	study and reviewed/approved of the manuscript.
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318	SUPPLEMENTAL FILES
319	Supplemental File 1: PRISMA Checklist
320	Supplemental File 2: Appendices

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- FIGURE LEGEND:
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# Appendix 1: Literature search strategies

#### Ovid MEDLINE(R) ALL <1946 to Jan 11, 2021>

- Accidental Falls/
- (slip\* or trip\* or stumbl\* or tumbl\*).tw,kf.
- (fall\* or fell or "fall- related" or "near- fall").tw,kf.
- 4 or/1-3
- limit 4 to "all aged (65 and over)"
- exp Aged/ or geriatrics/
- (geriatric\* or elder\* or age\* or "of age" or aging or senior\* or older adult\* or retired or retiree\* or elder\* or pensioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or octogenarian or nonagenarian\* or centenarian\* or sixties or seventies or eighties or nineties).tw,kf.
- 4 and (6 or 7)
- 5 or 8
- Social Isolation/
- 11 loneliness/
- exp social support/
- (social barrier\* or social isolat\* or social support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or connectedness or lonely or loneliness or "feel\* alone\*" or companionship).tw,kf.
- 14 ((lack or absence or minimi\*) adj2 (contact or communication or support\*)).tw,kf.
- 15 or/10-14
- 16 9 and 15
- animals/ not humans/
- 18 16 not 17

#### PsycINFO <1806 to January Week 2 2021>

- falls/
- (slip\* or trip\* or stumbl\* or tumbl\*).tw.
- (fall\* or fell or "fall- related" or "near- fall").tw.
- or/1-34
- limit 4 to "380 aged <age 65 yrs and older>"
- (geriatric\* or elder\* or age\* or "of age" or aging or senior\* or older adult\* or retired or retiree\* or elder\* or pensioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or

octogenarian or nonagenarian\* or centenarian\* or sixties or seventies or eighties or nineties).tw.

7 4 and 6

8 5 or 7

9 social isolation/ or loneliness/ or social support/ or friendship/

10 (social barrier\* or social isolat\* or social support\* or social car\* or

- 10 (social barrier\* or social isolat\* or social support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or confederation or lonely or loneliness
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- 11 5 and 10
- limit 11 to human

Database: EBM Reviews - Cochrane Database of Systematic Reviews <2005 to January 11, 2021>, EBM Reviews ACP Journal Club <1991 to January 11, 2021>, EBM Reviews - Cocarane Clinical Answers <January 2021>, EBM Reviews - Database of Abstracts of Reviews of Effects <1st Quarter 2016>

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### Joanna Briggs Institute EBP Database - < Current to January 11, 2021>

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  o text and data mining, Al training, and similar technologies. support\*)).mp.
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Appendix 2: Study Author, year	Characteristics (n=39) Study title	Journal name	Country	inc. 21 22 24 Stuck design	Study duration
	•		, and the second	Etudy design	(months)
Apikomonkon, 2003[26]	Fear of falling and fall circumstances in Thailand	NA	Thailand	oros <b>g</b> sectional	NA
Chiu, 2011[37]	Psychosocial responses to falling in older Chinese immigrants living in the community	Dissertation Abstracts International Section A: Humanities and Social Sciences	Canada	e premiser 2022. Dov Enseignement Sir uses related to te	6
Choi, 2015[30]	Characteristics associated with fear of falling and activity restriction in South Korean older adults	Journal of Aging and Health	South Korea	Sectional disconsistency of the section disconsist	NA
Curcio, 2009[4]	Activity restriction related to fear of falling among older people in the Colombian Andes Mountain	Journal of Aging and Health	Columbia	क्रिक्ट हैं sectional	NA
Dias, 2011[5]	Characteristics associated with activity restriction induced by fear of falling in community-dwelling elderly	Revista Brasileira de Fisioterapia	Brazil	A Rosectional ning,	NA
Faes, 2010[36]	Qualitative study on the impact of falling in frail older persons and family caregivers: Foundations for an intervention to prevent falls	Aging & Mental Health	Netherlands	Aual mative traini	NA
Faria, 2020[22]	Elderly residents in the community: gaining knowledge to support a rehabilitation nursing program	Revista Brasileira de Enfermagem	Portugal	©rose sectional	NA
Ferreira, 2018[31]	Aspects of social participation and neighborhood perception: ELSI-Brazil	Revista de saude Publica	Brazil	Frosssectional	NA
Finn, 2001[14]	The relationship between falls and fall-related efficacy, depression, and social resources	Dissertation Abstracts International: Section B: The Sciences and Engineering	USA	ar technologies.	NA
Gagnon, 2005[3]	Affective correlates of fear of falling in elderly persons	American Journal of Geriatric Psychiatry	Canada	crosstsectional	NA
Hajek, 2017[20]	The association of falls with loneliness and social exclusion: evidence from the DEAS German Ageing Survey	BMC Geriatrics	Germany	cross sectional	NA

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Hajek, 2020[13]	What are the psychosocial consequences when fear of falling starts or ends? Evidence from an asymmetric fixed effects analysis based on longitudinal data from the general population	International Journal of Geriatric Psychiatry	Germany	/bmjopen-2022-06ខ្លាំ 24 on 29 cted by copyrightភ្នំncluding	36
Host, 2011[38]	Older people's perception of and coping with falling, and their motivation for fall-prevention programmes	Scandinavian Journal of Public Health	Denmark	gualifative	2
Howland, 1998[25]	Covariates of fear of falling and associated activity curtailment	The Gerontological Society of America	USA	screign sectional	NA
Iliffe, 2007[16]	Health risk appraisal in older people 2: the implications for clinicians and commissioners of social isolation risk in older people	British Journal of General Practice	England	eptember 203 ectional Ens@ignement Su to tex	NA
Kara, 2009[28]	Evaluation of home environment and life satisfaction and falling in geriatrics: Examination of its relationship with fear	Physiotherapy Rehabilitation	Turkey	Sploade and d	NA
Mendes da Costa, 2012[29]	Fear of falling and associated activity restriction in older people. results of a cross-sectional study conducted in a Belgian town	Archives of Public Health	Belgium	Sectional Sectional MBES)	NA
Merchant, 2020[7]	Relationship between fear of falling, fear-related activity restriction, frailty, and sarcopenia	Journal of the American Geriatrics Society	Singapore	gross sectional	NA
Meric, 2007[34]	A qualitative study on the perceptions of old individuals regarding the life of the fall and its effect on their daily lives	Turkish Journal of Geriatrics	Turkey	dinal Gative	2
Murphy, 2002[1]	Characteristics associated with fear of falling and activity restriction in community-living older Persons	Journal of the American Geriatrics Society	USA	dross-sectional similar	NA
Nakaya, 2013[6]	The association between self-reported history of physical diseases and psychological distress in a community-dwelling Japanese population: the Ohsaki Cohort 2006 Study	European Journal of Public Health	Japan	similar dessectional description and similar dessectional description and similar description and similar dessection and similar description and simil	NA
Nicholson, 2005[15]	The relationship between injurious falls, fear of falling, social isolation, and depression	NA	USA	gros Sectional	NA
Petrinec, 2020[32]	Health-related quality of life of older women religious: negative influence of frailty	Western Journal of Nursing Research	USA	cros <b>≌</b> sectional	NA
Pin, 2016[11]	Impact of falling on social participation and social support trajectories in a middle-aged and elderly European sample	Social Science and Medicine - Population Health	Denmark, Sweden, Netherlands, Austria, Germany, France, Belgium,	cohest ce Bibliog	72

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Quach, 2016[19]	Social determinants of falls: The role of social support and depression among community-dwelling older adults	Dissertation Abstracts International: Section B: The Sciences and Engineering	USA	/bmjopen-2022-062124 on 29 Septembes 2022 Downly Enseignement Superior text at the composition of the compos	36
Robins, 2018[21]	The association between physical activity and social isolation in community-dwelling older adults	Aging & Mental Health	Australia	e sectional	NA
Schmid, 2009[35]	Consequences of poststroke falls: activity limitation, increased dependence, and the development of fear of falling	American Journal of Occupational Therapy	USA	nelitative of Sullive text	6
Schnittger, 2012[18]	Risk factors and mediating pathways of loneliness and social support in community-dwelling older adults	Aging & Mental Health	Ireland	Sieur nd da	NA
Stel, 2004[2]	Consequences of falling in older men and women and risk factors for health service use and functional decline	Age and Ageing	Netherlands	arosectional	NA
Tinetti, 1998[9]	The effect of falls and fall injuries on functioning in community-dwelling older persons	Journal of Gerontology	USA	<b>s</b> oho <del>c</del> t	36
Tinetti, 1994[24]	Fear of falling and fall-related efficacy in relationship to functioning among community-living elders	Journal of Gerontology	USA	I training,	NA
van der Meulen, 2014[10]	Effect of fall-related concerns on physical, mental, and social function in community-dwelling older adults: A prospective cohort study	Journal of American Geriatrics Society	Netherlands	Bohert similarossectional	14
van Lankveld, 2011[17]	Age-related health hazards in old patients with first- time referral to a rheumatologist: A descriptive study	Arthritis	Netherlands	orossisectional echnologian	NA
Vanden Wyngaert, 2020[23]	Associations between the measures of physical function, risk of falls and the quality of life in haemodialysis patients: a cross-sectional study	BMC Nephrology	Belgium	June 11, 2025 technologies.	
Vellas, 1987[8]	Prospective study of restriction of activity in old people after falls	Age and Ageing	France	cohownt >	6
Ward-Griffin, 2004[33]	Falls and fear of falling among community dwelling seniors: the dynamic tension between exercising precaution and striving for independence	Canadian Journal on Aging	Canada	qual Bative	NA

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Developing a falls prevention program for community-dwelling stroke survivors in Singapore: client and caregiver perspectives	Disability and Rehabilitation	Singapore	/bmjopen-2022-062124 on tected by copyright and leading	NA
Longitudinal Assessment of the relationships between geriatric conditions and loneliness	Journal of the American Medical Directors Association	USA	oling Septer	96
Prevalence and correlates of fear of falling, and associated avoidance of activity in the general population of community-living older people	Age and Ageing	Netherlands	schen 20	NA
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Appendix 3: Patient	Characteristics (	(n=39)				)621 nt, iı	
			DEMOGRAPI	HIC DATA			
Author, year	Overall sample size	Overall age (years)	Overall age (type)	Overall age variance (value)	Overall age variance (type)	female female ng for	% male
Apikomonkon, 2003[26]	546	NR	NR	60-94	range	ptem Ens	39
Chiu, 2011[37]	18	81	mean	71 to 94	range	88. <u>6</u> . <u>6</u>	11.1
Choi, 2015[30]	4,247	NR	NR	NR	NR	2022 54 mg	NR
Curcio, 2009[4]	1668	70.9	mean	7.4	SD	54.3 22 54.3 22	45.5
Dias, 2011[5]	113	74.5	mean	7	SD	89, ⊒ 0	15
Faes, 2010[36]	10	70-90	range	NR	NR	I AB O S	40
Faria, 2020[22]	48	75	mean	6.8	SD	66.72	33.33
Ferreira, 2018[31]	7935	NR	NR	NR	NR	5%.Bi c	43.1
Finn, 2001[14]	49	NR	mean	NR	SD	Se se de d	NR
Gagnon, 2005[3]	105	78.2	mean	8.9	SD	8\$. <b>₹</b> .₹	13.3
Hajek, 2017[20]	7808	73.8	mean	5.9	SD	4萬.奴∃	53.8
Hajek, 2020[13]	8836	65.5	mean	10.7	SD	<b>₹</b>	49.6
Host, 2011[38]	14	77	mean	68-87	range	64.3	35.7
Howland, 1998[25]	266	76.3	mean	7.9	SD	17.7.7. by	23
Iliffe, 2007[16]	3139	NR	NR	65-75+	range	5 <sup>24</sup> .5 <del>5</del>	45.5
Kara, 2009[28]	47	71.7	mean	5.6	SD	5 <b>5</b> .3 <b>≥</b>	44.7
Mendes da Costa, 2012[29]	501	NR	NR	65-85+	NR	57.7 bmj. co	42.3
Merchant, 2020[7]	493	73	mean	8	SD	<b>7<u>9</u>.3 8</b>	20.7
Meric, 2007[34]	22	NR	NR	65-83+	range	<b>6</b> ₹.6 ₹	36.4
Murphy, 2002[1]	1064	79.6	mean	5.3	SD	AS On	27
Nakaya, 2013[6]	43487	65+	range	NR	NR	<b>₹</b> .9 <b>८</b>	46.1
Nicholson, 2005[15]	68	78.5	mean	6.3	SD	€ <b>3</b> .4 <b>a</b>	39.6
Petrinec, 2020[32]	108	75.6	mean	65–93	range	180 = 1	0
Pin, 2016[11]	16583	50-95	range	NR	NR	19 × 2	NR
Quach, 2016[19]	8464	74	mean	7	SD	58.7 <b>25</b>	41.3
Robins, 2018[21]	245	77	mean	6	SD	60 <b>a</b>	40
Schmid, 2009[35]	42	67.5	mean	11.93	SD	NR <b>6</b>	NR
Schnittger, 2012[18]	579	NR	NR	NR	NR	69.1	30.9
Stel, 2004[2]	204	78.7	mean	6.3	SD	54.9 <b>6</b>	45.1
Tinetti, 1998[9]	1103	NR	NR	NR	NR	NR 5 73 5 6	NR
Tinetti, 1994[24]	1103	79.6	mean	5.2	SD	73 👼	27

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van der Meulen, 2014[10]	260	77.9	mean	5	SD	72.7 72inc	27.3
van Lankveld, 2011[17]	154	79.2	mean	5.1	SD	<u>78</u> o	21
Vanden Wyngaert, 2020[23]	113	67.5	mean	16	SD	129 S	57.5
Vellas, 1987[8]	178	65-85+	range	NR	NR	7 <b>5</b> .4 <b>8</b>	23.6
Ward-Griffin, 2004[33]	9	81.7	mean	72-92	range	Fig. Fig. 19	22.3
Xu, 2019[39]	17	65	mean	7	SD	St. sei.	55.6
Yu, 2020[12]	4680	74.01	mean	9.69	SD	mber 2022 jseignem s⊈eignem	43.9
Zijlstra, 2007[27]	4376	77.1	mean	4.9	SD	32.5 C	40.1
		04				2. Downlent Surface	

		SETTING DA	TA	e Sup Sup Xt :
Author, year	Setting	Streamlined setting	Participants	Description of actes 30 caregivers
-		description	living alone (%)	de de de
Apikomonkon,	Community in 4 provinces of	Community	9.9	NR at AB
2003[26]	Thailand			<u> </u>
Chiu, 2011[37]	Community in the Greater	Community	61	Two respondents with their children. The rest
	Toronto Area, Canada			lived alone or only with their spouse. Only seven
				of 18 respondents ≱ad  least one grown child
				living in the same sity who might provide
				assistance when neede
Choi, 2015[30]	Community setting in Korea	Community	NR	NR gg en
Curcio, 2009[4]	Community in Columbian	Community	9.5	NR and
	Andes Mountains			
Dias, 2011[5]	Community setting in Brazil	Community	38	NR 9. 9
Faes, 2010[36]	Home and outpatient clinic in	Community + Medical	10	All participants has access to a caregiver (either
	Netherlands			child or spouse)
Faria, 2020[22]	Urban health unit in northern Portugal	Medical	NR	NR Chno
Ferreira, 2018[31]	Urban communities in Brazil	Community	NR	NR o
Finn, 2001[14]	Two nursing homes	Nursing home	0	In general, they have extered a nursing home
	in the Chicago Metropolitan			because of an inability to adequately care for
	Area, USA			themselves, and they denot have anyone who can
				ably assist them, or the lack financial resources.
Gagnon, 2005[3]	Medical or orthopedic wards	Medical	65.7	NR en
	of 3 hospitals in Toronto,			Ö
	Canada			<u> </u>
Hajek, 2017[20]	Communities in Germany	Community	NR	NR 5
				NR Graphique delines.xhtml
				phi .
				ق
	For peer review o	nly - http://bmjopen.bmj.	com/site/about/qui	delines.xhtml <b>Q</b>
	•	, , , , ,		<u><del>o</del></u>

		BMJ Open	1	/bmjopen-2022-062124 on 29 cted by copyright, including NR NR
Hajek, 2020[13]	Community in Germany	Community	28.9	Vright, i
Host, 2011[38]	Copenhagen area in Denmark	Community	64.3	NR cc 24
Howland, 1998[25]	Communities in Eastern Massachusetts	Community	87	NR ding 29
Iliffe, 2007[16]	Community in London, England	Community	32.8	NR of Se
Kara, 2009[28]	Districts of Narlıdere, Gülbahçe and Mordoğan in Izmir, Turkey	Community	27.7	NR September 2022.  NR related to
Mendes da Costa, 2012[29]	Community in Walloon region of Belgium	Community	36.4	NR ed to
Merchant, 2020[7]	Community in northwest region of Singapore	Community	NR	NR ext a
Meric, 2007[34]	Geriatric Outpatient of Gülhane Military Medical Academy in Turkey	Medical	13.6	NR nd data
Murphy, 2002[1]	Community setting in New Haven, Connecticut, USA	Community	70	NR minir
Nakaya, 2013[6]	Community in Japan	Community	NR	87.3% reported sufficient social support, 12.2% reported lack of social support, 4.2% unknown.
Nicholson, 2005[15]	Community in United States	Community	53.4	NR 📆 💆
Petrinec, 2020[32]	Cleveland Catholic Diocese in USA	Community	100	Participants were not included if they needed caregiver assistance.
Pin, 2016[11]	Communities in 10 European Countries (Denmark, Sweden, The Netherlands, Austria, Germany, France, Belgium, Switzerland, Italy, and Spain)	Community	NR	NR and similar to
Quach, 2016[19]	Communities in USA	Community	23.3	One-third did not have the perceived support with basic personal care (eating or dressing) when needed.
Robins, 2018[21]	Communities in Australia	Community	49	NR
Schmid, 2009[35]	Community in United States	Community	NR	All participants had a caregiver.
Schnittger, 2012[18]	Technology Research for Independent Living (TRIL) clinic at St James's Hospital, Dublin.	Medical	NR	NR Agence
Stel, 2004[2]	Community in three regions in the Netherlands	Community	NR	NR Biblio

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Tinetti, 1998[9]	Community in New Haven,	Community	NR	NR in 11
Tinetti, 1994[24]	Connecticut, USA Community in New Haven, Connecticut, USA	Community	69	NR ding
van der Meulen, 2014[10]	Community in the Netherlands	Community	53.1	NA for u
van Lankveld, 2011[17]	Community in the Netherlands	Community	NR	NR Ense
Vanden Wyngaert, 2020[23]	Dialysis centres in Belgium	Medical	NR	NR algener
Vellas, 1987[8]	Community in Toulouse, France	Community	NR	NR to te
Ward-Griffin, 2004[33]	Community in Canada (11 senior apartment towers and in the Health Information and Promotion Centre)	Community	77.7	NR R Enseignement Superieur (A NR NR NR NR NR NR NR
Xu, 2019[39]	Community rehabilitation centers in Singapore	Medical	0	Four family careging two male) and four maids (all female) were in wewed. 33% employed a maid as a main caregiver.
Yu, 2020[12]	Community in USA	Community	NR	NR ≥ \$
Zijlstra, 2007[27]	Community in two urban areas in the Netherlands	Community	44	NR training, and s

