

Barriers and facilitating factors influencing implementation of occupational therapy home assessment recommendations: A mixed methods systematic review

Kristie J. Harper^{1,2}  | Kelly McAuliffe¹ | Dave N. Parsons^{2,3}

¹Occupational Therapy Department, Sir Charles Gairdner Hospital, Nedlands, Western Australia, Australia

²Curtin School of Allied Health, Occupational Therapy, Curtin University, Bentley, Western Australia, Australia

³St. John of God Midland Public and Private Hospital, Midland, Western Australia, Australia

Correspondence

Kristie J. Harper, Occupational Therapy Department, Sir Charles Gairdner Hospital, Hospital Avenue, Nedlands, Western Australia 6009, Australia.
Email: kristie.harper@health.wa.gov.au

Abstract

Introduction: Low implementation rates of occupational therapy home assessment recommendations have previously been reported. The objective was to identify and describe the barriers and facilitating factors that influence implementation of home assessment recommendations.

Methods: A mixed methods systematic review consisting of studies involving adults living in the community who received an occupational therapy home assessment was conducted. Seven databases were last searched in August 2021. Study quality was assessed using the Joanna Briggs Institute (JBI) critical appraisal tools (SUMARI) dependent on study design. Data synthesis followed the convergent integrated approach. Findings were mapped to the theoretical Capability Opportunity Motivation Behaviour (COM-B) model of health behaviour change.

Results: From 5,540 citations, 22 articles met the criteria for the systematic review. Implementation of occupational therapy home assessment recommendations ranged between 55% and 90%. Six synthesised findings were identified. Capability barriers included a patient's cognitive and physical ability. Motivation barriers included a perceived lack of need and stigma; patient reported decreased involvement and lack of choice. Opportunity barriers included limited family or carer involvement, carer stress, level of service provision available, including funding, therapy dosage and timing and environmental restrictions. Overall facilitators included patient-centred care, including choice and understanding need, individualised tailored recommendations, involvement of families and carers, provision of written record and strategies to support implementation. Results were limited by methodological weaknesses in identified studies and heterogeneity in the definition and measurement of implementation impacting on comparison. Specific intervention components were often poorly described.

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](https://creativecommons.org/licenses/by-nc/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2022 The Authors. *Australian Occupational Therapy Journal* published by John Wiley & Sons Australia, Ltd on behalf of Occupational Therapy Australia.

Conclusion: The theoretical model elucidates priority factors to address for promoting implementation of home assessment recommendations. Future high-quality research clearly defining intervention components is required to support short- and long-term implementation of recommendations in the home environment. Behaviour change techniques could be utilised to support home assessment practices in future research.

KEYWORDS

adherence, environmental modification, health behaviour change, home assessment, implementation, occupational therapy

1 | INTRODUCTION

Occupational therapists conduct home assessments to identify and facilitate changes needed to improve patients' safety and independence (Clemson et al., 2019; Gitlin et al., 2009). Implementation of recommendations provided during a home assessment is a key determinant of the success of occupational therapy interventions, including home modifications (Hill et al., 2008). Low implementation rates of occupational therapy recommendations following a home assessment are common and well reported in the literature (Day et al., 2002; Nikolaus & Bach, 2003; Pighills et al., 2011). Implementation of recommendations has been reported to drop as low as 50% 12 months after an occupational therapy home assessment (Cumming et al., 2001, 1999). Furthermore, low levels of implementation have been associated with increased falls and an overall decline in the occupational performance in older adults (Clemson et al., 2004; Cumming et al., 2001, 1999; Hill et al., 2008). Failure to institute home assessment recommendations also has potential consequences for hospital resources and government spending on community support programmes.

Enhanced implementation of home recommendations has been observed in older adults with more complex medical conditions and where consumers can agree with and support the need for home modifications or equipment use (Gosselin et al., 1994). Engaging contractors or external agencies to undertake home modifications has reportedly facilitated implementation (Currin et al., 2012). On the other hand, reported barriers to implementation include disagreement of need between older adults or family members and occupational therapists (Devor et al., 1994), reduced patient acceptance of disability or illness (Bridge et al., 2007), or recommendations provided without patient engagement or choice (Atwal et al., 2008). Other causes of poor implementation of recommendations that have been cited include a lack of available social supports, an inability of patients to be

Key Points for Occupational Therapy

- Implementation should be considered when providing patients with home assessment recommendations.
- Barriers and facilitators can be identified by using the COM-B model of health behaviour change.
- Implementation can be enabled with facilitators, including co-design, targeted approach and consideration of supports required.

able to make the recommended changes to the home environment themselves, and the perceived stigma of using assistive aids (Ainsworth & De Jonge, 2011; Bridge et al., 2007; Jones et al., 2008). Despite some studies investigating the drivers for implementation of recommendations, to date, there has been no systematic review of the literature identifying the facilitators and barriers supporting implementation of home assessment recommendations.

A novel way of interpreting the factors impacting implementation of home assessment recommendations is by mapping systematic review findings to the Capability Opportunity Motivation Behaviour (COM-B) model of health behaviour change (Michie et al., 2011; Sanford et al., 2004). The COM-B can frame the factors that influence health behaviour change. The model asserts three patient prerequisites for the performance of volitional behaviours: capability, motivation and opportunity (Michie et al., 2011). In this system, capability, motivation and opportunity interact to generate behaviour, and in the context of this study, interact to influence an adult's decision to implement the home assessment recommendations. Using the COM-B to frame the review's

findings will provide actionable recommendations for occupational therapy clinicians to work with consumers to improve implementation of home assessment recommendations.

A preliminary search of PROSPERO, PubMed the Cochrane Database of Systematic Reviews and JBI Evidence Synthesis was conducted, and no current or underway systematic reviews on the topic were identified. The overall research question was to determine what strategies support implementation of home assessment recommendations in adults (>18 years) or their caregivers who reside in private homes in the community. The objectives of this study were to (1) identify the barriers and facilitators that influence implementation of occupational therapy home assessment recommendations and (2) interpret the results using the COM-B framework to provide recommendations to occupational therapists to improve implementation rates.

2 | METHODS

This systematic review was conducted in accordance with the JBI methodology for systematic reviews of qualitative evidence (Aromataris & Munn, 2017). The systematic review was registered with PROSPERO (registration number CRD42020159233). This review was conducted in accordance with an a priori protocol (Harper et al., 2021) where additional detail can be found. The PRISMA statement guided the methodology and reporting of this systematic review (Page et al., 2021).

2.1 | Search strategy and selection criteria

2.1.1 | Population

This review considered research that included adults (>18 years) and their caregivers living in the community who received an occupational therapy home assessment. Caregivers were defined as individuals who were actively engaged in providing care, including family.

2.1.2 | Intervention

The quantitative component of the review considered studies that evaluated interventions that may include one or many home assessment recommendations. Home assessments could be conducted in the home setting or via tele-rehabilitation (Clemson et al., 2019; Sanford et al., 2004). This review considered all types of home

assessment recommendations and all delivery modalities. Consideration was given to the terms used in studies originating from different countries, that is, implementation, compliance, adherence, uptake, etc.

This review included studies that explored implementation of home assessment recommendations. Home assessment recommendations included the following: (1) assistive or adaptive equipment as a single or stand-alone intervention (e.g., shower chair, grab bar installation, personal alarm and non-slip footwear); (2) material or environmental adaptations (e.g., clearing pathways, non-slip strips on step edge and removal of mats); (3) behavioural adaptations including providing information or education on environmental risks and activity of daily living (ADL) retraining; and (4) structural modifications that aimed to remove barriers to function and improve task performance (e.g., ramps and shower hob removal) (Clemson et al., 2019; Gitlin et al., 2009).

2.1.3 | Phenomena of interest

The qualitative component of this review considered research that investigated barriers and facilitators in relation to implementation of home assessment recommendations. Barriers or facilitators were individual, organisational or contextual factors that impede or facilitate the implementation of home assessment recommendations. The barriers and facilitators identified in this review were further explored through the COM-B model of health behaviour change (Michie et al., 2011).

2.1.4 | Context

The qualitative component of this review considered research that examined home assessment recommendations for adults living in the community in private dwellings. For this review, both indoor and outdoor settings were considered part of the home environment.

2.1.5 | Types of studies

Quantitative studies included both experimental and quasi-experimental study designs, including randomised controlled trials, non-randomised controlled trials and pre-test post-test design. In addition, prospective and retrospective cohort studies, case-control studies and analytical cross-sectional studies were considered for inclusion. Qualitative studies included designs that focused on qualitative data, including but not limited to phenomenology, qualitative descriptive and narrative

research. Mixed methods studies were only considered if data from the quantitative or qualitative components could be clearly extracted.

The search strategy aimed to locate both published and unpublished studies. A three-step search strategy was utilised in this review. First, an initial limited search of PubMed (including Medline) and CINAHL (EBSCO) was undertaken, followed by analysis of the text words contained in the title and abstract and the index terms used to describe the articles. The search strategy, including all identified keywords and index terms, was adapted for each included information source and a second search was undertaken on 31 August, 2021 (Appendix S1). Finally, the reference lists of all studies selected for critical appraisal were screened for additional studies.

2.1.6 | Information sources

Studies published in English only were included. Studies published from January 2000 to the present were included to capture relevant studies over the previous 21 years representing current occupational therapy practice. The databases that were searched included the following: (1) PubMed (including Medline); (2) Embase (OVID); (3) CINAHL (EBSCO); (4) PsycINFO (OVID);

(5) OT Seeker; (6) Emcare (OVID); and (7) Cochrane Central Register of Controlled Trials (CENTRAL). Sources of unpublished studies and grey literature searched included Google Scholar, Open Grey, ProQuest Dissertations and Theses and MedNar.

2.1.7 | Study selection

Following the search, all identified citations were collated and uploaded into Endnote X9 and duplicates removed. Following a pilot test, titles and abstracts were screened by two independent reviewers for assessment against the inclusion criteria. Potentially relevant studies were retrieved in full, and their citation details imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI; JBI, Adelaide, Australia) (Munn et al., 2019). Full-text studies that did not meet the inclusion criteria were excluded and reasons for their exclusion are provided in Figure 1. Any disagreements between the reviewers were resolved through discussion and consensus.

Quantitative and qualitative data were extracted from studies included in the review by two independent reviewers using the standardised JBI data extraction tool in JBI SUMARI (Munn et al., 2019). The reviewers

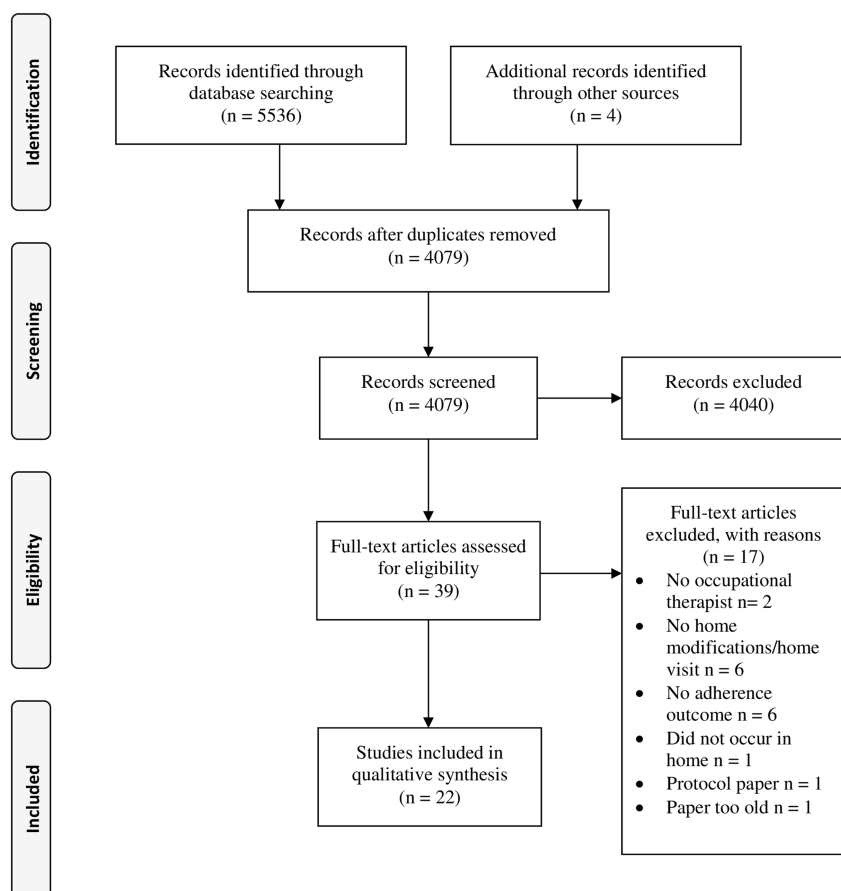


FIGURE 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart including search results, study selection and inclusion process

initially piloted the extraction form. The data extracted included specific details about the populations, study methods, phenomena of interest, context and outcomes of relevance to the review questions. Data extracted included the following: (1) study design, method of data collection and inclusion/exclusion criteria; (2) study setting, geographical location, study follow-up period and sample size; (3) intervention scope, duration, intensity (e.g., nature of assessment, tools utilised and follow-up), professionals involved; (4) method of assessment of implementation (e.g., self-reported via telephone and follow-up home assessment with an occupational therapist); (5) implementation levels; and (6) barriers and facilitators associated with implementation.

2.1.8 | Assessment of methodological quality

Quantitative and qualitative papers (including the relevant components of mixed methods papers) selected for retrieval were assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardised critical appraisal instruments from JBI SUMARI, dependent on study design (Aromataris & Munn, 2017; Munn et al., 2019). The methodological quality of the relevant components of the mixed methods studies was assessed in relation to both the qualitative and quantitative assessment tools. Authors of papers were contacted to request missing or additional data for clarification, where required. The results of critical appraisal were reported in narrative form and in tables. All studies, regardless of the results of their methodological quality, underwent data extraction and synthesis.

2.2 | Analysis

2.2.1 | Data transformation

As the review question can be addressed by both quantitative and qualitative research designs, this review followed a convergent integrated approach according to the JBI methodology for MMSR using JBI SUMARI (Aromataris & Munn, 2017; Munn et al., 2019). This involved data transformation and allowed the reviewers to combine quantitative and qualitative data. Extracted quantitative data were converted into qualitised data (Aromataris & Munn, 2017; Hong et al., 2017; Sandelowski et al., 2013; Stern et al., 2020). This involved transformation of quantitative finding such as rates of implementation of home assessment recommendations into textual descriptions or narrative interpretation of the quantitative results in a way that answered the review questions (Stern et al., 2020).

2.2.2 | Data synthesis and integration

The textual descriptions (qualitised data) from quantitative studies were then assembled and pooled with the qualitative data extracted directly from qualitative studies (Stern et al., 2020). Reviewers then undertook repeated, detailed examination of the assembled data to identify categories on the basis of similarity in meaning (Appendix S3). A set of integrated findings were also mapped to the theoretical (COM-B) model of health behaviour change (Figure 2) (Michie et al., 2011).