		FALLS AND FRA	ILTY DATA			<u>s.                                    </u>		
Author, year	Participants with history of falling (%)	List of comorbidities [comorbidity 1 (%), etc.]	Participants with frailty (%)	Frailty scale	Overall frailty score	Score Straff Score Sypes	Frailty variance value	Frailty variance type
Apikomonkon, 2003[26]	21	NR	NR	NR	NR	, 2025 ogies.	NR	NR
Chiu, 2011[37]	100	All participants reported having chronic conditions. The most common physical conditions reported were diabetes and hypertension.	NR	NR	NR	NR Agence	NR	NR
Choi, 2015[30]	NR	NR	NR	NR	NR	NR	NR	NR
Curcio, 2009[4]	31.9	Hypertension (53.0), Osteoarthritis (39.2), heart disease (20.2), COPD	NR	NR	NR	NR <b>bi</b> og	NR	NR

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		(16.8), Diabetes Mellitus (13.4), Lower extremities fracture (11.7), Pain in joints (33.1), Dizziness (15.2), Breathlessness (11.4), Hearing impairment (33.0), visual impairment (68.9)				bmjopen-2022-062124 on 29 Septembe انگریزی cted by copyrigh <u>t, including for uses r</u>		
Dias, 2011[5]	NR	NR	NR	NR	NR	SVIR E	NR	NR
Faes, 2010[36]	100	Cognitive impairment (70%)	NR	NR	NR	±\ <b>a</b> kg	NR	NR
Faria, 2020[22]	25	Cardiovascular diseases (76.6), endocrine diseases (56.8), musculoskeletal diseases (45.7), depression (16.3), respiratory diseases (14.3) and cerebrovascular diseases (9.3).	NR	NR	NR	er 2022. Downloaded from Superieur (ABE) (ABE) Frated to text and data mit	NR	NR
Ferreira, 2018[31]	NR	Overweight (women=65.2%, men=59.0%)	NR	NR	NR	ided f egir (A data	NR	NR
Finn, 2001[14]	51	NR	NR	NR	NR	3/1₹2	NR	NR
Gagnon, 2005[3]	100	NR	NR	NR	NR	<u> </u>	NR	NR
Hajek, 2017[20]	17.6	NR	NR	NR	NR	ØNR <mark></mark>	NR	NR
Hajek, 2020[13]	NR	Number of physical illnesses is mean = 2.6, SD = 1.9	NR	NR	NR	ANR Mom Jo	NR	NR
Host, 2011[38]	100	NR	NR	NR	NR	≣NR <mark>⊖</mark>	NR	NR
Howland, 1998[25]	35	Vision problems (26), stroke (11), dizziness (29)	NR	NR	NR	NR.bn	NR	NR
Iliffe, 2007[16]	11.20	Two or more chronic conditions (59.0%), takes 4 or more meds (33.4%)	NR	NR	NR	and simila	NR	NR
Kara, 2009[28]	29.9	NR	NR	NR	NR	NR.	NR	NR
Mendes da Costa, 2012[29]	31.6	NR	NR	NR	NR	NR Jur	NR	NR
Merchant, 2020[7]	mean = 0.4	NR	51.3	FRAIL scale	NR	on June 11, 202	NR	NR
Meric, 2007[34]	81	NR	NR	NR	NR	āNR <b>2</b>	NR	NR
Murphy, 2002[1]	39.70	Chronic dizziness (24.2), 5 or more medications (35.8), vision impairment (40.5)	NR	NR	NR	S.NR at Agend	NR	NR
Nakaya, 2013[6]	17.3	NR	NR	NR	NR	NR	NR	NR
Nicholson, 2005[15]	100	NR	NR	NR	NR	NR 00	NR	NR

Petrinec, 2020[32]	NR	Hypertension (60), Cataracts (60),	19	Tilburg	NR	1. VIDS	NR	NR
terrice, 2020[32]	IVIX	Thyroid disorders (30), Osteoporosis (17), Diabetes (7)	19	Frailty Indicator (TFI)	IVK	/bmjopen-2022-062124 on 29 Sep	IVIX	NIX
Pin, 2016[11]	2.8	NR	NR	NR	NR	O' S INR®	NR	NR
Quach, 2016[19]	38.0	NR	NR	NR	NR	%/ <u>1</u> 8/0	NR	NR
Robins, 2018[21]	38	Congestive heart failure (4%); Heart disease (33%); stroke (9%); Cancer (25%); diabetes (18%); lung disease (16%); Parkinson's disease (1%)	NR	NR	NR	tember 2022. D Enseignement uses related to	NR	NR
Schmid, 2009[35]	NR	Stroke (100%)	NR	NR	NR	a\ <b>1</b> }0	NR	NR
Schnittger, 2012[18]	NR	NR /	NR	NR	NR	≛\£o≥	NR	NR
Stel, 2004[2]	100	Dizziness (27.9%), visual impairment (23%)	NR	NR	NR	nloaded fr beffeur (A) and data	NR	NR
Tinetti, 1998[9]	30.3	NR	NR	NR	NR	at SE	NR	NR
Tinetti, 1994[24]	39	One or more chronic conditions (78%)	NR	NR	NR	<b> 3√₽</b> }⊆	NR	NR
van der Meulen, 2014[10]	55.5	NA	NR	NA	NA	ing.	NA	NA
van Lankveld, 2011[17]	44	Cardiac 36%, hypertension 40%, vascular 25%, respiratory 12%, EENT 21%, upper GI 14%, lower GI 10%, Hepatic 3%, kidney 3%, other GU 16%, neurological 18%, endocrine 21%, psychiatric 8%, Rhuematic disease general (56%), Osteoarthritis (49%), Spondylosis(31%), Rheumatoid arthritis(17%), Arthritis otherwise defined (12%), Gout (6%), Chodrocalcinosis (12%), Osteoporosis (1%), Shoulder problem (6%), Polymyalgia rheumatica (3%), Soft tissue (1%), Carpal tunnel syndrome (2%), Others (6%)	NR	NR	NR	//bmjopen.bmj.com/ on June 11, 2025 at A	NR	NR
Vanden Wyngaert, 2020[23]	NR	Cardiovascular disease (74.3%) diabetes (46.0%) musculoskeletal complications (44.2%), Neuropathy (28.3), retinopathy (31.9), respiratory complications (24.8), hepatopathy (17.7), pain (27.4%), depression	NR	NR	NR	Agence Bibliographique de l	NR	NR

	BMJ Open BMJ Open Cted by copyright copyright (23.9%), fatigue (18.6%), anxiety (15.0%), sleep disturbances (12.4%)							
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		(23.9%), fatigue (18.6%), anxiety				621 nt, ir		
V.11. 1007[0]	50	(15.0%), sleep disturbances (12.4%)	NID	NID	NID	<u> </u>	NID	NID
Vellas, 1987[8] Ward-Griffin, 2004[33]	50 NR	NR NR	NR NR	NR NR	NR NR	NR 2	NR NR	NR NR
Xu, 2019[39]	100	Stroke (100%)	NR	NR	NR	ōNR <b>y</b>	NR	NR
Yu, 2020[12]	mean =0.74	The mean number of comorbidities at	NR	NR	NR	NR-E	NR	NR
1 u, 2020[12]	mean =0.74	haseline was 2.24 (SD=1.38)	TVIX	INIX	IVIX	ter Use	IVIX	IVIX
Zijlstra, 2007[27]	32.6	NR	NR	NR	NR		NR	NR
		The mean number of comorbidities at baseline was 2.24 (SD=1.38)  NR  For peer review only - http://bmjopen.bm				eptember 2022. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l É Ensæignement Superieur (ABES) . <u>rruses re</u> lated to text and data mining, Al training, and similar technologies.		14
	'	or peer review only Thttp://billjopen.bil	,.com/ sitc/ db	oat, gaiaciii	ics.Alltill	e I		

	BMJ Open  BMJ Open  Sted by copyrigh  Copyrigh  Appendix 4: Montel health outcomes related to falls four of falling, and social isolation (n=6)								
Appendix 4: N	Iental health (	outcomes related to falls, fear of falling, a	cen cen by copyright, i. and social isolation (n=6)						
Author, Year	Sample	Results	Text description/interpretation of findings \$\frac{\text{N}}{2}\$						
Murphy, 2002[1]	n=1064	Variables independently associated with activity restriction in participants with fear of falling  Depression (CES-D scale) Adj relative risk: 1.27 (95% CI, 1.00-1.60); p=0.048	"We found that a history of an injurious fall within the past year, slow timed physical performance, two or more chrotelic conditions, and depressive symptoms were all independently associated with activity restriction."  The symptoms were all independently associated with activity restriction."  The symptoms were all independently associated with activity restriction.						
Stel, 2004[2]	n=204	Relationship between higher depression score and decline in social activities because of a fall OR: 2.0 (95% CI: 1.2-3.3); p<0.05	"A decline in functional status, social actions and physical activities was reported more often in respondents will be in the pression score."						
Gagnon, 2005[3]	n=105	Variables associated with fear of falling (Comparing subjects with no/slight fear and subjects with moderate/severe fear)  Depression (Structured Clinical Interview for DSM-IV (SCID))  Wald chi-square= 8.76; p=0.03  Anxiety (Structured Clinical Interview for DSM-IV (SCID))  Wald chi-square= 5.95; p<0.02	"Not only were depressive disorders and the strongest associated with fear of fall the variables that we measured.  Given that this was a cross-sectional stude a clusal relationship between depression and fear of falling cannot be interred. [] It is possible, therefore, that in some individuals, fear of falling is an anxious manifestation of depression. However, depression could also be a consequence of activity restriction or social is patient resulting from a fear of falling"  "Depressive disorders and anxiety disorders were significantly associated with categorical fear of falling, independently of these variables"						
Curcio, 2009[4]	n=1668	Variables associated with activity restriction related to fear of falling  Depression OR: 1.76 (95%CI, 1.38-2.24)	"A second model was then constructed with the psychosocial associated factors and other clinical and functional cavariates (see Table 4). After adjustment, functional and clinical factors remained independently associated with activity restriction related to fear of falling. Only depression and poor perceived health variables emerged as independent factors."						
Dias, 2011[5]	n=113	Variables associated with activity restriction due to fear of falling (compared to no FOF or FOF alone)	"The variables that best discriminated the groups were depression, exhaustion and participation in social activities demonstrated in the diagram (Figure 1). For the grouping obtained hrough the Chi-square						

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		<b>Depression</b> Chi-square=15.2, p=0.004	Automatic Interaction Detection (CHAID) method, it may be observed that the first distinctive characteristic was depression, evaluated using GDS. Those with positive symptoms for depression showed 90% chance of restricting activities due to fear of falling. Additionally, the presence of depressive symptoms seems to modulate the factors that are associated with activity respection due to fear of falling. A greater risk for depression has been sociated with inadequate evaluation of coping self-efficacy in stress fix the present of life. It is worth noting that the participants of the present of the other participants. Thus, it is possible that elders with depression because of that, restrict their activities.
Nakaya, 2013[6]	n=43487	Relationship between history of falling and psychological distress  Sufficient social support OR, 1.6 (95% CI: 1.3-1.9) p<0.01 Lack of social support OR, 2.0 (95% CI: 1.4-2.8) p<0.01	"We also conducted stratified analyses regardless according to differences in social subjects with a history of physical diseases in the diding those with history of fall/fracture) were at increased risk of physical distress, regardless of social support."  Litting of psychological distress according to differences in social subjects with a history of physical diseases in the did not be a support of the differences in social support.
Merchant, 2020[7]	n=493	Variables associated with fear of falling alone  Depression OR, 4.90 ( 95% CI, 1.06–22.67) p<0.05  Variables associated with fear of falling + fear-based activity restriction  Depression OR, 5.17 ( 95% CI, 1.84, 14.54)	"In our study, FOF and/or FAR were both significantly associated with depression in univariate and multivariate opinics regression model.  Those with FOF + FAR were nine times in ordinary itself to be depressed than those with no FOF. [] Strong links between gepressive symptoms with FOF and/or FAR have been reported in various studies, and their association is believed to be bidirectional whose management of one condition would improve the other."  11. 20. 25. 26. 26. 26. 26. 26. 26. 26. 26. 26. 26
		OR, 5.17 ( 95% CI, 1.84–14.54)  For peer review only - http://bmjopen.b	nce Bibliographique

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Appendix 5: Findings from included cohort studies (n=6)								
Author,	Sample	Results	Text description/ interpretation of findings 0					
Year			lin 2					
Vellas, 1987[8]	n=178  Studied two populations: 1) Individuals living in a retirement home (Fall victims = 59; Non-fallers=59)  2) Individuals living at home (Fall victims = 30; Non-fallers=30)	Retirement home (n=118) Among the fall victims there was a tendency towards restriction of activity: 3% walked less indoors, 5% went outside less, 4% had no leisure activity, 7% no longer visited their children and 11% no longer visited their friends. The lack of significance (P>0.05) is linked both to the very low level of activity on day 1 of the aged population living in retirement homes and to our small sample.  At home (n=60) On day 1, the fallers and control group had identical levels of activity. Reported a significant difference in the number of participants who maintained the same level of activity after 6 months, with this number being reduced in fall victims compared to non-fallers (p<0.02)	"The interpersonal relationships of the fallers were very poor: 90% did not belong to any group, 54% never visited the children, 40% never visited anybody."  "A fall may lead to loss of autonomy. Face rising as a result of falls have been identified by Isaacs and his confirms these findings and demonstrates the confirms these findings and demonstrates the confirms these findings and demonstrates to the confirms these findings and demonstrates the confirms the confirmation of activity and social life. The fear of recurrence often leads to 'institution of activity and social life. The fear of recurrence often leads to 'institution the confirmation that the confirms the confirmation that					
Tinetti, 1998[9]	n=1103 at baseline, 770 at 3 years follow-up	Effect of having 2 or more non- injurious falls on social functioning (Social Activity Scale):  Regression coefficient = -0.538 (p<0.05)	"While there did not appear to be an increased risk of decline in social functioning among participants experiencing as single noninjurious fall, repetitive fallers experienced a decline in social functioning in both short- and long-term follow-up analyses. The selationship between repetitive falling and decline in social functioning remained after adjusting for each category of covariates. Experiencing a serious fall injury, on the scheme and, was only marginally associated with decline in social functioning over the 1-year follow-up, and not at all over the 3-year follow-up. Preferential loss to follow-up of persons experiencing decline in social functioning between the 1- and 3-year follow-up interviews might at least partially explain the lack of relationship between injurious falls and change in social activities."					

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Van der Meulen, 2014[10]	n=260 Low level of concern about falling (n=127)  High level of concern about falling (n=129)  Follow-up = 14 months	Social participation (Frenchay Activities Index) Low level falling concern: Baseline mean, 39.9 (SD, 7.1) Follow-up mean, 38.8 (SD, 7.6) High level falling concern: Baseline mean, 36.8 (SD, 7) Follow-up mean, 35.7 (SD, 7.7) p-value = 0.006	persistent over 14 months of follow-up. [5] Accompanying effect size estimations were medium (social participation) to large (ADL dysfunction)."  or use in seign ember 2022.
Pin, 2016[11]	n=16583 Fallers (n=411) Non-fallers (n=14205)	Effect of falls on social participation (binary variable based on if they reported performing at least one activity from a prespecifed list of activities)  Model 2 adjusted by time, age, sociodemographic variables and health indicators:  OR, 0.86 [95% CI, 0.76-0.89] (p<0.001)  Model 3 added adjustment for frailty: OR, 0.95 [95% CI, 0.89-1.02] The interaction between initial frailty status and falling was significant (Table 4, Model 7a).  Contrast analyses revealed that the probability of social participation was less among frail people than among people who did not meet any of the frailty criteria in both fallers (χ2 (1)=6.93;p<0.01) and non-fallers (χ2 (1)=41.21; p<0.001)	"Falling significantly decreased the probatility of social participation in each of these activities and of participation is least one of them, but only before frailty was introduced into the podels (Table 3, Models 2 and 3). Frailty is indeed a strong confounce the relationship between falls and social participation. When it is the relationship between falls and social participation. When it is the relationship between significant."  "Then, we demonstrated the major role of frailty in the relationship between falling and social participation. The construction of the frailty phenotype (Fried et al., 2001; Santos-Eggmanni et al., 2009) was based on its physical component. In this manner frailty and falling were very close constructs. They shared similar risk factors, such as mobility disorders or bone density, and they had similar consequences in terms of social participation. Thus, it may be difficult to distinguish between the two concepts and to incentify a specific impact of falling (Nowak & Hubbard, 2009). However, we showed that the continuity in or disengagement from special participation. Thus, rather than by the falls themselves."
Yu, 2020[12]	n=4680	Relationship between number of falls and loneliness over 3 time-points (3 item UCLA Loneliness Scale)  Regression coefficient = 0.008, SE = 0.04, p = 0.048;	"Only the number of falls was significantly contelled with the loneliness score in the next time point, and more frequent loneliness at the previous wave predicts an increased number of falls in a years [] The results suggest that a vicious circle relationship exists between loneliness and falls. [] An increased number of falls also predicted more frequent loneliness in 4 years. These findings support exidence reported in cross-

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			Wave 1-2: $\beta$ =0.030, Wave 2-3: $\beta$ = 0.068	sectional studies that the occurrence of falls was related to social exclusion. [] Older adults who have fallen more frequently might choose to avoid risky activities such as going outside of the home and engaging in social activities. This could lead that discrepancy in desired and actual social engagement, which in turn	
	Hajek, 2020[13]	n=8836  In total, 669 individuals changed fear of falling (FOF) status from wave 5 to wave 6. More specifically, while the onset of FOF occurred in 431 individuals, the end of FOF occurred in 238 individuals.	Relationship between fear of falling and loneliness (Bude and Lantermann scale)  Onset of FOF β=0.02, SE=0.02, p=NR End of FOF β=-0.06, SE=0.03, p<0.05  Relationship between fear of falling and social isolation (De Jong Gierveld Loneliness Scale)  Onset of FOF β=0.06, SE=0.03, p<0.1 End of FOF β=0.01, SE=0.04, p=NR	results in more frequent experience of longlings."  "The end of FOF was associated with red	
			For peer review only - http://bmjopen.br	mj.com/site/about/guidelines.xhtml	1
				<u>~</u>	

Appendix 6: C	ross-sectiona	al studies reporting on falls and social isol	pen cted by copyright, including the lation/loneliness (n=11)
Author, Year	Sample	Results	Text description/ interpretation of findings 6
Finn, 2001[14]	n=49	Social Resources (OARS Social Support Scale)  Fallers (n=25) Mean: 2.4 (SD, 1) Non-Fallers (n=24) Mean: 2.0 (SD, 0.78)  p = 0.59	"The data from the present study supports the conclusion that the social resources of nursing home residents are the same, regardless of a history of falls that does not change their level of rewous functioning. Most nursing home residents are already in a position where they have to rely on others to come to them for visits, outing the community-based elderly individuals most like ing home residents do not have the means or capabilities to visit other was are not in their immediate environment. Therefore, regardless of fall-history the social resources available to nursing home residents on others."
Stel, 2004[2]	n=204	Relationship between falls inside and decline in social activities because of a fall  OR: 2.6 (95% CI: 1.1-6.5); p<0.05	"A decline in social activities after falling ignificantly associated with falls inside. The current study shows distributed also have consequences on the level of functioning and the people: respondents reported a decline in functional status (35) and people and activities outside the house (16.7%) and people activities (15.2%) as a direct consequence of the last fall."
Nicholson, 2005[15]	n=68	Relationship between injurious falls and social isolation (Lubben Social Network Scale)  Social isolation $\rho$ = -0.4; $p$ <0.05  Female $\rho$ = -0.5; $\rho$ =0.01  Family Sub Scale of Social Isolation $\rho$ = -0.2; $\rho$ =0.12	"Results suggest that there is a strong positive relationship between injurious falls and social isolation. Result from this sample suggest that there is an association between lower scores of the LSNS and higher number of injurious falls, which means that increased injurious falls are related to increased social isolation. In the findings for this sample it appears that there may be some direct link between injurious falls and social isolation.  Gender appeared to play a role when examining H4. Males as a group d not show a significant relationship between number of injurious falls and social isolation. The relationship for females as a group was positive and significant. This female sample showed a significant relation coefficient (see Table 4). This suggests that intrious falls may trigger some direct link to social isolation in females. There was no correlation between injurious falls and social isolation (see Table 3). It is possible that as the participant continues to have injurious falls and becomes less likely to leave the house due to a fear of future injurious falls, he/she will eventually become socially is lated. This is not necessarily the case when families are involved:  Output  Description:

)		BMJ Open  BMJ Open  cted by copyright.			/bmjopen-2	
					byrigh:	2022-0
			Friend Sub Scale of Social Isolation ρ= -0.43; p<0.05	"On the other hand, in the case of the frie correlation between injurious falls and so number of injurious falls was associated visolation. A possible explanation for this phenomenon with family and social isolatincreasing injurious falls may become more thus losing contact with friends. Friends of around the same age as the participant and amount of visits to the participant to make participant suffers as a result of being hor	including for the second of the control of the cont	isolation, such that a greater a greater degree of social of the opposite of the greater than a greater degree of social of the opposite oppo
	Iliffe, 2007[16]	n=3139	Falls and social isolation (Lubben social network scale) Socially isolated (n=368) 13.6% reported multiple falls in the past 12 months Not socially isolated (n=2133) 10.7% reported multiple falls in the past 12 months p=0.11	Multivariate analysis taking into account associations shows a different pattern. The to be associated with depressed mood and memory impairment and perceived poor lassociated. For the other factors [multiple hypothesis, no significant associations in analyses were found.		sof social isolation appears alone, while male sex, he may be weakly
•	Van Lankveld, 2011[17]	n=154	Relationship of falls with loneliness (De Jong Gierveld Loneliness scale) Correlation coefficient = 0.14 p=not significant	"Health status indicators were unrelated to functioning, and showed low to moderate health hazards."	grela grand simi	ations with the remaining
	Schnittger, 2012[18]	n=579	Association between history of falls and pathways of loneliness  Emotional loneliness (de Jong-Gierveld Loneliness Scale) Correlation coefficient=0.134 p<0.003  Social loneliness (de Jong-Gierveld Loneliness Scale) Correlation coefficient=0.09 p=not significant	"Interestingly, social support was the only variable, falls history, emerged in the fina relative importance of health factors compthe loneliness models"	<b>\$</b> m	odel; this may indicate the

		вмл О <sup>†</sup>	/bmjopen-2022-062124 on 29
		Social support (Lubben Social Network Scale) Correlation coefficient= -0.247 p<0.003	062124 on 29 tht, including f
Quach, 2016[19]	n=8464  No falls group (n=5249) One fall group (n=1352) At least two falls group (n=1863)	Social Relationship Index [mean (SD)]  No falls: 3.34 (1.32) One fall: 3.24 (1.35) At least two falls: 3.08 (1.35) p<0.0001  Note: this is a cohort study, but the outcomes relevant to our review question are from a cross-sectional survey given to participants at baseline	"Respondents who fell had a higher prevatence of clinically significant depression symptoms, were more often not married, had fewer good friends living in their neighborhood, were respondents who attend religious services or to be a volunteer, and were less that y to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood from the friends of
Hajek, 2017[20]	n=7808	Variables associated with history of falls  Social exclusion (Bude and Lantermann scale) $\beta$ =0.08; SE, -0.02; p<0.001  Loneliness (De Jong Gierveld Loneliness Scale) $\beta$ =0.08; SE, -0.02; p<0.001	Controlling for potential confounders, linear gression analysis showed that reporting a fall in the previous 12 most as associated with higher social exclusion scores ( $\beta$ = .08, p < .001) and higher loneliness scores ( $\beta$ = .08, p < .001). Contrarily, reporting a fall in the preceding 12 months was not associated with the number of important people in regular contact.
Robins, 2018[21]	n=245	Relationship between falls and social isolation (Friendship Scale for social isolation) OR 1.03 (95% CI: 0.66-1.62); p=0.9	No statistically significant association reparted between experiencing a fall in the past 12 months and social isolation. Line 11, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20
Faria, 2020[22]	n=48	Relationship between falls and loneliness (UCLA scale) p=0.384	No statistically significant association reported between experiencing a fall in the past 6 months and loneliness

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Vanden	n=113	Variables associated with risk of falls	"Regarding the PROMIS questionnaire, low associations were found
Wyngaert,			between measures of the risk of falls and the appreciation of participation
2020[23]		Ability to participate in social roles and	in social roles and activities on the one hand ( $\mathbf{k}2 = 0.11$ ), and depression
		activities	on the other (R2 = $0.08$ )"
		(PROMIS questionnaire)	9
		$R^2=0.11; p=0.01$	"Remarkably, the risk of falls on itself was identified as a determinant of
		•	difficulties on psycho-social well-being (in pression and social
		Depression	isolation) and of objective health utility [ $\frac{1}{6}$ $\frac{1}{6}$
		$R^2$ =0.08; p=0.01	difficulties on psycho-social well-being (in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and an increased risk of falls and an increased risk of falls and their outdoor social activities, resulting in the resulting in the resulting in the resulting in the resulting activities as a determinant of difficulties on psycho-social well-being (in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation i
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			of social contact to less stimulating activities of a phone call rather
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Appendix 7: Cross-sectional studies reporting on fear of falling and activity restriction due to fear of falling (N=15)

Author, Year	Sample	Results	Text description/ interpretation of find gs 2
Tinetti, 1994[24]	n=1103	Fear of falling (Falls Efficacy Scale – modified so low score corresponds with low confidence or greater fear) Fallers Mean, 79.8 (SD 23.4) Non-fallers Mean, 88.1 (SD 17.9)  p < .0001  Activity restriction because of fear of falling Fallers = 24% Non-fallers = 15% chi-square= 13.1; p < 0.001	In order to examine the impact of recent falls, we also determined the proportion of subjects reporting fear and the mean fall-related efficacy scores separately for subjects who did and did not experience a fall in the year prior to the interview. The proportion of subjects reporting a decrease in activity because of fear of falls was 24% among fallers vs 15% among non-fallers (chi-square= 13.1 and 2001). The mean fall-related efficacy scores were 79.8 (SD 23.4 and 88.1 (SD 17.9) among fallers and non-fallers, respectively (p < Downloaded from http://dx.doi.org/10.1001/1
Howland, 1998[25]	n=266	Relationship between falls and fear of falling OR: 2.498 (95% CI: 1.013-6.159); p=0.05  Relationship between falls and activity curtailment among those afraid of falling OR: 1.094 (95% CI: 0.376-3.177); p=0.869  Relationship between social support and activity curtailment among those afraid of falling (Social Support Scale) OR: 1.574 (95% CI: 1.082-2.290); p=0.018 Note: Here a higher social support score indicates lower levels of social support	"The contribution of personal falls experience to fear of falling was apparent. Those who suffered a previous fall were more likely to have a fear of falling."  "Surprisingly, neither the degree of fear of falling nor the experience of falls was associated with activity restriction. This finding suggests that activity curtailment is not just associated with extreme levels of fear. The presence of social support was, however, important. Those who could rely on others or talk with friends about farling were least likely to report activity curtailment. Thus, support of family and friends may be an important prerequisite for continuing to remain active even in the face of fear of falling. This support may serve as butter to the potentially debilitating consequences of fear of falling. It is possible this support is manifested as encouragement for remaining active."  "Those who curtailed activities [] did not differ with respect to social integration but were significantly (p = .024) less likely to be able to rely on friends or relatives in times of crisis (social support)"
Murphy, 2002[1]	n=1064	Variables independently associated with activity restriction in participants with fear of falling	"We found that a history of an injurious fall within the past year, slow timed physical performance, two or more chromic conditions, and

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		Injurious fall Adjusted relative risk (ARR): 1.36 (95% CI, 1.11-1.66); p=0.003  Two or more chronic conditions ARR: 1.34 (95% CI, 1.08-1.65); p=0.007  Slow-timed physical performance	depressive symptoms were all independently associated with activity restriction."  24 on 29 September 2022.  Enseigneme est related to the control of the co
Apikomonkon, 2003[26]	n=546	ARR: 1.44 (95% CI, 1.18-1.75); p=0.0004  Relationship between falls and activity restriction  Chi-square=5.49, p<0.05	"Compared with non-fallers, the older person with falls experiences were more likely to have activity restriction \$25% vs 16%). The Chisquare test indicated that fall history was a second at the control of the contro
		Relationship between fear of falling and activity restriction Chi-square=23.27, p<0.001	"Older people with FOF were more likely to activity restriction (26% vs 10%). The FOF using the SAFE To exercise was significantly associated with activity restriction as measured by dichotomous question."
Gagnon, 2005[3]	n=105	Variables associated with fear of falling (Comparing subjects with no/slight fear and subjects with moderate/severe fear)  Social support (confiding-relationships component of the Bedford Life Events and Difficulties Schedule modified for elderly subjects)  Wald chi-square= 3.77; p=0.05	"The following secondary independent variables were significantly associated with categorical fear of falling lizations (Wald chi-square 6.58; p 0.01), total number of medications (Wald chi-square 5.40; p 0.02), and social support (Wald chi-square 3.77; p 0.05). (Note: Higher scores mean less support.)"
Zijlstra, 2007[27]	n=4376	Variables significantly associated with avoidance of activity due to fear of falling  Multiple falls in past 6 months  OR: 1.97 (95% CI, 1.52-2.54)	"When fear of falling was added as an additional variable (model 3; Table 3), odds ratios of all variables that showed significance in model 2 decreased. Nevertheless, the association for the highest age group (≥80 years), fair and poor perceived general health and multiple falls with avoidance of activities remained statistically significant.  Our findings regarding avoidance of activity remained fairly similar when fear of falling was entered into the logister model. Although

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		Aged 80 years or older OR: 1.56 (95% CI, 1.24-1.95)  Fair perceived general health OR: 2.92 (95% CI, 2.43-3.52)  Poor perceived general health OR: 5.7 (95% CI, 3.57-9.12)	strongly associated with avoidance of activity wigher age (≥80 years), fair and poor perceived health and multipe falls remained independently associated with avoidance of activity in community-living older people. This implies that interventions aimed at reducing avoidance of activity should not focus on fear of falling alone, but on other modifiable factors, like falls, as well"
Iliffe, 2007[16]	n=3139	Relationship between fear of falling and social isolation (Lubben Social Network Scale)  OR: 1.21 (95%CI, 0.88-1.65)	Multivariate analysis taking into account associations shows a different pattern. The second isolation appears to be associated with depressed mood and all and all and all and associated. For the other factors [(fear of all and be associated)] listed in the second hypothesis, no significant associations in bit made analyses were found.
Curcio, 2009[4]	n=1668	Variables associated with activity restriction related to fear of falling  At least 1 fall in past year OR: 1.48 (95% CI, 1.18-1.86); p=0.001  Low social participation OR: 1.52 (95% CI, 1.20-1.92); p<0.01  Poor perceived health OR: 1.38 (95% CI, 1.06-1.79)	"Table 3 shows the bivariate relationships between activity restriction related to fear of falling and psychosocial actors. Activity restriction related to fear of falling had a strong bivariate association with poor perceived health, depression, low social participation, and poor life satisfaction."  "A second model was then constructed with the psychosocial associated factors and other clinical and functional covariates (see Table 4). After adjustment, functional and clinical factors remained independently associated with activity restriction related to fear of falling. Only depression and poor perceived health variables comerged as independent factors."
		Difficulties in activities of daily living OR: 1.65 (95% CI, 1.16-2.32)  Decreased physical activity OR: 1.35 (95% CI, 1.06-1.70)	"logistic regression analyses for activity restriction related to fear of falling. In the first model, 19 demographic, functional, and health-related variables with p values less than .05 derived from the bivariate analysis were entered into the logistic regression as independent variables.  Difficulties in ADL, decreased physical activity, polypharmacy, and

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Kara, 2009[28]	n=47	Polypharmacy OR: 1.56 (95%CI, 1.14-2.14)  Below poverty level OR: 1.32 (95%CI, 1.05-1.65)  Relationship between fear of falling and loneliness (Philadelphia Geriatric Center Morale Scale) p= 0.258; p=Not significant	extreme poverty were independently associated with activity restriction related to fear of falling. A second model was then constructed with the psychosocial associated factors and other linical and functional covariates (see Table 4). After adjustment functional and clinical factors remained independently associated with activity restriction related to fear of falling."  When the correlation between the fear of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was an activity of the Philadelphia Geriatric Center Morale Scatter was an activity of the Philadelphia Geriatric Center Morale Scatter was an activity of the Philadelphia Geriatric Center Morale Scatter was an activity of the Philadelphia Geriatric Center Morale Scatter was an activity of the Philadelphia Geriatric Center Morale Scatter was an activity of the Philadelphia Geriatric Center Morale Scatter was an activity of the Philadelphia Geriatric Center Morale Scatter was an activity of the Philadelphia Geriatric Center Morale Scatter was an activity of the Philadelphia Geriatric Center was an activity of the Philadelphia Center was an activity of the Philadelphia Geriatric Center
Dias, 2011[5]	n=113	Variables associated with activity restriction due to fear of falling (compared to no FOF or FOF alone)  Fear of falling intensity Mean 3.4 (SD, 0.9); p<0.0  Depression Chi-square=15.2, p=0.004  Exhaustion Chi-square=9.2, p=0.01  Participation in social activities Chi-square=10.4, p=0.016	"The three groups were statistically different to FOF evaluated using the question about fear intensity. The group that reported FOF and activity restriction demonstrated higher leading of fear when compared with the other groups"  "The variables that best discriminated the group of fear when compared with the other groups"  "The variables that best discriminated the group of fear when compared with the other groups"  "The variables that best discriminated the group of fear when compared with the other groups"  "The variables that best discriminated the group of fear when compared with the other groups"  "The variables that best discriminated the group of fear when compared with the other group of fear when compared to the diagram (Figure 1). For the grouping obtained through the Chi-square Automatic Interaction Detection (CHAID) method, it may be observed that the first distinctive characteristic was group on the chiracteristic using GDS. Those with positive symptoms for group of falling.  Additionally, the presence of depressive symptoms seems to modulate the factors that are associated with activity restriction due to fear of falling. A greater risk for depression has been associated with inadequate evaluation of coping self-efficacy in stressful events of life. It is worth noting that the participants of the present group who restricted activities by FOF showed lower self-efficacy in relation to the other participants. Thus, it is possible that elders with depressive symptoms perceive them selves less capable of performing certain gasks and, because of that, restrict their activities.  Out of the elders that did not have depressive symptoms, those who had positive result for exhaustion of the frailty phenotype had 78% chance of restricting activities due to fear of falling."  "Out of the ones who did not show positive result for exhaustion, the other distinctive characteristic was participation in social activities.

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Mendes da Costa, 2012[29]	n=501	Relationship between activity restriction due to fear of falling and number of falls in past 12 months  2 or more falls	Participation in social activities was the last discriminatory factor for the studied sample; however this variable did not wow association with activity restriction in the bivariate analysis. It is possible that this difference in relation to the participation is social activities only occurs for a subgroup and not for the whole sample. "The with age and with the number of falls within the past 12 months, with the past 12 months, and the properties of the subjects who did not fall. In the log the past 12 months, and the past 12 months are the past 12 months. The past 12 months are the past 12 months are the past 12 months are the past 12 months. The past 12 months are the past 12 months are the past 12 months are the past 12 months. The past 12 months are the past 12 months are the past 12 months are the past 12 months. The past 12 months are the past 12 month
Choi,	n=4247	OR, 3.04 (95% CI, 1.70-5.42)  1 fall OR, 1.33 (95% CI, 0.66-2.68)  Relationship between falls and fear-	Ont Superious Characteristics independently associated
2015[30]	11—4247	induced activity restriction  Previous fall experiences OR, 2.12 [95% CI, 0.96-4.67] p=0.062 Injurious falls OR, 3.03 [95% CI, 1.21-7.54] p=0.008	restriction were low socioeconomic status continuitive impairment, difficulty with activities of daily living, and but the socioeconomic status continuities of injurious falls.  Al training, and pendently associated to the socioeconomic status continuities impairment, difficulty with activities of daily living, and pendently injurious falls.
Ferreira, 2018[31]	n=7935	Relationship between fear of falling because of sidewalk defects and social participation OR 1.01 (95% CI: 0.99-1.04)	"As in the univariate analysis, the fear of malling because of defects in sidewalks and the perception of violence associated with social participation."
Petrinec, 2020[32]	n=108	Relationship between fear of falling and social functioning (Medical Outcomes Study 36-item Short-Form General Health Survey) $\beta$ = -0.29	"Fear of falls was an independent predictor for ole physical, physical functioning, and social functioning."  2025  at A 96
Merchant, 2020[7]	n=493	Variables associated with fear of falling alone  Number of falls	"The multivariate logistics regression in Table 2 shows that female sex (OR = 3.54; 95% CI = 1.82–6.90), number of edications (OR = 1.28; 95% CI = 1.03–13.60), prefrail or frail (OR = $\frac{1}{1000}$ 17; 95% CI = 1.26–3.73), depression (OR = 4.90; 95% CI = 1.06–22.67) and number of falls in the

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OR, 2.13 (95% CI, 1.20-3.78) p < 0.05

Social isolation

OR, 0.99 (95% CI, 0.51-1.89) p=not significant

Variables associated with fear of falling + fear-based activity restriction

Number of falls

OR, 1.4 (95% CI, 0.94–2.20) p=not significant

Social isolation

OR, 1.7 (95% CI, 0.82–3.55) p=not significant

Sarcopenia OR, 8.13 (95% CI, 1.52–43.41) past 12 months (OR = 2.13; 95% CI = 1.20–3.28) were significantly associated with FOF. Only sarcopenia (OR = 1.3) 413; 95% CI = 1.52– 43.41) and depression (OR = 5.17; 95%  $\mathbf{G} = \mathbf{9}$ 84–14.54) were significantly associated with FOF + FAR

"History of falling is a well-known risk for FOF and/or FAR as persons who have experienced falls are more likely to develop fear. However, three-quarters of those with FO FOF + FAR had never experienced a fall a study"

"Social isolation is another factor that is polity studied. In our study, one in three older adults with FOF + FAR a risk of social isolation compared with one in five with no FOF" a risk of social isolation compared with one in five with no FOF and/or FAR in both univariate and multivariate analysis."

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Annendix 8: 1	Relevant findings fr	om qualitative studies (n=7)
Author,	Qualitative	Results $\frac{1}{2}$
Year	analysis approach, and sample size	uding
Ward-Griffin,	Phenomenological	"Restricting activities was a second strategy identified by the participants, which in ool well avoiding certain social
2004[33]	approach	activities or/and physical environments. Participants used this strategy when they wanted to "play it safe" in
	0	times of inclement weather or in situations where ambulation might be difficult. Piggrapus weather conditions
	n=9	seemed to heighten their awareness and fear of falling. As Sarah explained, "I do not all alling, except around steps. They terrify me to death [along with] scaffolding around the town—that bother has been been been been been been been bee
		the sidewalk— that bothers me. And I am restricted to the house when there's fresh sage on the ground." Similarly
		Wilfred stated, "When it's really, really icy, and I don't have to go out, I don't drive to go out either.""
Meric,	Analysis approach	"After having a falling experience, elderly individuals had behavioral changes, when the competency
2007[34]	not reported	of achieving daily life activities, such as staying away from the crowded environment but before a formal of achieving daily life activities, such as staying away from the crowded environment but before a formal of achieving daily life activities, such as staying away from the crowded environment but before a formal of achieving daily life activities, such as staying away from the crowded environment but before a formal of achieving daily life activities, such as staying away from the crowded environment but before a formal of achieving daily life activities.
		acting very slowly, not able to do daily activities alone:
	n=22	" I can't go out anymore. I haven't been out alone for 2 years, there are always people to me." (75; woman). " I take my man's arm on the street, I can't get out much in case I fall into the street to me." (75; woman)."
Schmid, 2009[35]	Latent content analysis	"Quotes regarding the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequent consequences of poststroke falls categorized interpolation of the subsequences of poststroke falls categorized interpolation of the subsequence of the subseque
	n=42	"Limiting activity: Because falling became common for some participants, talk abou tragegies for the prevention of
		future falls was common and emerged naturally during interviews. A significant consequence was the choice to limit everyday life activities at home and in the community to help manage and present falls"
		"Increasing dependence: Participants discussed their dependence on assistive devices such as walkers, canes, and wheelchairs to reduce falls and feel secure in their environment. Some participants in dicaged use of the furniture,
		walls, or people as alternative assistive devices. Many discussed dependence on care very for maintaining balance
		and preventing falls. Participants easily became isolated because they were fearful to move about their own home, becoming increasingly dependent:
		"Developing fear of falling: This initial experience of falling with stroke onset was a raukatic event that
		consequently resulted in participants expressing fear that future falls would mean having mother stroke. They also discussed the subsequent development of fear of falling and the fear of being left of the floor for hours at a time.
		Participants described genuine fear of falling and fear about being hurt as well as the being being hurt as well as the being hurt as the being
		pervasive concern; fear, worry, and concern became a daily consequence of poststroke falls. Some participants were fearful that they would fall while out in the community and addressed the embarr ssment of a public fall.
		They were concerned about how they looked while walking around and seemed to be warried about the stigma
		related to falls and decreased mobility. Managing falls and fear of falling in everyday life became an important aspect of poststroke adjustment."
		aspect of poststroke adjustment.

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Faes, 2010[36]	Grounded theory approach n=10	"Patients described social withdrawal and attributed this to their fear of falling and the capabilities after falling. Patients recognised that they became (more) dependent on their caregiver after falling. One patient experienced social benefits from her fall, since she now receives more attention from her children"  "P#1 I can't travel anymore because of my limited mobility. I injured my leg in a fall of their caregiver after falling.  P#4 I stay at home more often and don't visit my friends anymore. I am afraid to fall their caregiver after falling.  P#5 My grandson is almost one year old. I still haven't seen his room. His room is up their caregiver after falling.  "Furthermore, our findings confirmed the consequences of falls in cognitively unimprised older persons that are mentioned in the literature; these include a fear of falling and social withdrawal discrete."
Chiu, 2011[37]	Focussed ethnographic approach n=18	"Following their initial fall, it appeared that changes occurred in individuals' independently by the help from —hourly maids during the rehabilitation period or for longer, recreational activities usually were soon discontinued. Mah-Jong, one of the most popular tile games among Chinese were not tioned by 12 respondents as a favourite pass time. Other social activities mentioned included Cantonese opera, who teering within their communities, and dim sum with friends. After a fall, these activities were interrupted two main reasons: 1) lack of transportation means and 2) lower mobility capabilities. Feelings of loneliness coses as the respondents felt that they were cut off from their friends."  "Intuitive changes included modifications made to personal behaviours. Avoidance behaviour was reported as an intuitive change. Specifically, fallers would avoid outdoor activities. Other intuitive changes include being more careful ("taking care") when walking and slowing down."
Host, 2011[38]	Phenomenographic approach n=14	"Others stopped doing certain activities to avoid falling and they did not choose activities that made them scared and nervous and caused bodily pain. They thus perceived that physical activity was not good and therefore stopped the activity. The families and the general practitioner (GP) supported their conversely, some felt that it was a loss if they had to stop activities they had enjoyed because it increased their sk of falling."  "Fall accidents had implications for older people's identity and autonomy, and the context of participation in fall-prevention activities was not always welcomed because it placed the respondents in a context in which they did not like to see themselves."  "For others, support from professionals was important in how they coped with falls and their prevention. The GP was a good support when they needed knowledge about appropriate and applicable preventive activities."
Xu, 2019[39]	Thematic analysis n=17	Identified theme of restricted mobility and social participation.

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"Stroke participants felt that they were restricted after the fall, particularly around their mobility functions and degree of social participations.	oyrigh -00 gh -00 ound having reduced balance, and
I am getting worse, especially my balance. I used to walk for a short distance out.  There was a big difference I used to walk with walking stick. But I have not b  Last time I could take public transport, go to [central area] and take a walk, now	tside but now I can't. (S7) been been walk since that fall. (S8) it's both ficult for me. (S1)"
"Stroke participants felt that they were restricted after the fall, particularly arot this affected their mobility functions and degree of social participation:  I am getting worse, especially my balance. I used to walk for a short distance out There was a big difference I used to walk with walking stick. But I have not b Last time I could take public transport, go to [central area] and take a walk, now.	September 2022. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Br uses related to text and data mining, Al training, and similar technologies.
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## Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #	
TITLE			ONT NOL "	
Title	1	Identify the report as a scoping review.	1	
ABSTRACT				
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3	
INTRODUCTION				
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5	
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5	
METHODS				
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	5-6	
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	6-7	
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6	
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Appendix 1	
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6	
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	8	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	7-8	
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	N/A	
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Appendix 4-6	



SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
RESULTS	<u> </u>		
sources of 14 re		Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	8; Figure 1
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8-11; Table 1; Appendix 7
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	N/A
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	11-15
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Table 2
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	15-16
Limitations	20	Discuss the limitations of the scoping review process.	17
Conclusions 21		Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	17
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	18

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colguhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467-473. doi: 10.7326/M18-0850.



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<sup>\*</sup> Where sources of evidence (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

<sup>†</sup> A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with information sources (see first footnote).

<sup>‡</sup> The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

<sup>§</sup> The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

# **BMJ Open**

## Global evidence on falls and subsequent social isolation in older adults: A scoping review

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<b>Primary Subject Heading</b> :	Geriatric medicine	
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Keywords:	REHABILITATION MEDICINE, GERIATRIC MEDICINE, PREVENTIVE MEDICINE	

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- **Background:** Falls are a leading cause of injury-related hospitalizations among adults aged 65
- years and older and may result in social isolation.
- **Objective**: To summarize evidence on falls and subsequent social isolation and/or loneliness in
- older adults through a scoping review.
- Eligibility criteria: Studies were eligible for inclusion if the population had a mean age of 60
- years or older, they examined falls and subsequent social isolation, loneliness, fear of falling or
- risk factors, and were primary studies (e.g., experimental, quasi-experimental, observational,
- qualitative).
- Sources of evidence: MEDLINE, CINAHL, Embase, Ageline, and grey literature from
- inception until January 11, 2021.
- **Charting methods:** A screening and charting form was developed and pilot-tested.
- Subsequently, two reviewers screened citations and full-text articles, and charted the evidence.
- **Results:** After screening 4,993 citations and 304 full-text articles, 39 studies were included in
- this review. Participants had a history of falling (range: 11 to 100%). Most studies were
- conducted in Europe (44%) and North America (33%) and were of the cross-sectional study
- design (66.7%), in the community (79%). Studies utilized 15 different scales. Six studies
- examined risk factors for social isolation and activity restriction associated with fear of falling.
- Six studies reported mental health outcomes related to falls and subsequent social isolation.
- **Conclusions:** Consistency in outcome measurement is recommended, as multiple outcomes were
- used across the included studies. Further research is warranted in this area, given the aging
- population and the importance of falls and social isolation to the health of older adults.
- Scoping Review Registration: 10.17605/OSF.IO/2R8HM

- **Word count**: 246/250 (abstract), 3034/3000 (main text)
- **Keywords**: scoping review, older adults, falling, social isolation, loneliness, fear of falling
- 26 Strengths and Limitations of this Study:
  - A robust methodology including a thorough and extensive literature search was used to review the literature in the area.
  - There was no date limits or language limits for studies eligible for inclusion in this scoping review.
  - Scoping reviews do not assess the quality of included studies and we cannot confirm the directional causality between falls and social isolation.

#### **INTRODUCTION**

Addressing social isolation in older adults is a growing priority in Canada, as over 30% older adults are at risk of social isolation [1]. Social isolation among older adults is associated with adverse health outcomes including cognitive decline, depression, anxiety, and dementia [2]. Globally, falls are the second leading cause of unintentional injury death, making falls a major public health concern [3]. In Canada, falls are the leading cause of injury-related hospitalizations among adults aged 65 years and older, and 20-30% of older adults experience at least one fall each year [4]. Falls may result in serious health-related consequences including physical (e.g., fractures), physiological (e.g., cognitive decline), and psychological (e.g., anxiety, depressive symptoms, fear of falling, and social isolation) outcomes [5].

Given the detrimental outcomes associated with both falls and social isolation, there is a need to understand the relationship between falls and subsequent social isolation in older adults. The current scoping review is focused on falling and the subsequent experience of social isolation and/or loneliness and to ascertain whether the COVID-19 context affected the relationship between falls and subsequent social isolation.

#### **METHODS**

- Protocol and registration
- The protocol for this scoping review was developed in accordance with the JBI (formerly Joanna
- Briggs Institute) guidance for scoping reviews and registered with Open Science Framework [6].
- An integrated knowledge translation approach was used [7], whereby colleagues from the Public
- Health Agency of Canada (YJ, KA, MdG, AGB) co-developed the review. The results are
- reported using the Preferred Reporting Items for Systematic Reviews and Meta-analysis
- (PRISMA) extension to scoping reviews [8] supplemented by PRISMA 2020 [9].

- Patient and Public Involvement
- Through the Strategy for Patient-Oriented Research (SPOR) Evidence Alliance, we collaborated
- closely with a patient partner who provided feedback on our protocol, participated in full-text
- screening piloting, and provided input on the manuscript (JB).
- Search strategy
- An experienced librarian developed our comprehensive literature search strategy, which was
- peer-reviewed by a second information specialist using the Peer Review of Electronic Search
- Strategies (PRESS) checklist [10]. MEDLINE, CINAHL, Embase, and Ageline were searched
- from inception until January 11, 2021 (Appendix 1). References of included studies and relevant
- reviews were scanned. Grey literature (i.e., unpublished or difficult to locate studies) was
- searched using the Canadian Agency for Drugs and Technologies in Health's Grey Matters
- checklist [11].
- Eligibility criteria
- The population of interest were older adults with a mean age of 60 years or older. The concept
- was the relationship between falls and subsequent social isolation or loneliness. As mentioned in
- our related systematic review on interventions for social isolation after falling, social isolation
- and loneliness are distinct concepts [12]. Social isolation included a decrease in any of the
- following: number of social contacts, feeling of belonging, fulfilling relationships, engagement
- with others, and quality of their personal network [12]. We defined loneliness as "the unpleasant
- experience that occurs when a person's network of social relations is deficient in some way,
- either quantitatively or qualitatively" [13]. For our primary objective, the context included any
- community or institutional setting. For our secondary objective, we limited the context to include
- studies that specified their consideration of the COVID-19 pandemic. Studies including

participants reporting a history of falling (i.e., regardless of the proportion of the sample who fell), the role of fear of falling in this relationship, as well as any risk (e.g. medication use, frailty) or protective (e.g. exercise, gait or balance training) factors were considered eligible for inclusion.

Eligible study designs included primary research studies of experimental (e.g., randomized controlled trials), quasi-experimental (e.g. non-randomized controlled trials, controlled before and after studies, interrupted time series), observational (e.g., cohort studies, case-control studies, cross-sectional studies), qualitative (phenomenological, ethnography, qualitative interview, etc.) and mixed method (e.g., convergent parallel, embedded, explanatory sequential) design. No restrictions based on study year, language of publication, or study duration were applied.

#### Study selection

A screening form was developed and a pilot-test using 50 citations was completed with 80% agreement, and subsequently, all remaining titles and abstracts were screened independently by pairs of reviewers (SMT, AP, JF, GM, AH). Discrepancies were resolved by a third reviewer.

Similarly, two pilot-tests were completed for full-text article screening (achieving 27% and 40% agreement, respectively), screening criteria were revised, and subsequently, full-text articles were assigned to independent pairs of reviewers. Discrepancies were resolved by a third reviewer.

### Data charting

A charting form was developed to capture data on study characteristics, population characteristics and outcomes of interest. Relevant outcomes included any data illustrating the relationship between falls and subsequent social isolation, including the role of fear of falling,

- and other risk factors or protective factors. A pilot-test was conducted using five studies,
  sufficient agreement was achieved, and subsequently, full data charting was completed by
  independent pairs of reviewers. Discrepancies were resolved by a third reviewer.
  - Analysis and presentation of results
- The review findings were summarized descriptively using summary tables.

#### RESULTS

- After screening 4993 citations and 304 full-text articles against our eligibility criteria, 39 studies
- were identified as eligible for inclusion based on our primary objective for this review (Figure 1).
- No studies were identified when limiting to the COVID-19 context for our secondary objective.
- Study and patient characteristics have been summarized in Table 1 and detailed data are reported
- in Appendices 2 and 3.

113 Table 1: Summary of study and patient characteristics

Characteristics	Number (%)
Study Characteristics (n=39)	
Geographical region	
Asia	5 (12.8%)
Australia	1 (2.5%)
Europe	17 (43.6%)
North America	13 (33.3%)
South America	3 (7.7%)
Study design	
Cohort	6 (13.8%)
Cross-sectional	26 (66.7%)
Qualitative	7 (19.4%)
Study duration	
Not applicable	29 (74.3%)
≤ 1 year	5 (12.8%)
≥ 1 year	5 (12.8%)
Patient characteristics	
Mean age	74.9 (range, 65.0 to 95.0)
Not reported	11 (28.2%)
65.0-69.9 years	4 (10.2%)
70.0-74.9 years	8 (20.5%)
75.0-79.9 years	14 (35.9%)

≥80.0 years	2 (5.1%)
Proportion of female participants	Mean: 65.3% (range, 42.5 to 88.9)
Sample size	Mean: 3043.6 (9 to 43487)
<100	11 (28.2%)
100-499	11 (28.2%)
500-999	3 (7.7%)
1000-1999	4 (10.2%)
2000-5000	4 (10.2%)
>5000	6 (15.4%)
Study setting	
Community	31 (79.4%)
Medical	6 (15.4%)
Nursing home	1 (2.5%)
Multi-site	1 (2.5%)
Participants living alone	44.1% (range, 0 to 100)
Participants with a history of falling	Mean: 50.8% (range, 11.2 to 100)
Not reported*	11 (28.2%)
≤25%	6 (15.4%)
25-40%	10 (25.6%)
40-85%	5 (12.8%)
>85%	7 (17.9%)

**Note:** \*not reported for the overall sample

Study characteristics

The publication year for included studies ranged from 1987 to 2020, with more than half published since 2010. Most studies were conducted in Europe (17/39, 44%) and North America (13/39, 33%). More than half of the studies were cross-sectional study design (66.7%) and 7 qualitative studies were included. Most were conducted in the community (79%). Studies utilized 15 different scales and a variety of self reported responses to assess variables such as social isolation, loneliness. (e.g., 18-item Lubben Social Network Scale, 6-item de Jong-Gierveld Loneliness Scale). Six studies identified risk factors for social isolation and for activity restriction due to fear of falling (Table 2). Six studies reported mental health outcomes (Appendix 4). Table 2: Potential risk factors for social isolation and activity restriction associated with fear of

falling

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Author, Year	Risk factor	Associated evidence		
Social Isolation after injurious fall				
Nicholson, 2005	Sex (female)	The authors noted a strong positive		
		correlation between injurious falls and social		
		isolation for women ( $\rho$ = -0.5; p=0.01), but		
		this was not significant for men.		
Activity Restriction	due to fear of falling			
Zijlstra, 2007	Aged 80 years or older	OR: 1.56 (95% CI, 1.24-1.95)		
	Fair perceived general health	OR: 2.92 (95% CI, 2.43-3.52)		
	Poor perceived general health	OR: 5.7 (95% CI, 3.57-9.12)		
Curcio, 2009	Poor perceived health	OR: 1.38 (95% CI, 1.06-1.79)		
	Depression	OR: 1.76 (95% CI, 1.38-2.24)		
	Low social participation	OR: 1.52 (95% CI, 1.20-1.92)		
	Difficulties in activities	OR: 1.65 (95% CI, 1.16-2.32)		
	of daily living			
	Decreased physical	OR: 1.35 (95% CI, 1.06-1.70)		
	activity			
	Polypharmacy	OR: 1.56 (95% CI, 1.14-2.14)		
	Below poverty level	OR: 1.32 (95% CI, 1.05-1.65)		
Dias, 2011	Depression	Chi-square=15.2, p=0.004		
	Exhaustion (frailty)	Chi-square=9.2, p=0.01		
	Participation in social	Chi-square=10.4, p=0.016		
	activities			
Murphy, 2002	Two or more chronic	ARR: 1.34 (95% CI, 1.08-1.65)		
	conditions			
	Slow-timed physical	ARR: 1.44 (95% CI, 1.18-1.75)		
	performance			
Merchant, 2020	Sarcopenia	OR, 8.13 (95% CI, 1.52–43.41)		

126 Abbreviations: OR, odds ratio; ARR, adjusted risk ratio

#### Patient characteristics

- Across all studies, the number of included patients was 118,702, with an average of 3,043
- patients per study. Their mean age ranged from 65 to 95 years. Approximately 65% of patients
- were female. Most studies included participants with a history of falling, ranging from 11% to
- 131 100% of the study population.

#### 132 <u>Cohort studies</u>

Among the 39 included studies, six were cohort studies (Appendix 5). Tinetti et al (1998) demonstrated a significant relationship between multiple non-injurious falls and a decline in social functioning (Regression coefficient = -0.538 (p<0.05)), measured using the Social Activity scale, in a sample of 770 older adults after 3 years of follow-up [14]. Similarly, Pin et al. (2016) found that in their cohort of 16,583 participants, those who fell showed decreased social participation after falling (p<0.001), which was no longer statistically significant when frailty was added in the model [15].

Vellas et al. (1987) compared people who fall versus those who did not in two populations: a retirement home (n=118) and older adults living at home (n=60) [16]. Among the older adults who lived at home, they noted that fewer fallers were able to maintain the same level of activity after 6 months of follow-up when compared to non-fallers (p<0.02).

Van der Meulen et al. (2014) assessed social participation (using the Frenchay Activities Index) in 260 older adults with low and high levels of concern about falling over 14-months [17]. They reported significant differences (specific results not reported) between the groups, with lower social participation scores in those who had a higher level of concern about falling.

In 4,680 older adults, Yu et al. (2021) reported a significant relationship between the number of falls and loneliness scores (measured using the 3 item University of California, Los Angeles (UCLA) Loneliness Scale) across three time points over 4-years (B = 0.008, p<0.05) [18]. A cohort study by Hajek et al. (2020) looked at loneliness (as measured using the Bude and Lantermann scale) and social isolation (measured using the De Jong Gierveld Loneliness Scale) and their link to fear of falling 669 older adults [19]. They compared older adults with an onset of fear of falling, to those who had no fear. Their findings revealed that the end of fear of falling

was associated with lower loneliness scores ( $\beta$  = -0.06, p<0.05) and other negative psychosocial outcomes (e.g., increased depressive symptoms).