3 | RESULTS

The study selection process identified 5,540 articles (Figure 1). Thirty-nine articles underwent full-text assessment. Twenty-two articles met criteria for the systematic review. This included six qualitative studies, nine quantitative studies and seven mixed methods studies.

3.1 | Methodological quality

No articles were excluded due to methodological quality (Appendix S2). Two of the studies were pilot projects (Boman et al., 2007; Gibson et al., 2010) involving convenience samples (Lau et al., 2018; Stark et al., 2009; Taylor et al., 2019). The small sample sizes limited the statistical power of the analyses in two studies (DeForge et al., 2008; Taylor et al., 2019). Most of the studies utilised cohort or experimental designs, often with no control group (Cumming et al., 2001; Currin et al., 2012; DeForge et al., 2008; Stark et al., 2009). One study demonstrated significant selection bias in which 25% of the participants declined to have an occupational therapist visit their home. In the qualitative research, the influence of the researcher on the research or vice versa was often unclear (Bleijlevens et al., 2008; Corcoran & Gitlin, 2001). Additionally, there were different definitions of implementation as some studies used a binary yes or no approach, and others considered partial implementation (Cumming et al., 2001; Currin et al., 2012; Lockwood et al., 2020).

Implementation was also assessed in different ways, with some studies completing follow-up home visits with blinded assessors and others relying on phone calls and patient self-report. Reporting may have been subjected to a social desirability bias and reliant on a patient's recall (DeForge et al., 2008; Gibson et al., 2010; La Grow et al., 2006). In two studies, a single unblinded rater assessed implementation, who was also the treating therapist (Corcoran & Gitlin, 2001; Stark et al., 2009). In another study, the outcomes assessor was not blinded to

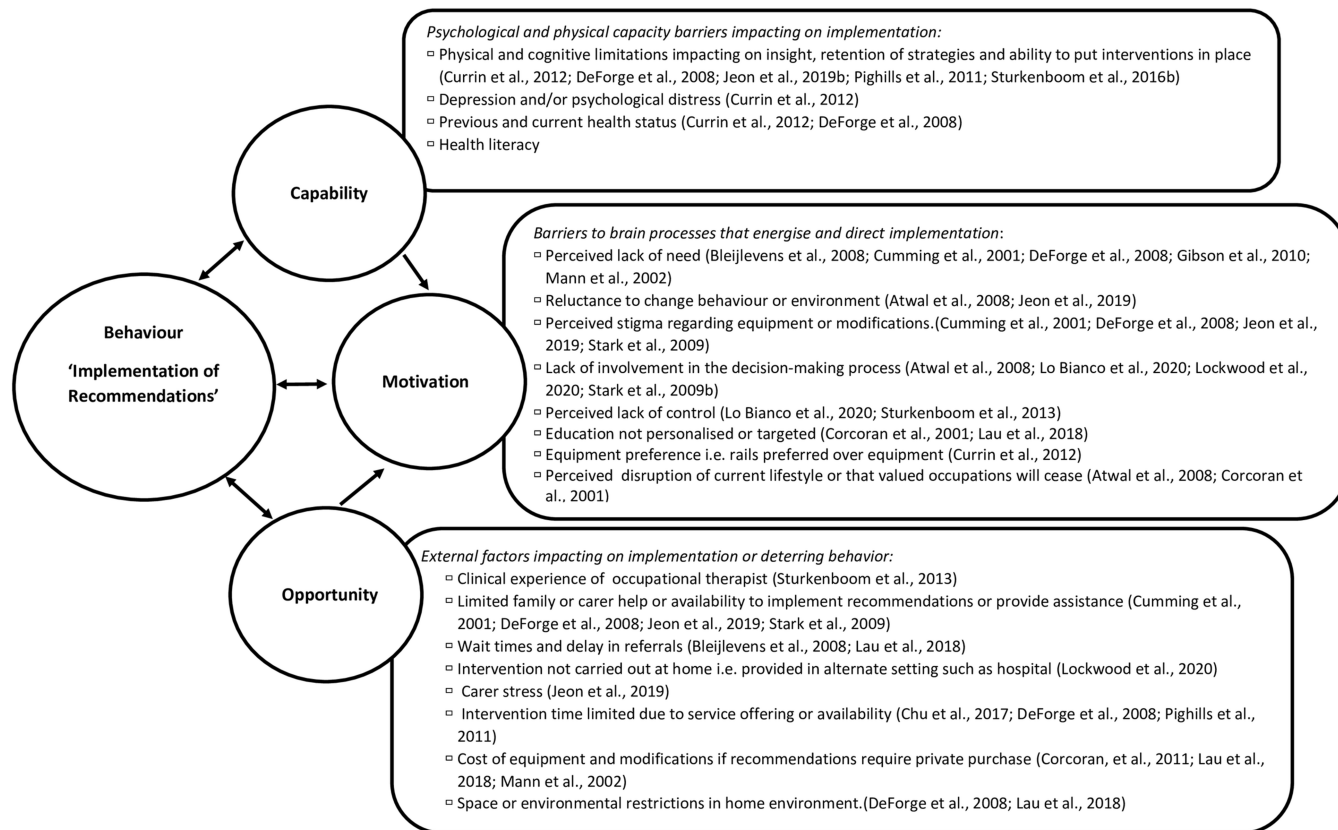


FIGURE 2 Synthesised barriers impacting on implementation of home assessment recommendations mapped to the Capability Opportunity Motivation Behaviour (COM-B) model of health behaviour change (Michie et al., 2011)

randomisation, resulting in another limitation to the study as rater bias may have been inadvertently introduced (Taylor et al., 2019). In all of the randomised controlled trials, allocation to treatment groups was not concealed, and those delivering treatment were not blinded to treatment assignment (Chu et al., 2017; Jeon et al., 2019; La Grow et al., 2006; Lockwood et al., 2020; Nikolaus & Bach, 2003; Pighills et al., 2011; Sturkenboom et al., 2013; Szanton et al., 2011; Taylor et al., 2019). Additionally, participants were not blinded to treatment assignment (Jeon et al., 2019; Lockwood et al., 2020; Nikolaus & Bach, 2003; Pighills et al., 2011). In one study, there was a significant loss of patients at the 2 year follow-up (Stark et al., 2009).

3.2 | Characteristics of included studies

Table 1 highlights the descriptive data from the studies for systematic review. Of the 22 studies, the majority were completed in Australia ($n = 5$), the United States of America ($n = 5$), the Netherlands ($n = 3$) and the United Kingdom ($n = 2$). All studies were published between 2001 and 2020. The mean age varied from 36.5 to 89.2 years, and sample sizes varied from 8 to

873 participants. Seven studies focused on patients aged 65 years and over, and eight studies excluded patients with severe cognitive impairment.