#### Cross-sectional studies related to falls and social isolation

Of the twenty-six cross-sectional studies included in this review, 11 reported on the relationship between falls and social isolation or loneliness (Appendix 6).

Quach et al. (2016) examined the relationship between falls and scores on the Social Relationship Index including 8,464 participants [20]. They noted that participants who reported experiencing a fall or multiple falls had a lower social relationship index score (mean, 3.24 and 3.08 respectively) compared to those who had not fallen (mean, 3.34; p<0.0001).

Hajek et al (2017) examined variables associated with a history of falling in 7,808 participants [21]. They found those reporting a fall in the previous 12 months had higher loneliness scores (De Jong Gierveld Loneliness Scale;  $\beta$  = .08, p < .001) and social exclusion scores (Bude and Lantermann scale;  $\beta$  = .08, p < .001) compared to those who had not fallen.

Schnittger et al. (2012) conducted a study in 579 older adults identifying risk factors for different pathways of loneliness – emotional loneliness, social loneliness (both measured using the De Jong Gierveld Loneliness Scale), and social support (measured using the Lubben Social Network Scale) [22]. A history of falls was the only biological variable that was identified as a statistically significant risk factor for inclusion in the model for social support (correlation coefficient= -0.247; p<0.003).

Stel et al (2004) reported a statistically significant decline in social activities in 204 older adults who experienced a fall inside their home (OR: 2.6 (95% CI: 1.1-6.5); p<0.05) [23], and Vanden Wyngaert et al. (2020) reported an association between risk of falls and participation in social roles and activities in 154 older adult haemodialysis patients (PROMIS questionnaire;

 $R^2$ =0.11; p=0.01) [24]. Finally, Nicholson et al. (2005) reported a strong positive relationship between experiencing an injurious fall and increasing social isolation in a sample of 68 older adults (Lubben Social Network Scale;  $\rho$ = -0.4; p<0.05), and highlighted that this relationship was stronger in women ( $\rho$ = -0.5; p=0.01) [25]. Additionally, they assessed this relationship using both the Family and Friends subscales of the Lubben Social Network Scale and found that the correlation was specific to the Friends subscale ( $\rho$ = -0.43; p<0.05).

Iliffe et al. (2007) and Robins et al. (2018) found no statistically significant associations between falls and social isolation using the Lubben Social Network Scale in a sample of 3,139 older adults and the Friendship Scale for social isolation in a sample of 245 older adults, respectively [26, 27]. Similarly, Van Lankveld et al. (2011) and Faria et al. (2020) found no correlation between falls and loneliness, using the De Jong Gierveld Loneliness scale in a sample of 579 older adults, and the UCLA scale in a sample of 48 older adults, respectively [28, 29]. Additionally, Finn et al. (2001) noted no difference in scores for the OARS social support scale when comparing fallers to non-fallers in a nursing home setting (n=49) [30].

Cross-sectional studies related to fear of falling and social isolation

Seven studies examined fear of falling linked to falls and social isolation (Appendix 7). Gagnon et al. (2005) reported a statistically significant positive relationship between fear of falling and social support in a sample of 105 older adults (measured using the confiding-relationships

component of the Bedford Life Events and Difficulties Schedule modified for elderly subjects;

Wald chi-square= 3.77; p=0.05) [31]. Curcio et al. (2009) reported a strong relationship between

p<0.01) [32]. Petrinec et al. (2020) identified fear of falling as an independent predictor of social

fear of falling and low social participation in 1,668 older adults (OR, 1.52; 95% CI, 1.20-1.92;

functioning (as measured by the Medical Outcomes Study 36-item Short-Form General Health Survey;  $\beta$ = -0.29) in 108 older adults [33].

Merchant et al. (2020) and Iliffe et al. (2007) showed no statistically significant relationship between fear of falling and social isolation in 493 older adults and 3,139 older adults, respectively [26, 34]. Ferreira et al. (2018) and Kara et al. (2009) showed no association between fear of falling and social participation (n=7,935) or fear of falling and loneliness (n=47), respectively [35, 36]. Cross-sectional studies related to falls and activity restriction due to fear of falling

Eight studies examined the relationship between falls and activity restriction due to fear of falling (Appendix 7). Tinetti et al (1994) and Apikomonkon et al. (2003) both reported a statistically significant decrease in activity due to fear of falling in individuals who experienced a fall compared to those who had not (n=1,103, chi-square= 13.1, p < 0.001; and n=546, chisquare=5.49, p<0.05, respectively) [37, 38]. Similarly, in 1,668 older adults, Curcio et al. (2009) demonstrated that those who restricted activity due to fear of falling were more likely to have experienced a fall in the year prior (OR: 1.48 (95%CI, 1.18-1.86); p=0.001) [32], and Mendes da Costa et al. (2012) demonstrated that activity restriction increased in those with multiple falls over the past year (OR, 3.04; 95% CI, 1.70-5.42) [39]. Murphy et al. (2002), and Choi et al. (2015) showed that a history of injurious falls was independently associated with activity restriction due to fear of falling (n=1,064, ARR: 1.36; 95% CI, 1.11-1.66; p=0.003; and n=4,247, OR, 3.03; 95% CI, 1.21-7.54, p=0.008, respectively) [40, 41].

Howland et al. (1998) reported no relationship between the experience of a fall and activity restriction in a sample of 266 older adults (OR: 1.094; 95% CI, 0.376-3.177; p=0.869) [42], as did Choi et al. (2015) (OR, 2.12; 95% CI, 0.96-4.67; p=0.062) among 4,247 older adults

number of falls and fear-based activity restriction in 493 older adults (OR, 1.4; 95% CI, 0.94– 2.20) [34].

[41]. Similarly, Merchant et al. (2020) also reported no significant relationship between the

# Qualitative studies

Seven qualitative studies were included (Appendix 8). All participants interviewed were older adults (n=124), including 51 stroke survivors [43, 44] and 10 experiencing frailty [45]. Common categories identified across these studies were activity restriction to manage fear of falling, changing behaviours to avoid falling [43, 45-47], feeling restricted due to reduced mobility after falling [43, 44, 48], increasing dependence on caregivers [43, 45], developing fear of falling [43, 45], feelings of loneliness or isolation [43, 48], and a negative impact on identity or autonomy [47].

# **DISCUSSION**

We conducted a comprehensive scoping review including 39 studies examining the relationship between falls and subsequent social isolation. We limited the scoping review to studies that identified social isolation after a fall, this was due to the request of the commissioning knowledge user. More than half of the studies were published since 2010, suggesting increased interest in the relationship between falls and social isolation in older adults. Social isolation and loneliness were measured using a variety of outcome measures across studies, such as degree of activity, and varying scales for loneliness, social isolation, social participation, social support, etc. This highlights the growing need for consistency in the measurement of social isolation and loneliness to allow for meaningful comparison across studies. Cornwall et al. (2009) highlight previous efforts to consolidate different measures of social isolation and build off this work.

They combined multiple measures of social isolation to develop two scales that measure distinct dimensions of social isolation – social disconnectedness and perceived isolation [49].

Only a few studies examined risk factors and mental health outcomes related to falls and subsequent social isolation. Risk factors linked to social isolation and activity restriction included age, sex/gender, poor perceived health, poverty, frailty, and comorbidity. Few studies also documented an association between activity restriction due to fear of falling and depression. Our findings suggest the presence of gaps in the literature for these important outcomes, highlighting the need for further research. No randomized trials exploring interventions for social isolation after a fall were identified in our scoping review, highlighting another gap in the literature and an area for future research to explore.

We did not identify any studies on falls and subsequent social isolation that were specific to the COVID-19 context, highlighting another gap in the evidence base. A scoping review by Kasar et al. (2021) suggests that older adults face increased social isolation as a result of pandemic-related restrictions, which can result in increased loneliness and reduced quality of life [50]. They also highlighted how technology can be used to deliver virtual or tele-health support services, and to allow older adults stay connected with their social networks [50]. A systematic review by Larson et al. (2021) assessed the impact of COVID-19 lockdowns on physical activity in older adults and reported that most studies demonstrated a decline in physical activity or an increase in sedentary behaviours in this population. The effectiveness of physical activity and exercise in preventing falls and fractures in older adults is well-established in the literature [51-53]. A decline in physical activity in older adults could lead to sarcopenia, and an increased risk of falls or fractures [53].

There are several strengths to our scoping review, such as the use of the JBI guide, and the PRISMA-ScR. A comprehensive literature search was conduced and several different types of study designs were included. However, limitations include that all studies were conducted in middle-high- or high-income economy countries. This suggests that our results may not be generalizable to low- and middle-income countries, highlighting a gap in the literature. Many of the included studies were cross-sectional and we cannot confirm the directional causality between falls and social isolation without more robust research. Furthermore, none of the included studies specifically focused on culturally and linguistically diverse (CALD) backgrounds, who might be at greater risk of social isolation after experiencing a fall. Additional research is warranted in this area [54]. In addition, we were unable to update the literature search due to lack of capacity and funding.

In summary, we found a dearth of research, particularly examining risk factors and mental health outcomes related to social isolation and falling older adults. Further research is warranted in this area, given the importance of falls and social isolation to the health of older adults.

1 ว							
2 3 4	282	LIST OF AE	BBREVIATIONS				
5 6	283	ARR	Absolute Risk Reduction				
7 8 9	284	CADTH	Canadian Agency for Drugs and Technologies in Health				
10 11	285	CI	Confidence interval				
12 13	286	OR	Odds Ratio				
14 15	287	PRESS	Peer Review of Electronic Search Strategies				
16 17 18 19 20	288	PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses				
21 22 23	289	DECLARAT	FIONS				
24 25	290	<u>Funding</u>					
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28 29	292	[4500415303] through the query services of the SPOR Evidence Alliance. The SPOR Evidence					
30 31 32	293	Alliance is su	apported by the Canadian Institutes of Health Research (CIHR) under Canada's				
33 34	294	Strategy for I	Patient-Oriented Research (SPOR) initiative, and the generosity of partners from a	41			
35 36	295	public agenci	es and organizations across Canada who have made cash or in-kind contributions	3.			
37 38 39	296	Dr. Tricco is	funded by a Tier 2 Canada Research Chair in Knowledge Synthesis [17-0126-				
40 41	297	AWA], and I	Dr. Straus is funded by a Tier 1 Canada Research Chair in Knowledge Translation	1			
42 43	298	[17-0245-SU	B].				
44 45	299	Ethics approv	<u>/al</u>				
46 47 48	300	Not required.					
49 50	301	Consent for p	<u>publication</u>				
51 52	302	Not applicabl	le.				
53 54 55 56	303	Availability of	of data and materials				
57 58				18			

304	The full dataset is available from the corresponding author upon reasonable request.
305	Conflict of interests
306	All authors do not have any potential (or perceived) conflicts of interest.
307	Author Contribution
308	ACT obtained funding for this study. SMT, ACT, YJ, MdG, and KA conceptualized the study.
309	SMT drafted the protocol, with input from ACT, YJ, MdG, KA, JB, JW, and SES. SMT oversaw
310	screening, full-text review, and data abstraction. SMT, AP, JF, GM, AH, and JB screened
311	citations and full text articles, abstracted and verified data. SMT and ACT interpreted results,
312	and SMT, AP, and ACT drafted the manuscript and revised the final version of the manuscript.
313	JF, GM, AH, YJ, MdG, KA, AGB, JB, JW, and SES critically reviewed the manuscript. All
314	authors approved of the final version.
315	Role of the funder
316	The funders were co-developers of this research project and contributed to the design of the
317	study and reviewed/approved of the manuscript.
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321	manuscript and creating tables and appendices.
322	SUPPLEMENTAL FILES
323	Supplemental File 1: PRISMA Checklist
324	Supplemental File 2: Appendices

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- FIGURE LEGEND:
- , diagra. Figure 1 – PRISMA 2020 study flow diagram.

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45 46 47

# Appendix 1: Literature search strategies

### Ovid MEDLINE(R) ALL <1946 to Jan 11, 2021>

- Accidental Falls/
- (slip\* or trip\* or stumbl\* or tumbl\*).tw,kf.
- (fall\* or fell or "fall- related" or "near- fall").tw,kf.
- 4 or/1-3
- limit 4 to "all aged (65 and over)"
- exp Aged/ or geriatrics/
- (geriatric\* or elder\* or age\* or "of age" or aging or senior\* or older adult\* or retired or retiree\* or elder\* or pensioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or octogenarian or nonagenarian\* or centenarian\* or sixties or seventies or eighties or nineties).tw,kf.
- 4 and (6 or 7)
- 5 or 8
- Social Isolation/
- 11 loneliness/
- exp social support/
- (social barrier\* or social isolat\* or social support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or connectedness or lonely or loneliness or "feel\* alone\*" or companionship).tw,kf.
- 14 ((lack or absence or minimi\*) adj2 (contact or communication or support\*)).tw,kf.
- 15 or/10-14
- 16 9 and 15
- animals/ not humans/
- 18 16 not 17

## PsycINFO <1806 to January Week 2 2021>

- falls/
- (slip\* or trip\* or stumbl\* or tumbl\*).tw.
- (fall\* or fell or "fall- related" or "near- fall").tw.
- or/1-34
- limit 4 to "380 aged <age 65 yrs and older>"
- (geriatric\* or elder\* or age\* or "of age" or aging or senior\* or older adult\* or retired or retiree\* or elder\* or pensioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or

octogenarian or nonagenarian\* or centenarian\* or sixties or seventies or eighties or nineties).tw.

7 4 and 6

8 5 or 7

9 social isolation/ or loneliness/ or social support/ or friendship/

10 (social barrier\* or social isolat\* or social support\* or social car\* or

- 10 (social barrier\* or social isolat\* or social support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or confederation or lonely or loneliness
- or "feel\* alone\*" or companionship).tw. a companion Embase Classic+Embase <1947 to 2022 Land and Company 11>

  I falling/
  (slip\* or trip\* or stumbl\* or tumbl\*)
  (fall\* or fell or "fall- related" or "portion or 1-3
  imit 4 to aged <65
  reliness."

- loneliness/ or social support/ or frien\(\mathbb{A}\)shi
- exp social isolation/
- (social barrier\* or social isolat\* or social support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or connected edness or lonely or loneliness or "feel\* alone\*" or companionship).tw. 3
- 9 ((lack or absence or minimi\*) adj2 (antat or communication or support\*)).tw.
- 10 or/6-9
- 11 5 and 10
- limit 11 to human

Database: EBM Reviews - Cochrane Database of Systematic Reviews <2005 to January 11, 2021>, EBM Reviews ACP Journal Club <1991 to January 11, 2021>, EBM Reviews - Cocarane Clinical Answers <January 2021>, EBM Reviews - Database of Abstracts of Reviews of Effects <1st Quarter 2016>

- (slip\* or trip\* or stumbl\* or tumbl\*).mp.  $\overline{\overline{\sigma}}$
- 2 (fall\* or fell or "fall- related" or "near- fall").mp.

47

- 1 or 2
- (geriatric\* or elder\* or age\* or "of age" or aging or senior\* or older adult\* or retired or retiree\* or elder\* or pensioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or octogenarian or nonagenarian\* or centenarian\* or sixties or seventies or eighties or nineties).mp.
- 5 3 and 4
- (social barrier\* or social isolat\* or social support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or connectedness or lonely or loneliness or "feel\* alone\*" or companionship).mp.
- 7 ((lack or absence or minimi\*) adj2 (contact or communication or support\*)).mp.
- 6 or 7
- 5 and 8

# Joanna Briggs Institute EBP Database - < Current to January 11, 2021>

- (slip\* or trip\* or stumbl\* or tumbl\*).mp.
- (fall\* or fell or "fall- related" or "near- fall").mp.
- 3 1 or 2
- (geriatric\* or elder\* or age\* or "of age" or aging or senior\* or older adult\* or retired or retiree\* or elder\* or pensioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or octogenarian or nonagenarian\* or centenarian\* or sixties or seventies or eighties or nineties).mp.
- 3 and 4 5
- (social barrier\* or social isolation\* or social support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or connectedness or lonely or loneliness or "feel\* alone\*" or companionship).mp.
- ((lack or absence or minimi\*) adj2 (contact or communication or support\*)).mp.
- 8 6 or 7
- 5 and 8

# AMED (Allied and Complementary Medicine) <1985 to January 2021>

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- (fall\* or fell or "fall- related" or "near- fall").mp.
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  4 (geriatric\* or elder\* or age\* or "of age" of aging or senior\* or older adult\* or retired or retiree\* or elder\* or pansioner\* or older people or older patient\* or gerontology or Sexagenarian\* or septuagenarian\* or octogenarian or nonagenarian\* or centen arian or sixties or seventies or eighties or nineties).mp. Se
- 5 3 and 4
- (social barrier\* or social isolation\* of wall support\* or social car\* or psychosocial support\* or psycho-social support\* or social frailt\* or friendship\* or "social\* connected\*" or companionship).mp. or "feel\* alone\*" or companionship alone\*" or co
- Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 nt Superieur (ABES) .
  o text and data mining, Al training, and similar technologies. support\*)).mp.
- 6 or 7
- 5 and 8

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Appendix 2: Study Author, year	Characteristics (n=39) Study title	Journal name	Country	inc. 21 22 24 Stuck design	Study duration
	•		, and the second	Etudy design	(months)
Apikomonkon, 2003[26]	Fear of falling and fall circumstances in Thailand	NA	Thailand	oros <b>g</b> sectional	NA
Chiu, 2011[37]	Psychosocial responses to falling in older Chinese immigrants living in the community	Dissertation Abstracts International Section A: Humanities and Social Sciences	Canada	e premiser 2022. Dov Enseignement Sir uses related to te	6
Choi, 2015[30]	Characteristics associated with fear of falling and activity restriction in South Korean older adults	Journal of Aging and Health	South Korea	Sectional disconsistency of the section disconsist	NA
Curcio, 2009[4]	Activity restriction related to fear of falling among older people in the Colombian Andes Mountain	Journal of Aging and Health	Columbia	क्रिक्ट हैं sectional	NA
Dias, 2011[5]	Characteristics associated with activity restriction induced by fear of falling in community-dwelling elderly	Revista Brasileira de Fisioterapia	Brazil	A Rosectional ning,	NA
Faes, 2010[36]	Qualitative study on the impact of falling in frail older persons and family caregivers: Foundations for an intervention to prevent falls	Aging & Mental Health	Netherlands	Aual mative traini	NA
Faria, 2020[22]	Elderly residents in the community: gaining knowledge to support a rehabilitation nursing program	Revista Brasileira de Enfermagem	Portugal	©rose sectional	NA
Ferreira, 2018[31]	Aspects of social participation and neighborhood perception: ELSI-Brazil	Revista de saude Publica	Brazil	Frosssectional	NA
Finn, 2001[14]	The relationship between falls and fall-related efficacy, depression, and social resources	Dissertation Abstracts International: Section B: The Sciences and Engineering	USA	ar technologies.	NA
Gagnon, 2005[3]	Affective correlates of fear of falling in elderly persons	American Journal of Geriatric Psychiatry	Canada	crosstsectional	NA
Hajek, 2017[20]	The association of falls with loneliness and social exclusion: evidence from the DEAS German Ageing Survey	BMC Geriatrics	Germany	cross sectional	NA