3.3 | Occupational therapy home assessments and interventions

Studies included a broad range of assessment tools (Table 2), including the Canadian Occupational Performance Measure (COPM), Spector-Katz Index, Timed Up and Go (TUG), Functional Independence Measure (FIM) and the Assessment of Motor and Process Scale (AMPS). Forty seven percent of interventional studies utilised a standardised home safety assessment (Chu et al., 2017; La Grow et al., 2006; Lau et al., 2018; Lockwood et al., 2020; Pighills et al., 2011). The intervention approaches described in the studies are outlined in Table 2. The intervention scope, duration and intensity varied significantly. Studies ranged from providing a one off home visit (Bleijlevens et al., 2008), to a home visit with written recommendations, (La Grow et al., 2006; Lau et al., 2018) to five 90 min home visits working with carers for patients with dementia (Corcoran & Gitlin, 2001), and 12 home visits over a 4 month period

TABLE 1 Study characteristics

Study	Study design	Location	Inclusion criteria	Participant description	Sample size
Atwal et al. (2008)	Qualitative	The United Kingdom	≥65 year adults and their carers who attended an occupational therapy pre-discharge home visit, who are able to consent to participate.	Mean age: 86.5 (SD 6.9) Gender: 60% female	<i>n</i> = 22 semi-structured interviews (<i>n</i> = 15 older adults, <i>n</i> = 7 carers)
Boman et al. (2007)	Mixed methodology	Stockholm, Sweden	Adults with acquired brain injury with poor to moderate memory impairments, independent or in need of minimal assistance for self-care, no other major cognitive impairments, such as aphasia, or spatial or visual impairments.	Median age: 36.5 (SD 6.0)	<i>n</i> = 8
Bleijlevens et al. (2008)	Randomised controlled trial with process evaluation	The Netherlands	>65 year adults, community dwelling, visited an ED due to a fall, not permanently bedridden or fully dependent on a wheelchair, able to complete questionnaires or interviews by telephone.	Not provided	<i>n</i> = 166, with 117 receiving an occupational therapy home assessment
Chu et al. (2017)	Single-blind RCT	Hong Kong (multisite)	≥65 years adults, community dwelling, ambulatory (with or without aid), presented to ED due to fall, able to provide consent, Mini-Mental State Examination (MMSE) score <15.	Mean age: 78.6 Males: 31.6% Full-time carer: 49.5% Live alone 25.3% MMSE mean score: 20	<i>n</i> = 204
Corcoran (2001)	Mixed methods	Philadelphia	Family caregivers providing care for a person with a diagnosis of dementia with moderate impairment.	Caregiver mean age: 59.3 primarily caring for non-spouse Gender: 73% female	<i>n</i> = 100
Cumming et al. (2001)	RCT	Australia	≥65 year, lived in the community, patients with cognitive impairment were included if they lived with a caregiver. Inpatients were not eligible if a home visit was planned as part of their usual care.	Mean age: 77.0 (SD 7.1) Gender: 56% female 39% reported one or more fall before recruitment.	<i>n</i> = 264

(Continues)

TABLE 1 (Continued)

Study	Study design	Location	Inclusion criteria	Participant description	Sample size
Currin et al. (2012)	Cohort nested within a randomised controlled trial	Australia	>60 years of age, were able to complete a Timed Up and Go Test, were assessed as being physically and cognitively able to complete a rehabilitation programme, had a recent fall, poor balance and/or functional decline or from the ED of three local hospitals after presentation for a fall not requiring hospital admission. The cohort for this study was participants who received at least one recommendation following an environmental audit by an occupational therapist.	Mean age: 79.2 (SD 7.6) Gender: 70% female Live alone: 42.5%	<i>n</i> = 80 63 of these were followed up to assess implementation
DeForge et al. (2008)	Quasi-Experimental Study	London, Ontario, Canada	Hospital inpatients or their family caregivers receiving care on a musculoskeletal unit.	Mean age: 79.1 (SD 9.6) Gender: 62% female	<i>n</i> = 92
Gibson et al. (2010)	Quasi-Experimental	Western United States	Sample contained both individuals who had never fallen and individuals with a history of one or more falls.	Mean age: 75.2 (SD 7.4) Gender: 83% female.	<i>n</i> = 120
Jeon et al. (2019)	Parallel-group randomised controlled pilot trial Additional: qualitative enquiry of the intervention group	Sydney, Australia	≥60 years, have a mild cognitive impairment or early/moderate dementia, difficulty with ≥1 basic ADL and/or ≥2 IADL, stand with or without assistance, live within 25 km central Sydney, have conversational English, carer at least 4 days or 7 h/week, not currently receiving in home rehab, had not received a home visit in last 12 months, no terminal diagnosis (<1 year survival) or active cancer treatment, did not plan to move in < 1 year, not on cholinesterase inhibitor (and/or memantine) for <3 months.	Mean age: 79.0 Gender: 50% males	<i>n</i> = 18

(Continues)

TABLE 1 (Continued)

Study	Study design	Location	Inclusion criteria	Participant description	Sample size
La Grow et al. (2006)	Randomised controlled trial	New Zealand – Dunedin and Auckland	≥75 years, had a distant visual acuity of 6/24 m or worse in the better eye after the best possible correction, lived in the community, were ambulant, understood the requirements of the trial.	Demographics not described	<i>n</i> = 390
Lau et al. (2018)	Concurrent nested mixed-method design	Australia	≥18 years, proficient in English, intact cognition, lives in private owned residence, received a home visit and home modifications by an occupational therapist.	Mean age: 79.8 (<i>SD</i> 2.4) Gender: 60% female	<i>n</i> = 10
Lo Bianco et al. (2020)	Qualitative	Australia	Stakeholders within the contexts of aging in place including industry professionals and older adults who had received prior falls prevention intervention.	Older adults with an age range of 69–92 years. Gender: 60% female.	<i>n</i> = 11 (industry professionals) <i>n</i> = 10 (older adults)
Lockwood et al. (2020)	Process evaluation of a randomised controlled trial	Australia	≥50 years, hip fracture, living in private residence, ≤5 errors on the Short Portable Mental Status Questionnaire	Mean age: 81.3 (<i>SD</i> 7.3) Gender: 74% female	<i>n</i> = 65
Mann et al. (2002)	Longitudinal cohort study	The United States	People receiving services from senior service agencies and hospital rehabilitation programmes	Mean age: 75.6 Gender: 73.8% female	<i>n</i> = 873
Nikolaus and Bach (2003)	Randomised controlled trial	Germany	Older adults who lived at home prior to admission, had multiple chronic conditions or functional decline, could be discharged home, did not have a terminal illness or severe cognitive decline and lived <15 km from home intervention team.	Mean age: 81.5 (<i>SD</i> 6.4) Gender: 73.3% female	<i>n</i> = 360
Pighills et al. (2011)	Pilot three armed randomised controlled trial	The United Kingdom	≥70 years and had a fall in past 12 months, not living in residential or nursing homes and had not received occupational therapy interventions in the preceding year.	Mean age: 79 (<i>SD</i> 6)	<i>n</i> = 238

(Continues)

TABLE 1 (Continued)

Study	Study design	Location	Inclusion criteria	Participant description	Sample size
Stark et al. (2009)	Quasi-experimental design, pre/post/post prospective study	The United States	≥ 60 years, lived within catchment area, ≤ 6 on two or more activities on the telephone version of the Functional Impairment Measure (FIM), <10 on the Short Blessed Memory Orientation and Concentration Test	Mean age: 81.7 (SD 6) Gender: 88% female	<i>n</i> = 77
Sturkenboom et al. (2013)	Process evaluation and exploratory randomised controlled trial	The Netherlands	Idiopathic Parkinson's disease, lived at home, reported difficulties in daily activities relevant for the patient, and had a nonprofessional caregiver who could provide assistance at least twice a week and had not received occupational therapy in the last 12 months, no disabling comorbidity or inability to complete questionnaires (i.e., due to severe cognitive problems), and not participating in another intervention trial.	Intervention: Mean age: 66.7 (SD 11.8) Gender: 30% female Control: Mean age: 68.5 (SD 9.6) Gender: 23% female	<i>n</i> = 43
Sturkenboom et al. (2016)	Process evaluation alongside a randomised controlled trial	The Netherlands	Caregivers and patients living at home and reported difficulties in meaningful daily activities with an indication for occupational therapy. Patients could not be diagnosed with atypical parkinsonism, received occupational therapy in the preceding 3 months, have a predominant disabling comorbidity, had insufficient understanding of the Dutch language, or had a MMSE score <24. Occupational therapists who delivered therapy.	Patients had a median age of 71, 62% were in Hoehn and Yahr stage 1 or 2 (mild disease). Most participating caregivers (103/117; 88%) were the patient's partner. The participating therapists were all women with a median practice experience of 12 years.	Patients: <i>n</i> = 124 Caregivers: <i>n</i> = 117 Occupational therapists: <i>n</i> = 18

(Continues)

TABLE 1 (Continued)

Study	Study design	Location	Inclusion criteria	Participant description	Sample size
Szanton et al. (2011)	Prospective randomised controlled pilot trial	The United States	<p>≥65 years of age, demonstrate cognitive function with a score of ≥24 MMSE, report difficulty with at least one PADL or at least two IADL, be considered low income (household income equalling or less than 199% of Federal Poverty Level), and be able to stand with or without assistance. Patients were excluded if they had been hospitalised ≥3 times in the previous year, were currently receiving in-home rehabilitation, had a terminal diagnosis with ≤1 year expected survival, receiving active cancer treatment, had plans to move ≤1 year, or not competent to provide informed consent.</p>	<p>Intervention Mean age: 79.0 (SD 8.2) Gender: 96% female Control: Mean age: 77.0 (SD 7.1) Gender: 94% female 79% of the overall group was African American</p>	n = 40
Taylor et al. (2019)	Randomised controlled trial	The United States	<p>≥65 years of age, the ability to engage in dressing, toileting, bathing or hygiene, and self-care transfers at an independent or modified independent level. Authority to follow through or recommend follow through with the recommendation for environmental changes. Not receiving home health therapy services or had received them in the past 60 calendar days, no diagnosis of dementia.</p>	<p>Intervention group: Mean age: 74.3 (SD 7.5) Gender: 66.7% female Control group: Mean age: 74.0 (SD 7.9) Gender: 60% female</p>	n = 22

Abbreviations: ED, emergency department; IADL, instrumental activity of daily living; RCT, randomised controlled trial; SD, standard deviation.

again working with carers to support patients with mild dementia (Jeon et al., 2019). One study provided a pre-discharge home visit prior to hospital discharge (Lockwood et al., 2020). Another provided four home visits over a 1 year period again supporting a hospital discharge (Nikolaus & Bach, 2003). The most common intervention strategy included a home assessment consisting of approximately a 1 h assessment with provision of recommendations often in a written format (Bleijlevens et al., 2008; La Grow et al., 2006; Lau et al., 2018; Lockwood et al., 2020; Pighills et al., 2011).

Seventeen articles described the intervention implemented in varied detail (Table 2). One home visit was completed by an occupational therapist and a physiotherapist (Currin et al., 2012). Some studies focused on the impact of the intervention on other outcomes such as reducing falls or improving ADL performance (Chu et al., 2017; La Grow et al., 2006; Szanton et al., 2011). Other studies focused on individual populations including patients with dementia and their carers (Corcoran & Gitlin, 2001; Jeon et al., 2019), patients with low vision (La Grow et al., 2006) and patients with Parkinson's

TABLE 2 Identified articles where intervention characteristics and associated implementation levels were assessed

Study	Intervention description	Clinical assessments	Duration/intensity of intervention	Funding provided for equipment or modifications	Implementation definition, measurement and timeframe	Implementation reported
Bleijevens et al. (2008)	Fall prevention programme comprising of a medical and occupational therapy assessment. The home assessment included: - Recommendations with regard to behavioural change, functional needs and safety. - Recommendations and referrals concerning technical aids, adaptations or additional support. - A copy was sent to GP.	Not stated	1 × home visit (mean time of 55 min).	Not stated	One telephone interview (completed within 3.5 months from referral).	59%
Boman et al. (2007)	Two apartments equipped with a set of basic and advanced electronic aids to daily living (EADL) for either 4 or 6 months during an intervention time of 2 years. The teaching and learning method was influenced by certain principles of errorless learning.	<ul style="list-style-type: none"> • Rivermead Behavioural Test • FIM • Canadian Occupational Performance Measure (COPM) • Self-rating questionnaire • QoL visual analog scale • Sickness impact profile 	First 3 weeks of 6 month stay included 1–2 hours of training 4–5 times a week.	The cost of rent for the apartments was financed via the study project.	Observations were made once a month using 'status protocol' checklist. The self-rating questionnaire was conducted at the end of the period of intervention.	Not assessed.

(Continues)

TABLE 2 (Continued)

Study	Intervention description	Clinical assessments	Duration/intensity of intervention	Funding provided for equipment or modifications	Implementation definition, measurement and timeframe	Implementation reported
Chu et al. (2017)	Home assessment with provision of recommendations for environmental modification, prescription of assistive devices, provision of customised fall reduction care plan, provision of on-site skills training and referrals to community agencies. Follow-up phone call after 2 months.	<ul style="list-style-type: none"> Westmead Home Safety assessment Hong Kong Chinese prototype of the Falls Behavioural Scale for the older person 	<p>1 × 1.5 h home assessment.</p> <p>Fortnightly telephone calls made by blind assessor regarding falls and hospital representations and admissions</p>	For participants living in public housing, the government funded recommended home modifications requiring additional resources, whereas participants living in private housing paid for modifications themselves.	Phone call at 2 month post-intervention. Definition of implementation not specified.	76.3% to address environmental hazards and daily life routine, 38.9% for educational advice on fall reduction care plans, 68% for assistive devices recommendations, and 44.4% for accessing community services.
Corcoran and Gitlin (2001)	Home environment intervention based on a competence-environmental press framework. Therapists provided environmental and social strategies to assist caregivers support people with dementia.	Revised memory and problem behaviour checklist	5 × 90 min occupational therapy home visits	No funding was provided	Implementation was assessed at the final home visit and defined by use, i.e., if the occupational therapist observed the presence of a physical change or if the caregiver stated that it was in use and was effective in addressing the problem identified.	81% overall implementation (83%–84% for with task/social environment related modifications and 74% for environmental modifications).

(Continues)

TABLE 2 (Continued)

Study	Intervention description	Clinical assessments	Duration/intensity of intervention	Funding provided for equipment or modifications	Implementation definition, measurement and timeframe	Implementation reported
Cumming et al. (2001)	Routine home evaluation recording hazards with provision of written list to patients of recommended home modifications. The study occupational therapist supervised the completion of recommended home modifications and made further home visits if needed.	<ul style="list-style-type: none"> Baseline interview Standardised home assessment form Spector-Katz Index Tinetti's Falls Efficacy Scale Smith's Modification of the Rosow-Breslau Health Scale 	<p>1 × 1 h home assessment</p> <p>About 2 weeks after the initial visit, the occupational therapist telephoned all participants who needed home modifications to check that modifications had been made and to encourage implementation of recommendations.</p>	Home modifications were heavily subsidised by the government. Bath rails were provided and installed by a publicly funded handyman service, and bath seats and other equipment were provided at low cost directly by the local Area Health Service.	<p>12 months after the first home visit, a research assistant carried out follow-up home visits to assess implementation. The research assistant had a copy of the occupational therapist's recommendations and made a visual check to see whether modifications were in place as well as asked about changes in behaviour. On the basis of the research assistant's subjective judgement, implementation of each recommendation was graded as fully adherent, partly adherent, or not adherent. A single implementation score was calculated.</p>	<ul style="list-style-type: none"> 52% partial or complete implementation Implementation of specific environmental varied from a high of 72% full implementation of non-slip mats to a low of 19% implementation of adding a rail to external stairs 21% had not implemented any recommendations