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Hajek, 2020[13]	What are the psychosocial consequences when fear of falling starts or ends? Evidence from an asymmetric fixed effects analysis based on longitudinal data from the general population	International Journal of Geriatric Psychiatry	Germany	/bmjopen-2022-06ខ្លាំ 24 on 29 cted by copyrightភ្នំncluding	36
Host, 2011[38]	Older people's perception of and coping with falling, and their motivation for fall-prevention programmes	Scandinavian Journal of Public Health	Denmark	gualifative	2
Howland, 1998[25]	Covariates of fear of falling and associated activity curtailment	The Gerontological Society of America	USA	screign sectional	NA
Iliffe, 2007[16]	Health risk appraisal in older people 2: the implications for clinicians and commissioners of social isolation risk in older people	British Journal of General Practice	England	eptember 203 ectional Ens@ignement Su to tex	NA
Kara, 2009[28]	Evaluation of home environment and life satisfaction and falling in geriatrics: Examination of its relationship with fear	Physiotherapy Rehabilitation	Turkey	Sploade and d	NA
Mendes da Costa, 2012[29]	Fear of falling and associated activity restriction in older people. results of a cross-sectional study conducted in a Belgian town	Archives of Public Health	Belgium	Sectional Sectional MBES)	NA
Merchant, 2020[7]	Relationship between fear of falling, fear-related activity restriction, frailty, and sarcopenia	Journal of the American Geriatrics Society	Singapore	gross sectional	NA
Meric, 2007[34]	A qualitative study on the perceptions of old individuals regarding the life of the fall and its effect on their daily lives	Turkish Journal of Geriatrics	Turkey	dinal Gative	2
Murphy, 2002[1]	Characteristics associated with fear of falling and activity restriction in community-living older Persons	Journal of the American Geriatrics Society	USA	dross-sectional similar	NA
Nakaya, 2013[6]	The association between self-reported history of physical diseases and psychological distress in a community-dwelling Japanese population: the Ohsaki Cohort 2006 Study	European Journal of Public Health	Japan	similar dessectional description and similar dessectional description and similar description and similar dessection and similar description and simil	NA
Nicholson, 2005[15]	The relationship between injurious falls, fear of falling, social isolation, and depression	NA	USA	gros Sectional	NA
Petrinec, 2020[32]	Health-related quality of life of older women religious: negative influence of frailty	Western Journal of Nursing Research	USA	cros sectional	NA
Pin, 2016[11]	Impact of falling on social participation and social support trajectories in a middle-aged and elderly European sample	Social Science and Medicine - Population Health	Denmark, Sweden, Netherlands, Austria, Germany, France, Belgium,	cohest ce Bibliog	72

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			Switzerland, Italy, Spain	22-06212 right, in	
Quach, 2016[19]	Social determinants of falls: The role of social support and depression among community-dwelling older adults	Dissertation Abstracts International: Section B: The Sciences and Engineering	USA	/bmjopen-2022-062124 on 29 Septembes 2022 Downly Enseignement Supercted by copyright, including for uses related to text at	36
Robins, 2018[21]	The association between physical activity and social isolation in community-dwelling older adults	Aging & Mental Health	Australia	e sectional	NA
Schmid, 2009[35]	Consequences of poststroke falls: activity limitation, increased dependence, and the development of fear of falling	American Journal of Occupational Therapy	USA	nelitative of Sullivative text	6
Schnittger, 2012[18]	Risk factors and mediating pathways of loneliness and social support in community-dwelling older adults	Aging & Mental Health	Ireland	Sieur nd da	NA
Stel, 2004[2]	Consequences of falling in older men and women and risk factors for health service use and functional decline	Age and Ageing	Netherlands	ta eros http	NA
Tinetti, 1998[9]	The effect of falls and fall injuries on functioning in community-dwelling older persons	Journal of Gerontology	USA	<b>s</b> oho <del>c</del> t	36
Tinetti, 1994[24]	Fear of falling and fall-related efficacy in relationship to functioning among community-living elders	Journal of Gerontology	USA	I training,	NA
van der Meulen, 2014[10]	Effect of fall-related concerns on physical, mental, and social function in community-dwelling older adults: A prospective cohort study	Journal of American Geriatrics Society	Netherlands	Bohert similarossectional	14
van Lankveld, 2011[17]	Age-related health hazards in old patients with first- time referral to a rheumatologist: A descriptive study	Arthritis	Netherlands	orossisectional echnologian	NA
Vanden Wyngaert, 2020[23]	Associations between the measures of physical function, risk of falls and the quality of life in haemodialysis patients: a cross-sectional study	BMC Nephrology	Belgium	June 11, 2025 technologies.	
Vellas, 1987[8]	Prospective study of restriction of activity in old people after falls	Age and Ageing	France	cohownt >	6
Ward-Griffin, 2004[33]	Falls and fear of falling among community dwelling seniors: the dynamic tension between exercising precaution and striving for independence	Canadian Journal on Aging	Canada	qual Bative	NA

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Developing a falls prevention program for community-dwelling stroke survivors in Singapore: client and caregiver perspectives	Disability and Rehabilitation	Singapore	/bmjopen-2022-062124 on tected by copyright Encluding	NA
Longitudinal Assessment of the relationships between geriatric conditions and loneliness	Journal of the American Medical Directors Association	USA	oling Septer	96
Prevalence and correlates of fear of falling, and associated avoidance of activity in the general population of community-living older people	Age and Ageing	Netherlands	schen 20	NA
Prevalence and correlates of fear of falling, and associated avoidance of activity in the general copulation of community-living older people			তা তা তা তা তা তা তা তা তা তা তা তা তা ত	
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Appendix 3: Patient	Characteristics (	(n=39)				)621 nt, iı	
			DEMOGRAPI	HIC DATA			
Author, year	Overall sample size	Overall age (years)	Overall age (type)	Overall age variance (value)	Overall age variance (type)	female female ng for	% male
Apikomonkon, 2003[26]	546	NR	NR	60-94	range	ptem Ens	39
Chiu, 2011[37]	18	81	mean	71 to 94	range	88.00.00 88.00.00	11.1
Choi, 2015[30]	4,247	NR	NR	NR	NR	2022 54 mg	NR
Curcio, 2009[4]	1668	70.9	mean	7.4	SD	54.3 22 54.3 22	45.5
Dias, 2011[5]	113	74.5	mean	7	SD	89, ⊒ □	15
Faes, 2010[36]	10	70-90	range	NR	NR	I AB O S	40
Faria, 2020[22]	48	75	mean	6.8	SD	66.72	33.33
Ferreira, 2018[31]	7935	NR	NR	NR	NR	5%.Bi c	43.1
Finn, 2001[14]	49	NR	mean	NR	SD	Se se de d	NR
Gagnon, 2005[3]	105	78.2	mean	8.9	SD	8\$. <b>₹</b> .₹	13.3
Hajek, 2017[20]	7808	73.8	mean	5.9	SD	4萬.奴∃	53.8
Hajek, 2020[13]	8836	65.5	mean	10.7	SD	<b>₹</b>	49.6
Host, 2011[38]	14	77	mean	68-87	range	64.3	35.7
Howland, 1998[25]	266	76.3	mean	7.9	SD	17.7.7. by	23
Iliffe, 2007[16]	3139	NR	NR	65-75+	range	5 <sup>24</sup> .5 <del>5</del>	45.5
Kara, 2009[28]	47	71.7	mean	5.6	SD	5 <b>5</b> .3 <b>≥</b>	44.7
Mendes da Costa, 2012[29]	501	NR	NR	65-85+	NR	57.7 bmj. co	42.3
Merchant, 2020[7]	493	73	mean	8	SD	<b>7<u>9</u>.3 8</b>	20.7
Meric, 2007[34]	22	NR	NR	65-83+	range	<b>6</b> ₹.6 ₹	36.4
Murphy, 2002[1]	1064	79.6	mean	5.3	SD	AS On	27
Nakaya, 2013[6]	43487	65+	range	NR	NR	<b>₹</b> .9 <b>८</b>	46.1
Nicholson, 2005[15]	68	78.5	mean	6.3	SD	€ <b>3</b> .4 <b>a</b>	39.6
Petrinec, 2020[32]	108	75.6	mean	65–93	range	180 = 1	0
Pin, 2016[11]	16583	50-95	range	NR	NR	19 × 2	NR
Quach, 2016[19]	8464	74	mean	7	SD	58.7 <b>25</b>	41.3
Robins, 2018[21]	245	77	mean	6	SD	60 <b>a</b>	40
Schmid, 2009[35]	42	67.5	mean	11.93	SD	NR <b>6</b>	NR
Schnittger, 2012[18]	579	NR	NR	NR	NR	69.1	30.9
Stel, 2004[2]	204	78.7	mean	6.3	SD	54.9 <b>6</b>	45.1
Tinetti, 1998[9]	1103	NR	NR	NR	NR	NR 5 73 5 6	NR
Tinetti, 1994[24]	1103	79.6	mean	5.2	SD	73 👼	27

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			В	MJ Open		/bmjopen-2022-0 cted by copyrigh	
van der Meulen, 2014[10]	260	77.9	mean	5	SD	72.7 72nc	27.3
van Lankveld, 2011[17]	154	79.2	mean	5.1	SD	<u>78</u> o	21
Vanden Wyngaert, 2020[23]	113	67.5	mean	16	SD	49 S	57.5
Vellas, 1987[8]	178	65-85+	range	NR	NR	7 <b>5</b> .4 <b>8</b>	23.6
Ward-Griffin, 2004[33]	9	81.7	mean	72-92	range	Fig. His	22.3
Xu, 2019[39]	17	65	mean	7	SD	44 sei	55.6
Yu, 2020[12]	4680	74.01	mean	9.69	SD	mber 2022 şeignem s⊈ejanem	43.9
Zijlstra, 2007[27]	4376	77.1	mean	4.9	SD	32.5 C	40.1
		Oh				2. Dow	

		SETTING DA	TA	e X ty
Author, year	Setting	Streamlined setting	Participants	Description of aces 30 caregivers
		description	living alone (%)	de de de
Apikomonkon,	Community in 4 provinces of	Community	9.9	NR ta (A) fr
2003[26]	Thailand			TO THE METERS OF
Chiu, 2011[37]	Community in the Greater	Community	61	Two respondents with their children. The rest
	Toronto Area, Canada			lived alone or only with their spouse. Only seven
				of 18 respondents ≱ad  least one grown child
				living in the same sity who might provide
				assistance when neede
Choi, 2015[30]	Community setting in Korea	Community	NR	NR 09 9
Curcio, 2009[4]	Community in Columbian	Community	9.5	NR and
	Andes Mountains			
Dias, 2011[5]	Community setting in Brazil	Community	38	NR S. S
Faes, 2010[36]	Home and outpatient clinic in	Community + Medical	10	All participants has access to a caregiver (either
	Netherlands			child or spouse)
Faria, 2020[22]	Urban health unit in northern Portugal	Medical	NR	NR Ching
Ferreira, 2018[31]	Urban communities in Brazil	Community	NR	NR ō -
Finn, 2001[14]	Two nursing homes	Nursing home	0	In general, they have extered a nursing home
	in the Chicago Metropolitan			because of an inability to adequately care for
	Area, USA			themselves, and they denot have anyone who can
				ably assist them, or the lack financial resources.
Gagnon, 2005[3]	Medical or orthopedic wards	Medical	65.7	NR Sp
	of 3 hospitals in Toronto,			Ö
	Canada			<u> </u>
Hajek, 2017[20]	Communities in Germany	Community	NR	NR 🖺
				NR Graphique delines.xhtml
				Phi
				ar Qu
	For peer review o	nly - http://bmjopen.bmj.	com/site/about/qui	delines.xhtml <b>Q</b>
	•	, , , , ,		<u>Ф</u>

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Hajek, 2020[13]	Community in Germany	Community	28.9	yright, i NR t, i
Host, 2011[38]	Copenhagen area in Denmark	Community	64.3	NR c 24
Howland, 1998[25]	Communities in Eastern Massachusetts	Community	87	NR ding
Iliffe, 2007[16]	Community in London, England	Community	32.8	NR for Se gr
Kara, 2009[28]	Districts of Narlıdere, Gülbahçe and Mordoğan in Izmir, Turkey	Community	27.7	NR September 2022.  NR essrelated to
Mendes da Costa, 2012[29]	Community in Walloon region of Belgium	Community	36.4	NR emen to
Merchant, 2020[7]	Community in northwest region of Singapore	Community	NR	NR text pe
Meric, 2007[34]	Geriatric Outpatient of Gülhane Military Medical Academy in Turkey	Medical	13.6	NR nd date
Murphy, 2002[1]	Community setting in New Haven, Connecticut, USA	Community	70	NR minir
Nakaya, 2013[6]	Community in Japan	Community	NR	87.3% reported sufficient social support, 12.2% reported lack of social support, 4.2% unknown.
Nicholson, 2005[15]	Community in United States	Community	53.4	NR 👸 💆
Petrinec, 2020[32]	Cleveland Catholic Diocese in USA	Community	100	Participants were not included if they needed caregiver assistance.
Pin, 2016[11]	Communities in 10 European Countries (Denmark, Sweden, The Netherlands, Austria, Germany, France, Belgium, Switzerland, Italy, and Spain)	Community	NR	NR and similar to
Quach, 2016[19]	Communities in USA	Community	23.3	One-third did not have the perceived support with basic personal care (eating or dressing) when needed.
Robins, 2018[21]	Communities in Australia	Community	49	NR
Schmid, 2009[35]	Community in United States	Community	NR	All participants had a Garegiver.
Schnittger, 2012[18]	Technology Research for Independent Living (TRIL) clinic at St James's Hospital, Dublin.	Medical	NR	at Agence
Stel, 2004[2]	Community in three regions in the Netherlands	Community	NR	NR Bb

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Tinetti, 1998[9]	Community in New Haven,	Community	NR	NR in 11
Tinetti, 1994[24]	Connecticut, USA Community in New Haven, Connecticut, USA	Community	69	NR uding
van der Meulen, 2014[10]	Community in the Netherlands	Community	53.1	NA for u
van Lankveld, 2011[17]	Community in the Netherlands	Community	NR	NR Ense
Vanden Wyngaert, 2020[23]	Dialysis centres in Belgium	Medical	NR	NR algener
Vellas, 1987[8]	Community in Toulouse, France	Community	NR	NR to te
Ward-Griffin, 2004[33]	Community in Canada (11 senior apartment towers and in the Health Information and Promotion Centre)	Community	77.7	NR R Enseignement Superieur (A NR NR NR NR NR NR NR
Xu, 2019[39]	Community rehabilitation centers in Singapore	Medical	0	Four family careging two male) and four maids (all female) were in wewed. 33% employed a maid as a main caregiver.
Yu, 2020[12]	Community in USA	Community	NR	NR ≥ \$
Zijlstra, 2007[27]	Community in two urban areas in the Netherlands	Community	44	NR training, and s

		FALLS AND FRA	ILTY DATA			<u>s.                                    </u>		
Author, year	Participants with history of falling (%)	List of comorbidities [comorbidity 1 (%), etc.]	Participants with frailty (%)	Frailty scale	Overall frailty score	POVE all Trates	Frailty variance value	Frailty variance type
Apikomonkon, 2003[26]	21	NR	NR	NR	NR	, 2025 ogies.	NR	NR
Chiu, 2011[37]	100	All participants reported having chronic conditions. The most common physical conditions reported were diabetes and hypertension.	NR	NR	NR	NR Agence	NR	NR
Choi, 2015[30]	NR	NR	NR	NR	NR	NR	NR	NR
Curcio, 2009[4]	31.9	Hypertension (53.0), Osteoarthritis (39.2), heart disease (20.2), COPD	NR	NR	NR	NR <b>bi</b> og	NR	NR

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		(16.8), Diabetes Mellitus (13.4), Lower extremities fracture (11.7), Pain in joints (33.1), Dizziness (15.2), Breathlessness (11.4), Hearing impairment (33.0), visual impairment (68.9)				bmjopen-2022-062124 on 29 Septembe انگریزی cted by copyrigh <u>t, including for uses r</u>		
Dias, 2011[5]	NR	NR	NR	NR	NR	SVIR E	NR	NR
Faes, 2010[36]	100	Cognitive impairment (70%)	NR	NR	NR	<b>1 1 1 1 1 1 1 1 1 1</b>	NR	NR
Faria, 2020[22]	25	Cardiovascular diseases (76.6), endocrine diseases (56.8), musculoskeletal diseases (45.7), depression (16.3), respiratory diseases (14.3) and cerebrovascular diseases (9.3).	NR	NR	NR	er 2022. Downloaded from Superieur (ABE)	NR	NR
Ferreira, 2018[31]	NR	Overweight (women=65.2%, men=59.0%)	NR	NR	NR	ided f egir (A data	NR	NR
Finn, 2001[14]	51	NR	NR	NR	NR	3/48.5	NR	NR
Gagnon, 2005[3]	100	NR	NR	NR	NR	<u> </u>	NR	NR
Hajek, 2017[20]	17.6	NR	NR	NR	NR	ØNR.	NR	NR
Hajek, 2020[13]	NR	Number of physical illnesses is mean = 2.6, SD = 1.9	NR	NR	NR	ANR Mom jo	NR	NR
Host, 2011[38]	100	NR	NR	NR	NR	≣NR <mark>8</mark>	NR	NR
Howland, 1998[25]	35	Vision problems (26), stroke (11), dizziness (29)	NR	NR	NR	NR.bn	NR	NR
Iliffe, 2007[16]	11.20	Two or more chronic conditions (59.0%), takes 4 or more meds (33.4%)	NR	NR	NR	and simila	NR	NR
Kara, 2009[28]	29.9	NR	NR	NR	NR	≣NR o	NR	NR
Mendes da Costa, 2012[29]	31.6	NR	NR	NR	NR	NR Jur	NR	NR
Merchant, 2020[7]	mean = 0.4	NR	51.3	FRAIL scale	NR	on June 11, 202	NR	NR
Meric, 2007[34]	81	NR	NR	NR	NR	āNR <b>2</b>	NR	NR
Murphy, 2002[1]	39.70	Chronic dizziness (24.2), 5 or more medications (35.8), vision impairment (40.5)	NR	NR	NR	S.NR at Agend	NR	NR
Nakaya, 2013[6]	17.3	NR	NR	NR	NR	NR	NR	NR
Nicholson, 2005[15]	100	NR	NR	NR	NR	NR 00	NR	NR

Petrinec, 2020[32]	NR	Hypertension (60), Cataracts (60),	19	Tilburg	NR	1. VD2	NR	NR
retifiec, 2020[32]	INK	Thyroid disorders (30), Osteoporosis (17), Diabetes (7)	19	Frailty Indicator (TFI)	INK	/bmjopen-2022-062124 on 29 Sep	INK	INK
Pin, 2016[11]	2.8	NR	NR	NR	NR	NR <del>P</del>	NR	NR
Quach, 2016[19]	38.0	NR	NR	NR	NR	%/ <u>1</u> 8/0	NR	NR
Robins, 2018[21]	38	Congestive heart failure (4%); Heart disease (33%); stroke (9%); Cancer (25%); diabetes (18%); lung disease (16%); Parkinson's disease (1%)	NR	NR	NR	tember 2022. D Enseignement uses related to	NR	NR
Schmid, 2009[35]	NR	Stroke (100%)	NR	NR	NR	a\ <b>1</b> }0	NR	NR
Schnittger, 2012[18]	NR	NR	NR	NR	NR	, Eo-Eo-E	NR	NR
Stel, 2004[2]	100	Dizziness (27.9%), visual impairment (23%)	NR	NR	NR	nloaded fr beffeur (A) and data	NR	NR
Tinetti, 1998[9]	30.3	NR	NR	NR	NR	at SE	NR	NR
Tinetti, 1994[24]	39	One or more chronic conditions (78%)	NR	NR	NR	<b> 3√₽</b> }⊆	NR	NR
van der Meulen, 2014[10]	55.5	NA	NR	NA	NA	ing.	NA	NA
van Lankveld, 2011[17]	44	Cardiac 36%, hypertension 40%, vascular 25%, respiratory 12%, EENT 21%, upper GI 14%, lower GI 10%, Hepatic 3%, kidney 3%, other GU 16%, neurological 18%, endocrine 21%, psychiatric 8%, Rhuematic disease general (56%), Osteoarthritis (49%), Spondylosis(31%), Rheumatoid arthritis(17%), Arthritis otherwise defined (12%), Gout (6%), Chodrocalcinosis (12%), Osteoporosis (1%), Shoulder problem (6%), Polymyalgia rheumatica (3%), Soft tissue (1%), Carpal tunnel syndrome (2%), Others (6%)	NR	NR	NR	//bmjopen.bmj.com/ on June 11, 2025 at /	NR	NR
Vanden Wyngaert, 2020[23]	NR	Cardiovascular disease (74.3%) diabetes (46.0%) musculoskeletal complications (44.2%), Neuropathy (28.3), retinopathy (31.9), respiratory complications (24.8), hepatopathy (17.7), pain (27.4%), depression	NR	NR	NR	Agence Bibliographique de l	NR	NR