(Continues)

TABLE 2 (Continued)

Study	Intervention description	Clinical assessments	Duration/intensity of intervention	Funding provided for equipment or modifications	Implementation definition, measurement and timeframe	Implementation reported
Currin et al. (2012)	All participants received an initial joint home visit by an occupational therapist and physiotherapist. Following the environmental audit recommendations and associated referrals were completed.	<ul style="list-style-type: none"> Falls Prevention Environmental Audit-Community Tool Timed Up and Go Test European Quality of Life Five Dimensions Frenchay Activity Index Abbreviated Mental Test Score K-10 	1 × home visit. No timeframe provided.	Referrals were made to outside agencies for equipment or modifications as per usual occupational therapy practice. Clients and/or family members were given information as to where other equipment could be purchased or hired.	Implementation was measured with a binary outcome (y/n) according to whether each recommended modification was completed or not. At the 6-month follow-up, an independent assessor not involved with the trial visited the clients at their homes and identified whether the recommendations were completed.	55% were completed by 6 months.

DeForge et al. (2008)	During hospital admission patients were provided with a discharge recommendation form including 5 domains (appointments, medications, equipment, treatments and community services). Unclear if home assessment was completed.	<ul style="list-style-type: none"> FIM Burg Balance Scale MMSE Geriatric Depression Scale (GDS-15) 	Approximately 3 months after discharge, telephone interviews were conducted by a trained interviewer.	The article did not explain if equipment was provided or hired.	Discharge recommendations (DRs) were reviewed, and respondents were asked about the extent to which they were able to follow each recommendation. Self-reported implementation was scored on a 3-point scale (0 = no implementation, 1 = partial implementation, and 2 = full implementation). Follow-up phone calls lasted approx. 45 min.	No overall implementation level reported. More than 80% of those given either equipment or treatment recommendations complied.
-----------------------	--	--	---	---	---	--

(Continues)

TABLE 2 (Continued)

Study	Intervention description	Clinical assessments	Duration/intensity of intervention	Funding provided for equipment or modifications	Implementation definition, measurement and timeframe	Implementation reported
Gibson et al. (2010)	A home visit was completed and paired with the provision of information about fall hazards and fall risk factors in the participant's homes and included recommendations for hazard removal and home modifications.	<ul style="list-style-type: none"> Project specific falls risk assessment 	1 × home visit. In cases of identified need, resources were provided to facilitate follow-through on recommended changes.	Article did not specify	3-month follow-up telephone interview	No overall implementation level reported.
Jeon et al. (2019)	Home assessments providing required equipment, installations, education and carer support. This consisted of 5–6 occupational therapy visits, 3–4 visits from a registered nurse, and 1 visit from a neuropsychologist. I-HARP also included 2 individualised carer support sessions at the beginning (90mins face to face and 30 mins phone).	<ul style="list-style-type: none"> Global deterioration rating scale for assessment of primary degenerative dementia (GDRS) MMSE Disability assessment for dementia (DAD) Late life function and disability instrument computer adaptive test (LLFDI-CAT) GDS-15 3-level version of the EuroQol 5 dimension (EQ 5D-3L) The Zarit burden inventory (ZBI). 	12 × 1.5 h over 4 months.	<ul style="list-style-type: none"> ≤\$1,000 of funding per patient was provided for minor home modifications, e.g., ramps, rails etc. and assistive devices. 	4 and 12 month post-intervention. Phone interviews with carer participants from the intervention group, with additional review of field notes and case conference minutes.	<ul style="list-style-type: none"> Not assessed for individual therapy components. However states that all nine dyads completed and complied.
La Grow et al. (2006)	A home safety programme designed to prevent falls in older people with severe visual impairment.	<ul style="list-style-type: none"> Westmead Home Safety Assessment checklist 	<ul style="list-style-type: none"> 1 × home visit (time frame not provided). A second home visit was completed when certain providers required the occupational 	The OT facilitated provision of new equipment and payment from a variety of usual sources depending on the price and type of	The environmental hazards and any risky behaviour observed in each home at the initial visit were coded from the assessment checklist.	90% reported complying partially or completely with one or more recommendation. In all, 78 participants reported fully or

(Continues)

TABLE 2 (Continued)

Study	Intervention description	Clinical assessments	Duration/intensity of intervention	Funding provided for equipment or modifications	Implementation definition, measurement and timeframe	Implementation reported
	Participants were divided into 4 groups - Home safety programme (<i>n</i> = 100) - Exercise		therapist to confirm that the equipment had been installed. Participants who also received the exercise programme with vitamin D supplement also received 5 home visits from a physiotherapist for exercise and telephone calls	item. Referrals were to other organisations for mobility aids and installation of safety equipment such as hand rails and shower stools.	Agreed recommendations for change were documented. Implementation of recommendations was evaluated during a telephone interview by the occupational therapist 6 months after study entry. The participant reported whether each agreed recommendation for home modifications and behaviour change had been actioned, partially actioned, or not carried out.	partially complying with the recommendations to remove, repair, modify, or replace loose mats inside the home or at the entrance.

Lockwood et al. (2020)

All patients received multidisciplinary team assessment and intervention in hospital post hip fracture.

Participants allocated to intervention group were provided with the pre discharge occupational therapy. Family was encouraged to be present (especially for patients with cognitive

- Home falls and accidents screening tool (Home Fast) in hospital to gather information about the home environment
- Standardised report was completed and participants received a copy of the form.

1 × 1 h home visit completed 1–5 days prior to hospital discharge.

Article did not specify

A research assistant blinded to group allocation visited the participant's home at 30 days and completed a visual inspection and interview with the participant.

Implementation was measured with a binary outcome (yes/no) according to whether each recommendation had been implemented or

Participants implemented 89% (393/442) of recommendations made by occupational therapists. There were 52% (34/65) of participants who followed all the recommendations.

(Continues)

TABLE 2 (Continued)

Study	Intervention description	Clinical assessments	Duration/intensity of intervention	Funding provided for equipment or modifications	Implementation definition, measurement and timeframe	Implementation reported
	<p>impairments). Occupational therapist facilitated practice of daily living skills, provided education, advice and recommendations on assistive technology, modifications and community support services.</p>				<p>not. Participants were also asked if modifications were yet to be completed by external service providers and these were measured with a binary outcome (yes/no).</p>	
Nikolaus and Bach (2003)	<p>One home visit was made during the hospital stay to evaluate the patient's home and to prescribe technical aids when necessary. After discharge, at least one further home visit (mean 2.6; range 1–8) was performed to inform people about the possible fall risks in their home, to give advice on possible changes of the home environment, to facilitate any necessary home modifications, and to teach the persons in the use of technical and mobility aids when necessary.</p>	<p>To identify home hazards, a standardised home safety checklist was used.</p> <p>During the comprehensive geriatric assessment, the following assessments were completed during the hospital stay:</p> <ul style="list-style-type: none"> • Barthel Index • Lawton Brody questionnaire • MMSE • GDS • Performance Oriented Mobility Assessment • Timed Up and Go • Times Test of Money Counting • Jaeger eyesight 	<p>2 × home visits (1 × prior to discharge, 1 × post-discharge at 3 months)</p> <p>Participants in both groups were contacted monthly by telephone. Both groups received the 1 year follow-up home visit.</p>	<p>The article did not specify</p>	<p>1 year after randomisation, home visits were made for all participants. Additional information about the rate of physiotherapy, medication, rehospitalisation, nursing home placement and the use of home help services was obtained from the patient's general practitioners. A trained interviewer who was not a member of the HIT collected all follow-up data.</p>	<p>Overall, 222 home modifications were recommended. There were 137 homes with at least one recommended change (75.7%). The most commonly recommended home modifications were elevation of toilet seat ($n = 43$), use of a rollator ($n = 37$) and fixing grab bars in the bathroom ($n = 27$).</p>

(Continues)

TABLE 2 (Continued)

Study	Intervention description	Clinical assessments	Duration/intensity of intervention	Funding provided for equipment or modifications	Implementation definition, measurement and timeframe	Implementation reported
Pighills et al. (2011)	Home assessment with the participant and assessor suggesting possible solutions and agreeing on recommendations. A written summary was provided to patients and the assessor made referrals to other agencies for equipment and input as indicated. There were no additional resources available to implement the recommendations.	<ul style="list-style-type: none"> Westmead Home Safety Assessment Falls Efficacy Scale EuroQol SF-12 Barthel Index 	<p>1 × 1.5/2 h home assessment</p> <p>Follow-up phone call 4 week post to determine whether recommendations had been followed.</p>	Article did not specify	12 month follow-up phone contact established level of implementation and reason for no implementation.	12% were not implemented, 60% were partially implemented, and 28% were fully implemented...
Stark et al. (2009)	The participants underwent a structured home assessment process to identify and rank performance problems. The participants also reviewed and approved the intervention strategies. The intervention was implemented by a team that included the participant, a construction company, family members (if	<p>Assessments battery consisted of:</p> <ul style="list-style-type: none"> Visual acuity (lighthouse near visual acuity) Get up and go Short blessed test Goniometry Sound repetition FIM Card sort (only completed at baseline) Self-rated performance and satisfaction Performance based assessment of severity of environmental barrier 	Baseline assessments were competed over two visits. The total number of OT visits ranged from 3 to 10 visits.	The article did not specify; however, it is recorded that home modifications were of no cost to the patients.	3 months after modifications were completed, the same occupational therapist readministered the assessment battery. Photographs of the modifications were taken to verify that the changes had been made. 2 years after the final treatment visit, each participant was contacted to participate in a follow-up 2-year post-test to evaluate the intervention. A	Approximately 80% of modifications recommended by the therapist were adopted.

(Continues)

TABLE 2 (Continued)

Study	Intervention description	Clinical assessments	Duration/intensity of intervention	Funding provided for equipment or modifications	Implementation definition, measurement and timeframe	Implementation reported
Sturkenboom et al. (2013)	The intervention group received occupational therapy following the Dutch care guidelines. The intervention was standardised using a protocol.	<ul style="list-style-type: none"> Assessments completed at 2 years: <ul style="list-style-type: none"> FIM Performance based assessment of severity of environmental barrier COPM Assessment of Motor and Process Scale (AMPS) ZBI 	The intervention was delivered at home for 10 weeks within 3 months, while the number of sessions could vary depending on complexity of goals, with a maximum of 16 sessions (45–60 minutes).	Article did not specify	<p>The article did not define or measure implementation. Within 1 month after the intervention, they evaluated perceived barriers and facilitators for a successful intervention by individually interviewing the participants.</p> <p>Single-blind assessments were obtained at baseline and after pilot trial completion 6 months later. Implementation was not defined or assessed.</p>	<p>subsample of 37 of the original participants was visited in their homes. During this visit, participants were re-consented. Only the study endpoint measures were repeated.</p> <p>The outcome measures revealed negligible to small effects in favour of the intervention group.</p>
Szanton et al. (2011)	Community Aging in Place: Advancing Better Living for Elders (CAPABLE) programme delivered by occupational therapist, registered nurse and a handyman.	<ul style="list-style-type: none"> Semi-structured clinical interview using the Client-Clinician Assessment Protocol (C-CAP) EQ-5D or Euroqol Falls Efficacy MMSE 	Up to 10 in home sessions, 60 min long, over 6 months consisting of 6 occupational therapy sessions, 4 nurse sessions and a visit from the handyman.	Installations completed by handyman – contracted by Civic works a non-profit AmeriCorp site. Average budget \$1,300 per household	<p>Single-blind assessments were obtained at baseline and after pilot trial completion 6 months later. Implementation was not defined or assessed.</p>	Implementation not assessed.

(Continues)

TABLE 2 (Continued)

Study	Intervention description	Clinical assessments	Duration/intensity of intervention	Funding provided for equipment or modifications	Implementation definition, measurement and timeframe	Implementation reported
Taylor et al. (2019)	An initial home assessment was completed. Participants received a written education, along with a written and verbal review of the recommendations generated from the environmental evaluation. Participants were encouraged to verbalise and/or demonstrate their understanding of the recommendations. A second home visit reviewed previously provided recommendations.	<ul style="list-style-type: none"> Activities-Specific Balance Confidence scale (ABC) Check for Safety: A Home Fall Prevention Checklist for Older Adults 	2 × treatment home assessments and 1 × data collection home visit. Length of visits not evident. Each home visit was scheduled 30–45 days apart.	The article did not specify	Implementation (with recommendations) was measured via observation utilising forms created for this study and was gathered during the third home visit. Percentage of implementation of recommendations was calculated using the total number of environmental recommendations as the denominator and the total number of recommendations followed as the numerator.	69% in the intervention group versus 37% in the control group.

Abbreviations: FIM, Functional Independence Measure; HIT, home intervention team.

disease (Sturkenboom et al., 2013; Sturkenboom et al., 2016).

Interventions were often funded by the government health systems, or a set budget was provided (Cumming et al., 2001). Chu et al. (2017) indicated that installations were funded if a participant lived in public housing (Chu et al., 2017). Patients and families may have contributed to the cost of modifications in some studies (Currin et al., 2012; Lau et al., 2018), or this was not clearly specified in the 10 articles (Bleijlevens et al., 2008; DeForge et al., 2008; Gibson et al., 2010; Lockwood et al., 2020; Mann et al., 2002; Nikolaus & Bach, 2003; Pighills et al., 2011; Sturkenboom et al., 2013; Sturkenboom et al., 2016; Taylor et al., 2019).

3.4 | Implementation levels

Follow-up periods ranged from 2 to 12 months, with implementation rates ranging from 55% (Currin et al., 2012) to 90% (La Grow et al., 2006). La Grow et al. (2006) reported 90% implementation of recommendation where participants with reduced vision received one home visit. The Westmead Home Safety Checklist was utilised, and a follow-up letter was provided. The occupational therapist facilitated provision of the new equipment without cost to the patient. The least successful study with a 55% implementation rate provided a single joint occupational therapy and physiotherapy home assessment (Currin et al., 2012). Modifications and equipment were self-funded with the occupational therapist completing referrals to outside agencies. Equipment could be hired or purchased (Currin et al., 2012).

Data synthesis and integration of all studies was undertaken to identify the overarching barriers and facilitators. Eight categories and six synthesised findings were identified (Appendix S3).