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		(23.9%), fatigue (18.6%), anxiety				621 nt, ir		
V.11. 1007[0]	50	(15.0%), sleep disturbances (12.4%)	NID	NID	NID	<u> </u>	NID	NID
Vellas, 1987[8] Ward-Griffin, 2004[33]	50 NR	NR NR	NR NR	NR NR	NR NR	NR 2	NR NR	NR NR
Xu, 2019[39]	100	Stroke (100%)	NR	NR	NR	ōNR <b>y</b>	NR	NR
Yu, 2020[12]	mean =0.74	The mean number of comorbidities at	NR	NR	NR	NR-E	NR	NR
1 u, 2020[12]	mean =0.74	haseline was 2.24 (SD=1.38)	TVIX	INIX	IVIX	ter Use	IVIX	IVIX
Zijlstra, 2007[27]	32.6	NR	NR	NR	NR		NR	NR
		The mean number of comorbidities at baseline was 2.24 (SD=1.38)  NR  For peer review only - http://bmjopen.bm				eptember 2022. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l É Ensæignement Superieur (ABES) . <u>rruses re</u> lated to text and data mining, Al training, and similar technologies.		14
	'	or peer review only Thttp://billjopen.bil	,.com/ sitc/ db	oat, gaiaciii	ics.Alltill	e I		

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Appendix 4: N	Iental health (	outcomes related to falls, fear of falling, a	pyright, i. 1022-062. Ind social isolation (n=6)
Author, Year	Sample	Results	Text description/interpretation of findings \$\frac{\text{N}}{2}\$
Murphy, 2002[1]	n=1064	Variables independently associated with activity restriction in participants with fear of falling  Depression (CES-D scale) Adj relative risk: 1.27 (95% CI, 1.00-1.60); p=0.048	"We found that a history of an injurious fall within the past year, slow timed physical performance, two or more chrotelic conditions, and depressive symptoms were all independently associated with activity restriction."  The symptoms were all independently associated with activity restriction."  The symptoms were all independently associated with activity restriction.
Stel, 2004[2]	n=204	Relationship between higher depression score and decline in social activities because of a fall OR: 2.0 (95% CI: 1.2-3.3); p<0.05	"A decline in functional status, social actions and physical activities was reported more often in respondents will be in the pression score."
Gagnon, 2005[3]	n=105	Variables associated with fear of falling (Comparing subjects with no/slight fear and subjects with moderate/severe fear)  Depression (Structured Clinical Interview for DSM-IV (SCID))  Wald chi-square= 8.76; p=0.03  Anxiety (Structured Clinical Interview for DSM-IV (SCID))  Wald chi-square= 5.95; p<0.02	"Not only were depressive disorders and the strongest associated with fear of fall the variables that we measured.  Given that this was a cross-sectional stude a clusal relationship between depression and fear of falling cannot be interred. [] It is possible, therefore, that in some individuals, fear of falling is an anxious manifestation of depression. However, depression could also be a consequence of activity restriction or social is patient resulting from a fear of falling"  "Depressive disorders and anxiety disorders were significantly associated with categorical fear of falling, independently of these variables"
Curcio, 2009[4]	n=1668	Variables associated with activity restriction related to fear of falling  Depression OR: 1.76 (95%CI, 1.38-2.24)	"A second model was then constructed with the psychosocial associated factors and other clinical and functional cavariates (see Table 4). After adjustment, functional and clinical factors remained independently associated with activity restriction related to fear of falling. Only depression and poor perceived health variables emerged as independent factors."
Dias, 2011[5]	n=113	Variables associated with activity restriction due to fear of falling (compared to no FOF or FOF alone)	"The variables that best discriminated the groups were depression, exhaustion and participation in social activities demonstrated in the diagram (Figure 1). For the grouping obtained hrough the Chi-square

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		<b>Depression</b> Chi-square=15.2, p=0.004	Automatic Interaction Detection (CHAID) method, it may be observed that the first distinctive characteristic was depression, evaluated using GDS. Those with positive symptoms for expression showed 90% chance of restricting activities due to fear of falling. Additionally, the presence of depressive symptoms seems to modulate the factors that are associated with activity respection due to fear of falling. A greater risk for depression has been sociated with inadequate evaluation of coping self-efficacy in stress for evaluation of coping self-efficacy in stress for evaluation of the participants of the present for expression that the participant is the present for expression that the present for expression that the present for expression that the participant is the present for expression that the present f
Nakaya, 2013[6]	n=43487	Relationship between history of falling and psychological distress  Sufficient social support OR, 1.6 (95% CI: 1.3-1.9) p<0.01 Lack of social support OR, 2.0 (95% CI: 1.4-2.8) p<0.01	"We also conducted stratified analyses regardless of social support."  "We also conducted stratified analyses regardless of social support status. Almost all subjects with a history of physical diseases including those with history of fall/fracture) were at increased risk of property of fall/fracture."  "The property of physical diseases including those with history of fall/fracture) were at increased risk of property of fall/fracture."  "The property of physical diseases including those with history of fall/fracture."  "The property of physical diseases including those with history of fall/fracture."  "The property of physical diseases including those with history of fall/fracture."  "The property of physical diseases including those with history of fall/fracture."  "The property of physical diseases including those with history of fall/fracture."  "The property of physical diseases including those with history of fall/fracture."  "The property of physical diseases including those with history of fall/fracture."  "The property of physical diseases including those with history of fall/fracture."  "The property of physical diseases including those with history of fall/fracture."  "The property of physical diseases including those with history of physical diseases."  "The property of physical diseases including those with history of physical diseases."  "The property of physical diseases including those with history of physical diseases."  "The property of physical diseases in physical diseases."  "The property of physical disea
Merchant, 2020[7]	n=493	Variables associated with fear of falling alone  Depression OR, 4.90 ( 95% CI, 1.06–22.67) p<0.05  Variables associated with fear of falling + fear-based activity restriction  Depression OR, 5.17 ( 95% CI, 1.84, 14.54)	"In our study, FOF and/or FAR were both significantly associated with depression in univariate and multivariate of significantly associated with depression in univariate and multivariate of significantly associated with mose with FOF + FAR were nine times for sikely to be depressed than those with no FOF. [] Strong links between gepressive symptoms with FOF and/or FAR have been reported in various studies, and their association is believed to be bidirectional whose management of one condition would improve the other."
		OR, 5.17 ( 95% CI, 1.84–14.54)  For peer review only - http://bmjopen.b	nce Bibliographique

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Appendix 5:	Findings from incl	uded cohort studies (n=6)	ıt, ir
Author,	Sample	Results	Text description/ interpretation of findings 0
Year			lin 2
Vellas, 1987[8]	n=178  Studied two populations: 1) Individuals living in a retirement home (Fall victims = 59; Non-fallers=59)  2) Individuals living at home (Fall victims = 30; Non-fallers=30)	Retirement home (n=118) Among the fall victims there was a tendency towards restriction of activity: 3% walked less indoors, 5% went outside less, 4% had no leisure activity, 7% no longer visited their children and 11% no longer visited their friends. The lack of significance (P>0.05) is linked both to the very low level of activity on day 1 of the aged population living in retirement homes and to our small sample.  At home (n=60) On day 1, the fallers and control group had identical levels of activity. Reported a significant difference in the number of participants who maintained the same level of activity after 6 months, with this number being reduced in fall victims compared to non-fallers (p<0.02)	"The interpersonal relationships of the fallers were very poor: 90% did not belong to any group, 54% never visited the children, 40% never visited anybody."  "A fall may lead to loss of autonomy. Face rising as a result of falls have been identified by Isaacs and his confirms these findings and demonstrates the confirms these findings and demonstrates the confirms these findings and demonstrates to be confirmed to the confirms these findings and demonstrates the confirms these findings and demonstrates to be confirmed to the confirmation of activity following a fall without fracture."  "Falls in elderly persons give rise to a decent of the patient. But, it is difficult to show whether falls are an indicate from http://bmjopen.bmj.com/sp
Tinetti, 1998[9]	n=1103 at baseline, 770 at 3 years follow-up	Effect of having 2 or more non- injurious falls on social functioning (Social Activity Scale):  Regression coefficient = -0.538 (p<0.05)	"While there did not appear to be an increased risk of decline in social functioning among participants experiencing as single noninjurious fall, repetitive fallers experienced a decline in social functioning in both short- and long-term follow-up analyses. The selationship between repetitive falling and decline in social functioning remained after adjusting for each category of covariates. Experiencing a serious fall injury, on the scheme and, was only marginally associated with decline in social functioning over the 1-year follow-up, and not at all over the 3-year follow-up. Preferential loss to follow-up of persons experiencing decline in social functioning between the 1- and 3-year follow-up interviews might at least partially explain the lack of relationship between injurious falls and change in social activities."

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Van der Meulen, 2014[10]	n=260 Low level of concern about falling (n=127)  High level of concern about falling (n=129)  Follow-up = 14 months	Social participation (Frenchay Activities Index) Low level falling concern: Baseline mean, 39.9 (SD, 7.1) Follow-up mean, 38.8 (SD, 7.6) High level falling concern: Baseline mean, 36.8 (SD, 7) Follow-up mean, 35.7 (SD, 7.7)  p-value = 0.006	persistent over 14 months of follow-up. [5] Accompanying effect size estimations were medium (social participation) to large (ADL dysfunction)."  or use in seignement to be a seignement of the
Pin, 2016[11]	n=16583 Fallers (n=411) Non-fallers (n=14205)	Effect of falls on social participation (binary variable based on if they reported performing at least one activity from a prespecifed list of activities)  Model 2 adjusted by time, age, sociodemographic variables and health indicators:  OR, 0.86 [95% CI, 0.76-0.89] (p<0.001)  Model 3 added adjustment for frailty: OR, 0.95 [95% CI, 0.89-1.02] The interaction between initial frailty status and falling was significant (Table 4, Model 7a).  Contrast analyses revealed that the probability of social participation was less among frail people than among people who did not meet any of the frailty criteria in both fallers (χ2 (1)=6.93;p<0.01) and non-fallers (χ2 (1)=41.21; p<0.001)	"Falling significantly decreased the probatility of social participation in each of these activities and of participation is least one of them, but only before frailty was introduced into the possible (Table 3, Models 2 and 3). Frailty is indeed a strong confounce the relationship between falls and social participation. When it is the property of the relationship between falls and social participation. When it is the property of the effect formal ling decreased and was no longer significant."  "Then, we demonstrated the major role of frailty in the relationship between falling and social participation. The construction of the frailty phenotype (Fried et al., 2001; Santos-Eggmanni et al., 2009) was based on its physical component. In this manner frailty and falling were very close constructs. They shared similar risk factors, such as mobility disorders or bone density, and they had similar consequences in terms of disability or mortality. Moreover, we showed that they had similar consequences in terms of social participation. Thus, it may be difficult to distinguish between the two concepts and to incentify a specific impact of falling (Nowak & Hubbard, 2009). However, our analyses showed that the continuity in or disengagement from special activities was due to a long-term process that was amplified by lealth-events, rather than by the falls themselves."
Yu, 2020[12]	n=4680	Relationship between number of falls and loneliness over 3 time-points (3 item UCLA Loneliness Scale)  Regression coefficient = 0.008, SE = 0.04, p = 0.048;	"Only the number of falls was significantly conceiled with the loneliness score in the next time point, and more frequent loneliness at the previous wave predicts an increased number of falls in a years [] The results suggest that a vicious circle relationship exists between loneliness and falls. [] An increased number of falls also predicted more frequent loneliness in 4 years. These findings support exidence reported in cross-

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			Wave 1-2: $\beta$ =0.030, Wave 2-3: $\beta$ = 0.068	sectional studies that the occurrence of falls was related to social exclusion. [] Older adults who have fallen more frequently might choose to avoid risky activities such as going outside of the home and engaging in social activities. This could lead that discrepancy in desired and actual social engagement, which in turn	
	Hajek, 2020[13]	n=8836  In total, 669 individuals changed fear of falling (FOF) status from wave 5 to wave 6. More specifically, while the onset of FOF occurred in 431 individuals, the end of FOF occurred in 238 individuals.	Relationship between fear of falling and loneliness (Bude and Lantermann scale)  Onset of FOF β=0.02, SE=0.02, p=NR End of FOF β=-0.06, SE=0.03, p<0.05  Relationship between fear of falling and social isolation (De Jong Gierveld Loneliness Scale)  Onset of FOF β=0.06, SE=0.03, p<0.1 End of FOF β=0.01, SE=0.04, p=NR	results in more frequent experience of longlings."  "The end of FOF was associated with red	
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Appendix 6: C	ross-sectiona	al studies reporting on falls and social isol	pen cted by copyright, including the lation/loneliness (n=11)
Author, Year	Sample	Results	Text description/ interpretation of findings 6
Finn, 2001[14]	n=49	Social Resources (OARS Social Support Scale)  Fallers (n=25) Mean: 2.4 (SD, 1) Non-Fallers (n=24) Mean: 2.0 (SD, 0.78)  p = 0.59	"The data from the present study supports the conclusion that the social resources of nursing home residents are the same, regardless of a history of falls that does not change their level of rewous functioning. Most nursing home residents are already in a position where they have to rely on others to come to them for visits, outing the community-based elderly individuals most like ing home residents do not have the means or capabilities to visit other was are not in their immediate environment. Therefore, regardless of fall-history the social resources available to nursing home residents on others."
Stel, 2004[2]	n=204	Relationship between falls inside and decline in social activities because of a fall  OR: 2.6 (95% CI: 1.1-6.5); p<0.05	"A decline in social activities after falling ignificantly associated with falls inside. The current study shows distributed also have consequences on the level of functioning and the people: respondents reported a decline in functional status (35) and people and activities outside the house (16.7%) and people activities (15.2%) as a direct consequence of the last fall."
Nicholson, 2005[15]	n=68	Relationship between injurious falls and social isolation (Lubben Social Network Scale)  Social isolation $\rho$ = -0.4; $p$ <0.05  Female $\rho$ = -0.5; $\rho$ =0.01  Family Sub Scale of Social Isolation $\rho$ = -0.2; $\rho$ =0.12	"Results suggest that there is a strong positive relationship between injurious falls and social isolation. Result from this sample suggest that there is an association between lower scores of the LSNS and higher number of injurious falls, which means that increased injurious falls are related to increased social isolation. In the findings for this sample it appears that there may be some direct link between injurious falls and social isolation.  Gender appeared to play a role when examining H4. Males as a group d not show a significant relationship between number of injurious falls and social isolation. The relationship for females as a group was positive and significant. This female sample showed a significant relation coefficient (see Table 4). This suggests that intrious falls may trigger some direct link to social isolation in females. The suggests that in the social isolation (see Table 3). It is possible that as the participant continues to have injurious falls and becomes less likely to leave the house due to affear of future injurious falls, he/she will eventually become socially is lated. This is not necessarily the case when families are involved:  Output  Description:

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					byrigh:	2022-0
			Friend Sub Scale of Social Isolation ρ= -0.43; p<0.05	"On the other hand, in the case of the frie correlation between injurious falls and so number of injurious falls was associated visolation. A possible explanation for this phenomenon with family and social isolatincreasing injurious falls may become more thus losing contact with friends. Friends of around the same age as the participant and amount of visits to the participant to make participant suffers as a result of being hor	including for the second of the control of the cont	isolation, such that a greater a greater degree of social of the opposite of the greater than a greater degree of social of the opposite of th
	Iliffe, 2007[16]	n=3139	Falls and social isolation (Lubben social network scale) Socially isolated (n=368) 13.6% reported multiple falls in the past 12 months Not socially isolated (n=2133) 10.7% reported multiple falls in the past 12 months p=0.11	Multivariate analysis taking into account associations shows a different pattern. The to be associated with depressed mood and memory impairment and perceived poor leassociated. For the other factors [multiple hypothesis, no significant associations in analyses were found.		sof social isolation appears alone, while male sex, he may be weakly
•	Van Lankveld, 2011[17]	n=154	Relationship of falls with loneliness (De Jong Gierveld Loneliness scale) Correlation coefficient = 0.14 p=not significant	"Health status indicators were unrelated to functioning, and showed low to moderate health hazards."	grela grand simi	ations with the remaining
	Schnittger, 2012[18]	n=579	Association between history of falls and pathways of loneliness  Emotional loneliness (de Jong-Gierveld Loneliness Scale) Correlation coefficient=0.134 p<0.003  Social loneliness (de Jong-Gierveld Loneliness Scale) Correlation coefficient=0.09 p=not significant	"Interestingly, social support was the only variable, falls history, emerged in the fina relative importance of health factors compthe loneliness models"	<b>\$</b> m	odel; this may indicate the

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		Social support (Lubben Social Network Scale) Correlation coefficient= -0.247 p<0.003	062124 on 29 tht, including f
Quach, 2016[19]	n=8464  No falls group (n=5249) One fall group (n=1352) At least two falls group (n=1863)	Social Relationship Index [mean (SD)]  No falls: 3.34 (1.32) One fall: 3.24 (1.35) At least two falls: 3.08 (1.35) p<0.0001  Note: this is a cohort study, but the outcomes relevant to our review question are from a cross-sectional survey given to participants at baseline	"Respondents who fell had a higher prevatence of clinically significant depression symptoms, were more often not married, had fewer good friends living in their neighborhood, were respondents who attend religious services or to be a volunteer, and were less that y to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood to have perceived support from friends or relatives, when neighborhood from the friends of
Hajek, 2017[20]	n=7808	Variables associated with history of falls  Social exclusion (Bude and Lantermann scale) $\beta$ =0.08; SE, -0.02; p<0.001  Loneliness (De Jong Gierveld Loneliness Scale) $\beta$ =0.08; SE, -0.02; p<0.001	Controlling for potential confounders, linear gression analysis showed that reporting a fall in the previous 12 most as associated with higher social exclusion scores ( $\beta$ = .08, p < .001) and higher loneliness scores ( $\beta$ = .08, p < .001). Contrarily, reporting a fall in the preceding 12 months was not associated with the number of important people in regular contact.
Robins, 2018[21]	n=245	Relationship between falls and social isolation (Friendship Scale for social isolation) OR 1.03 (95% CI: 0.66-1.62); p=0.9	No statistically significant association reparted between experiencing a fall in the past 12 months and social isolation. Line 11, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20
Faria, 2020[22]	n=48	Relationship between falls and loneliness (UCLA scale) p=0.384	No statistically significant association reported between experiencing a fall in the past 6 months and loneliness

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Vanden	n=113	Variables associated with risk of falls	"Regarding the PROMIS questionnaire, low associations were found
Wyngaert,			between measures of the risk of falls and the appreciation of participation
2020[23]		Ability to participate in social roles and	in social roles and activities on the one hand ( $\mathbf{k}2 = 0.11$ ), and depression
		activities	on the other (R2 = $0.08$ )"
		(PROMIS questionnaire)	9
		$R^2=0.11; p=0.01$	"Remarkably, the risk of falls on itself was identified as a determinant of
		•	difficulties on psycho-social well-being (in pression and social
		Depression	isolation) and of objective health utility [ $\frac{1}{6}$ $\frac{1}{6}$
		$R^2$ =0.08; p=0.01	difficulties on psycho-social well-being (in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and an increased risk of falls and an increased risk of falls and their outdoor social activities, resulting in the resulting in the resulting in the resulting in the resulting activities as a determinant of difficulties on psycho-social well-being (in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation) and of objective health utility [in Theorems and social isolation i
		, ,	their outdoor social activities resulting in the part of the part
			of social contact to less stimulating activities of a phone call rather
			than a rendezvous point), promoting the rest impairments in mental
			health and depression"
			than a rendezvous point), promoting the right of impairments in mental health and depression"  The promoting the right of impairments in mental health and depression and data mining, and similar technologies.  Al training, and similar technologies.
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Appendix 7: Cross-sectional studies reporting on fear of falling and activity restriction due to fear of falling (N=15)

Author, Year	Sample	Results	Text description/ interpretation of find pgs ₹
Tinetti, 1994[24]	n=1103	Fear of falling (Falls Efficacy Scale – modified so low score corresponds with low confidence or greater fear) Fallers Mean, 79.8 (SD 23.4) Non-fallers Mean, 88.1 (SD 17.9)  p < .0001  Activity restriction because of fear of falling Fallers = 24% Non-fallers = 15% chi-square= 13.1; p < 0.001	In order to examine the impact of recent falls, we also determined the proportion of subjects reporting fear and the mean fall-related efficacy scores separately for subjects who did and did not experience a fall in the year prior to the interview. The proportion of subjects reporting a decrease in activity because of fear of falls was 24% among fallers vs 15% among non-fallers (chi-square= 13.1 and 88.1 (SD 17.9) among fallers and non-fallers, respectively (p < Downloaded from http://dx.doi.org/10.100/1
Howland, 1998[25]	n=266	Relationship between falls and fear of falling OR: 2.498 (95% CI: 1.013-6.159); p=0.05  Relationship between falls and activity curtailment among those afraid of falling OR: 1.094 (95% CI: 0.376-3.177); p=0.869  Relationship between social support and activity curtailment among those afraid of falling (Social Support Scale) OR: 1.574 (95% CI: 1.082-2.290); p=0.018 Note: Here a higher social support score indicates lower levels of social support	"The contribution of personal falls experience to fear of falling was apparent. Those who suffered a previous fall were more likely to have a fear of falling."  "Surprisingly, neither the degree of fear of falling nor the experience of falls was associated with activity restriction. This finding suggests that activity curtailment is not just associated with extreme levels of fear. The presence of social support was, however, important. Those who could rely on others or talk with friends about farling were least likely to report activity curtailment. Thus, support of family and friends may be an important prerequisite for continuing to remain active even in the face of fear of falling. This support may serve as butter to the potentially debilitating consequences of fear of falling. It is possible this support is manifested as encouragement for remaining active."  "Those who curtailed activities [] did not differ with respect to social integration but were significantly (p = .024) less likely to be able to rely on friends or relatives in times of crisis (social support)"
Murphy, 2002[1]	n=1064	Variables independently associated with activity restriction in participants with fear of falling	"We found that a history of an injurious fall within the past year, slow timed physical performance, two or more chrokic conditions, and

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		Injurious fall Adjusted relative risk (ARR): 1.36 (95% CI, 1.11-1.66); p=0.003  Two or more chronic conditions ARR: 1.34 (95% CI, 1.08-1.65); p=0.007  Slow-timed physical performance	depressive symptoms were all independently associated with activity restriction."  24 on 29 September 2022.  Enseigneme estrelated to the control of the con
Apikomonkon, 2003[26]	n=546	ARR: 1.44 (95% CI, 1.18-1.75); p=0.0004  Relationship between falls and activity restriction  Chi-square=5.49, p<0.05	"Compared with non-fallers, the older person with falls experiences were more likely to have activity restriction \$25% vs 16%). The Chisquare test indicated that fall history was activity restriction measured by dichotomous questions.
		Relationship between fear of falling and activity restriction Chi-square=23.27, p<0.001	"Older people with FOF were more likely to restriction (26% vs 10%). The FOF using the SAFE To restrict was significantly associated with activity restriction as measured by dichotomous question."
Gagnon, 2005[3]	n=105	Variables associated with fear of falling (Comparing subjects with no/slight fear and subjects with moderate/severe fear)  Social support (confiding-relationships component of the Bedford Life Events and Difficulties Schedule modified for elderly subjects)  Wald chi-square= 3.77; p=0.05	"The following secondary independent variables were significantly associated with categorical fear of falling dizzeness (Wald chi-square 6.58; p 0.01), total number of medications (Wald chi-square 5.40; p 0.02), and social support (Wald chi-square 3.77; p 0.05). (Note: Higher scores mean less support.)"
Zijlstra, 2007[27]	n=4376	Variables significantly associated with avoidance of activity due to fear of falling  Multiple falls in past 6 months OR: 1.97 (95% CI, 1.52-2.54)	"When fear of falling was added as an ada tional variable (model 3; Table 3), odds ratios of all variables that showed significance in model 2 decreased. Nevertheless, the association for the highest age group (≥80 years), fair and poor perceived general health and multiple falls with avoidance of activities remained statistically significant.  Our findings regarding avoidance of activity remained fairly similar when fear of falling was entered into the logis to model. Although

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		Aged 80 years or older OR: 1.56 (95% CI, 1.24-1.95)  Fair perceived general health OR: 2.92 (95% CI, 2.43-3.52)  Poor perceived general health OR: 5.7 (95% CI, 3.57-9.12)	strongly associated with avoidance of activity wigher age (≥80 years), fair and poor perceived health and multipe falls remained independently associated with avoidance of activity in community-living older people. This implies that interventions aimed at reducing avoidance of activity should not focus on fear of falling alone, but on other modifiable factors, like falls, as well"
Iliffe, 2007[16]	n=3139	Relationship between fear of falling and social isolation (Lubben Social Network Scale)  OR: 1.21 (95%CI, 0.88-1.65)	Multivariate analysis taking into account associations shows a different pattern. The second isolation appears to be associated with depressed mood and all and all and all and associated. For the other factors [(fear of all and be associated)] listed in the second hypothesis, no significant associations in bit made analyses were found.
Curcio, 2009[4]	n=1668	Variables associated with activity restriction related to fear of falling  At least 1 fall in past year OR: 1.48 (95% CI, 1.18-1.86); p=0.001  Low social participation OR: 1.52 (95% CI, 1.20-1.92); p<0.01  Poor perceived health OR: 1.38 (95% CI, 1.06-1.79)	"Table 3 shows the bivariate relationships between activity restriction related to fear of falling and psychosocial actors. Activity restriction related to fear of falling had a strong bivariate association with poor perceived health, depression, low social participation, and poor life satisfaction."  "A second model was then constructed with the psychosocial associated factors and other clinical and functional covariates (see Table 4). After adjustment, functional and clinical factors remained independently associated with activity restriction related to fear of falling. Only depression and poor perceived health variables comerged as independent factors."
		Difficulties in activities of daily living OR: 1.65 (95% CI, 1.16-2.32)  Decreased physical activity OR: 1.35 (95% CI, 1.06-1.70)	"logistic regression analyses for activity restriction related to fear of falling. In the first model, 19 demographic, functional, and health-related variables with p values less than .05 derived from the bivariate analysis were entered into the logistic regression as independent variables.  Difficulties in ADL, decreased physical activity, polypharmacy, and

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Kara, 2009[28]	n=47	Polypharmacy OR: 1.56 (95%CI, 1.14-2.14)  Below poverty level OR: 1.32 (95%CI, 1.05-1.65)  Relationship between fear of falling and loneliness (Philadelphia Geriatric Center Morale Scale) p= 0.258; p=Not significant	extreme poverty were independently associated with activity restriction related to fear of falling. A second model was then constructed with the psychosocial associated factors and other linical and functional covariates (see Table 4). After adjustment functional and clinical factors remained independently associated with activity restriction related to fear of falling."  When the correlation between the fear of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was and the subscales of the Philadelphia Geriatric Center Morale Scatter was an additional center was an additional center was an additional center was an additional center w
Dias, 2011[5]	n=113	Variables associated with activity restriction due to fear of falling (compared to no FOF or FOF alone)  Fear of falling intensity Mean 3.4 (SD, 0.9); p<0.0  Depression Chi-square=15.2, p=0.004  Exhaustion Chi-square=9.2, p=0.01  Participation in social activities Chi-square=10.4, p=0.016	"The three groups were statistically different to FOF evaluated using the question about fear intensity. The group that reported FOF and activity restriction demonstrated higher leading of fear when compared with the other groups"  "The variables that best discriminated the group of fear when compared with the other groups"  "The variables that best discriminated the group of fear when compared with the other groups"  "The variables that best discriminated the group of fear when compared with the other groups"  "The variables that best discriminated the group of fear when compared with the other groups"  "The variables that best discriminated the group of fear when compared with the other group of fear when compared to the diagram (Figure 1). For the grouping obtained through the Chi-square Automatic Interaction Detection (CHAID) method, it may be observed that the first distinctive characteristic was group on the chiracteristic using GDS. Those with positive symptoms for group of falling.  Additionally, the presence of depressive symptoms seems to modulate the factors that are associated with activity restriction due to fear of falling. A greater risk for depression has been associated with inadequate evaluation of coping self-efficacy in stressful events of life. It is worth noting that the participants of the present group who restricted activities by FOF showed lower self-efficacy in relation to the other participants. Thus, it is possible that elders with depressive symptoms perceive them selves less capable of performing certain gasks and, because of that, restrict their activities.  Out of the elders that did not have depressive symptoms, those who had positive result for exhaustion of the frailty phenotype had 78% chance of restricting activities due to fear of falling."  "Out of the ones who did not show positive result for exhaustion, the other distinctive characteristic was participation in social activities.

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Mendes da Costa, 2012[29]	n=501	Relationship between activity restriction due to fear of falling and number of falls in past 12 months  2 or more falls	Participation in social activities was the last discriminatory factor for the studied sample; however this variable did not wow association with activity restriction in the bivariate analysis. It is possible that this difference in relation to the participation is social activities only occurs for a subgroup and not for the whole sample. "The with age and with the number of falls within the past 12 months, with the past 12 months, and the properties of the subjects who did not fall. In the log the past 12 months, and the past 12 months are the past 12 months. The past 12 months are the past 12 months are the past 12 months are the past 12 months. The past 12 months are the past 12 months are the past 12 months are the past 12 months. The past 12 months are the past 12 months are the past 12 months are the past 12 months. The past 12 months are the past 12 month
Choi,	n=4247	OR, 3.04 (95% CI, 1.70-5.42)  1 fall OR, 1.33 (95% CI, 0.66-2.68)  Relationship between falls and fear-	Ont Superious Characteristics independently associated
2015[30]	11—4247	induced activity restriction  Previous fall experiences OR, 2.12 [95% CI, 0.96-4.67] p=0.062 Injurious falls OR, 3.03 [95% CI, 1.21-7.54] p=0.008	restriction were low socioeconomic status with activities of daily living, and bistory of injurious falls.  Al training, and bistory of injurious falls.
Ferreira, 2018[31]	n=7935	Relationship between fear of falling because of sidewalk defects and social participation OR 1.01 (95% CI: 0.99-1.04)	"As in the univariate analysis, the fear of malling because of defects in sidewalks and the perception of violence associated with social participation."
Petrinec, 2020[32]	n=108	Relationship between fear of falling and social functioning (Medical Outcomes Study 36-item Short-Form General Health Survey) $\beta$ = -0.29	"Fear of falls was an independent predictor for ole physical, physical functioning, and social functioning."  2025  at A 96
Merchant, 2020[7]	n=493	Variables associated with fear of falling alone  Number of falls	"The multivariate logistics regression in Table 2 shows that female sex (OR = 3.54; 95% CI = 1.82–6.90), number of edications (OR = 1.28; 95% CI = 1.03–13.60), prefrail or frail (OR = $\frac{1}{1000}$ 17; 95% CI = 1.26–3.73), depression (OR = 4.90; 95% CI = 1.06–22.67) and number of falls in the

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OR, 2.13 (95% CI, 1.20-3.78) p < 0.05

Social isolation

OR, 0.99 (95% CI, 0.51-1.89) p=not significant

Variables associated with fear of falling + fear-based activity restriction

Number of falls

OR, 1.4 (95% CI, 0.94–2.20) p=not significant

Social isolation

OR, 1.7 (95% CI, 0.82–3.55) p=not significant

Sarcopenia OR, 8.13 (95% CI, 1.52–43.41) past 12 months (OR = 2.13; 95% CI = 1.20–3.28) were significantly associated with FOF. Only sarcopenia (OR = 13; 95% CI = 1.52– 43.41) and depression (OR = 5.17; 95%  $(\frac{1}{8}) = \frac{1}{9}$ 84–14.54) were significantly associated with FOF + FAR

"History of falling is a well-known risk for FOF and/or FAR as persons who have experienced falls are more likely to develop fear. However, three-quarters of those with FO FOF + FAR had never experienced a fall a study"

"Social isolation is another factor that is polity studied. In our study, one in three older adults with FOF + FAR a risk of social isolation compared with one in five with no FOF" a risk of social isolation compared with one in five with no FOF and/or FAR in both univariate and multivariate analysis."

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Annendix 8: 1	Relevant findings fr	om qualitative studies (n=7)
Author, Year	Qualitative analysis approach,	Results C 4 on
Ward-Griffin, 2004[33]	Phenomenological approach n=9	"Restricting activities was a second strategy identified by the participants, which involved avoiding certain social activities or/and physical environments. Participants used this strategy when they wanted to "play it safe" in times of inclement weather or in situations where ambulation might be difficult. Possibly used the conditions seemed to heighten their awareness and fear of falling. As Sarah explained, "I do not all alling, except around steps. They terrify me to death [along with] scaffolding around the town—that bother has bothers me. And I am restricted to the house when there's fresh sales won the ground." Similarly
Meric, 2007[34]	Analysis approach not reported n=22	Wilfred stated, "When it's really, really icy, and I don't have to go out, I don't drive to go out either."  "After having a falling experience, elderly individuals had behavioral changes, where creased the competency of achieving daily life activities, such as staying away from the crowded environments to going outside alone, acting very slowly, not able to do daily activities alone:  " I can't go out anymore. I haven't been out alone for 2 years, there are always people to to me." (75; woman).  " I take my man's arm on the street, I can't get out much in case I fall into the street." woman)."
Schmid, 2009[35]	Latent content analysis n=42	"Quotes regarding the subsequent consequences of poststroke falls categorized interest following three themes:  (1) limiting activity and participation, (2) increasing dependence, and (3) developing the far of falling"  "Limiting activity: Because falling became common for some participants, talk about interest for the prevention of future falls was common and emerged naturally during interviews. A significant confequence was the choice to limit everyday life activities at home and in the community to help manage and preventialls"  "Increasing dependence: Participants discussed their dependence on assistive devices such as walkers, canes, and wheelchairs to reduce falls and feel secure in their environment. Some participants indicated use of the furniture, walls, or people as alternative assistive devices. Many discussed dependence on care for maintaining balance and preventing falls. Participants easily became isolated because they were fearful to leave their home, and some were even fearful to move about their own home, becoming increasingly dependent."  "Developing fear of falling: This initial experience of falling with stroke onset was a raumatic event that consequently resulted in participants expressing fear that future falls would mean having mother stroke. They also discussed the subsequent development of fear of falling and the fear of being left of the floor for hours at a time. Participants described genuine fear of falling and fear about being hurt as well as the subsequent impact on function and independence. Some participants discussed falls becoming a frequent event and a common and pervasive concern; fear, worry, and concern became a daily consequence of poststroke falls. Some participants were fearful that they would fall while out in the community and addressed the embarressment of a public fall. They were concerned about how they looked while walking around and seemed to be were red about the stigma.
		related to falls and decreased mobility. Managing falls and fear of falling in everyday life became an important aspect of poststroke adjustment."

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Faes, 2010[36]	Grounded theory approach n=10	"Patients described social withdrawal and attributed this to their fear of falling and the capabilities after falling. Patients recognised that they became (more) dependent on their caregiver after falling. One patient experienced social benefits from her fall, since she now receives more attention from her children"  "P#1 I can't travel anymore because of my limited mobility. I injured my leg in a fall of their caregiver after falling.  P#4 I stay at home more often and don't visit my friends anymore. I am afraid to fall their caregiver after falling.  P#5 My grandson is almost one year old. I still haven't seen his room. His room is up their caregiver after falling.  "Furthermore, our findings confirmed the consequences of falls in cognitively unimpring older persons that are mentioned in the literature; these include a fear of falling and social withdrawal discrete the fear of falling and physical limitations"
Chiu, 2011[37]	Focussed ethnographic approach n=18	"Following their initial fall, it appeared that changes occurred in individuals' independently by the help from —hourly maids during the rehabilitation period or for longer, recreational activities usually were soon discontinued. Mah-Jong, one of the most popular tile games among Chinese were not tioned by 12 respondents as a favourite pass time. Other social activities mentioned included Cantonese opera, who teering within their communities, and dim sum with friends. After a fall, these activities were interrupted two main reasons: 1) lack of transportation means and 2) lower mobility capabilities. Feelings of loneliness coses as the respondents felt that they were cut off from their friends."  "Intuitive changes included modifications made to personal behaviours. Avoidance behaviour was reported as an intuitive change. Specifically, fallers would avoid outdoor activities. Other intuitive changes include being more careful ("taking care") when walking and slowing down."
Host, 2011[38]	Phenomenographic approach n=14	"Others stopped doing certain activities to avoid falling and they did not choose activities that made them scared and nervous and caused bodily pain. They thus perceived that physical activity was not good and therefore stopped the activity. The families and the general practitioner (GP) supported their conversely, some felt that it was a loss if they had to stop activities they had enjoyed because it increased their sk of falling."  "Fall accidents had implications for older people's identity and autonomy, and the context of participation in fall-prevention activities was not always welcomed because it placed the respondents in a context in which they did not like to see themselves."  "For others, support from professionals was important in how they coped with falls and their prevention. The GP was a good support when they needed knowledge about appropriate and applicable preventive activities."
Xu, 2019[39]	Thematic analysis n=17	Identified theme of restricted mobility and social participation.

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"Stroke participants felt that they were restricted after the fall, particularly around their mobility functions and degree of social participation."	pyrigh <u>t</u> hav	no 22 22 25 26 27 27 27 27 27
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## Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			ONT NOL "
Title	1	Identify the report as a scoping review.	1
ABSTRACT	I		<u> </u>
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	5-6
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	6-7
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Appendix 1
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	8
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	7-8
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	N/A
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Appendix 4-6



SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #			
RESULTS						
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	8; Figure 1			
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8-11; Table 1; Appendix 7			
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	N/A			
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	11-15			
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Table 2			
DISCUSSION						
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	15-16			
Limitations	20	Discuss the limitations of the scoping review process.	17			
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	17			
FUNDING						
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	18			

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

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<sup>\*</sup> Where sources of evidence (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

<sup>†</sup> A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with information sources (see first footnote).

<sup>‡</sup> The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

<sup>§</sup> The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).