3.5 | Identified barriers impacting implementation

Providing new items or making changes to objects in the home reportedly disrupted personal lifestyle choices, impacting on implementation of recommendations (Corcoran & Gitlin, 2001). Atwal et al. (2008) identified a conflict between carers and patients, where older adults were reluctant to accept changes or to have valued occupations stopped when returning home from hospital. However, this required balancing with carer needs and anxiety (Atwal et al., 2008; Sturkenboom et al., 2013). Patients in this study highlighted a lack of involvement in the decision making process that impacted on

perceived need for interventions and implementation of occupational therapy home assessment recommendations (Atwal et al., 2008).

Mann et al. (2002) also identified a lack of perceived need from patients that did not accept assistive aids or equipment (Mann et al., 2002). Bleijlevens et al. (2008) highlighted the need for timeliness of assessments and implementation of modifications to meet patients' requirements and ensure relevance (Bleijlevens et al., 2008). Time and therapy dosage (number of visits) was highlighted by therapists and patients, where a single home assessment and provision of recommendations may not be sufficient to support patient behaviour change (Bleijlevens et al., 2008; Chu et al., 2017). Additionally, patients in the pre-contemplation stage of change may not be open to or consider modifications necessary impacting on implementation (Cumming et al., 2001).

The stigma associated with assistive equipment use and modifications was highlighted as a barrier (Cumming et al., 2001; Currin et al., 2012; Mann et al., 2002). Currin et al. (2012) highlighted that the type of recommendation could impact implementation. Bath and toilet rails appeared more acceptable than over toilet frames and commodes (Currin et al., 2012). Additionally, Nikolaus and Bach (2003) reported that less than 50% of patients followed recommendations to remove rugs/carpets or obstructions in walkways. The permanency of the recommendations, for example, free-standing equipment compared with grab rail installation, appeared to influence implementation dependent on personal preference and the nature of someone's functional needs (Currin et al., 2012; Lau et al., 2018).

Further barriers included a lack of funding for assistive devices or modifications. This resulted in patients being required to cover any financial costs (Corcoran & Gitlin, 2001; Lau et al., 2018; Mann et al., 2002). Patients with higher levels of comorbidities were also more likely to implement recommendations, again supporting the concept of need (Currin et al., 2012; DeForge et al., 2008). However, patients with a co-existence of depression and psychological distress were less likely to implement recommendations (Currin et al., 2012). Cognitive limitations may impact upon the implementation of recommendations after assessment (Pighills et al., 2011).

3.6 | Identified barriers mapped to the COM-B

The barriers impacting on implementation of recommendation derived from this review were mapped to the COM-B model of health behaviour change (Figure 2)

(Michie et al., 2011). Capability barriers include factors such as a patient's cognitive and physical ability to recall and implement interventions independently. Motivation barriers included examples such as a perceived lack of need, modification or equipment stigma; patients reported decreased involvement and lack of choice. Opportunity barriers included limited family or carer involvement, carer stress, level of service provision available for funding, therapy dosage and timing and environmental restrictions.

3.7 | Identified facilitating factors impacting on implementation

The accuracy of design and installation of modifications was reportedly important to patients and impacted on their perceived usefulness of modifications (Lau et al., 2018). Person-centred service provision or goal setting including co-design of home modifications reportedly reinforced patient engagement (Lo Bianco et al., 2020; Sturkenboom et al., 2013). Therapy time to reinforce use of technology and equipment, dependent on the patient group, was identified as a facilitating factor supporting implementation (Boman et al., 2007). Nygård et al. (2004) also found that occupational therapists perceived that more time was needed at home after discharge for older adults to discover changes to their needs in the home environment, to accept these, and to have therapeutic opportunities for behavioural practice and rehearsal. This was also identified in other studies with older adults, whereby increased time was required to facilitate engagement (Atwal et al., 2008; Nygård et al., 2004). Pighills et al. (2011) reported that it is likely intensity, including participant involvement, directly affects implementation.

Patients' understanding the benefit of the intervention and associated perceived outcomes such as reduced falls and increased independence was likely to impact implementation (Gibson et al., 2010). Enhanced implementation of recommendations was evident after the provision of targeted recommendations or an action plan, where patients were not overwhelmed by an abundance of information or suggestions (Corcoran & Gitlin, 2001). Recommendations that were tailored and targeted to the individual supported implementation when compared with generalised intervention or education (Taylor et al., 2019). Additionally, engagement with relatives or carers enabled implementation of home assessment recommendations. Implementation was regularly reported as higher in patients who received help at home from others (Cumming et al., 2001; Stark et al., 2009).

4 | DISCUSSION

This systematic review identified 22 papers that explored implementation of recommendations provided by occupational therapists during a home assessment to improve a patient's safety and occupational performance in the home environment. This review has highlighted the importance of co-design and joint decision making. It is the role of the occupational therapist to impart knowledge and work with the patient and their carers to determine what recommendations are important to them, meet their values and beliefs and perceived needs. Occupational therapy recommendations need to be tailored to the person and take into account what the patient or carer can or are willing to accept, ensuring their ownership of this process.

Considerable heterogeneity in the interventions described and the funding available to support recommendations were identified. Generally, increased therapy dosage was utilised to support patient groups with significant disabilities, including dementia and Parkinson's disease. Additionally Chu et al. (2017) proposed that a single home visit and phone call may not be adequate to support implementation of all recommendations. This may also further strengthen the finding that frequency and intensity of intervention may impact on implementation.

Determining implementation levels to individual therapy components or home assessment recommendations is difficult due to the differences in the follow-up periods, interventions provided, measures of implementation and the populations investigated. Descriptions of interventions could be improved using the Template for Intervention Description and Replication (TIDieR) (Hoffmann et al., 2014). Critical details were often not reported, including funding provided, the clinical assessment(s) undertaken, the definition of implementation and timeframe or the therapy dosage (Bleijlevens et al., 2008; Currin et al., 2012; Gibson et al., 2010).

The permanence of the recommendations appeared to influence implementation, dependent on personal preference and the nature of someone's functional needs (Currin et al., 2012; Lau et al., 2018). This may be further influenced by the service provider, for example, in an acute service where equipment may only be temporarily offered or when equipment or installations are at a cost to the service user. It is therefore important for service providers and therapists to understand these influencing factors when making recommendations. For example, participants in one study indicated that the ability to try and determine usefulness of a recommendation was the most significant factor influencing implementation, which would be simpler in the case of freestanding equipment rather than permanent installations (Mann et al., 2002).

4.1 | Implications and future research

This review highlights how occupational therapists' can work with patients and their carers to support implementation of home assessment recommendations by considering the barriers and using the facilitating factors outlined in this review. Behaviour change models and theories may support occupational therapy practice to complete effective home assessments with interventions implemented (Michie et al., 2011). Behaviour change techniques reflected in the facilitating factors may be useful and include the provision of written feedback, motivational interviewing, targeted approach, goal setting and recording tools (Michie et al., 2013). Behaviour changes techniques could be more routinely integrated into home assessment interventions to support patient engagement and could be reviewed in future research.

This review supports specific and targeted patient recommendations (Corcoran & Gitlin, 2001; Taylor et al., 2019). The findings infer that assessment and education are best placed in a person's home, tailored to the person and the task they are completing in their natural environment while mitigating safety risks, including falls. This has implications for service provision for patients moving between hospital and home. Considering when and how assessments and interventions should take place is essential for adding value and increasing effectiveness.

This study has explored the barriers and facilitators regarding implementation of home assessment recommendations and has highlighted the need for further high-quality research into factors that support health behaviour change in this setting. Additionally, further research should consider using the TIDieR framework to support clinical replication (Hoffmann et al., 2014).

4.2 | Limitations

This systematic review has certain limitations. First, methodological weaknesses in the studies were identified where implementation levels were often self-reported or defined in different manners, impacting on the ability to compare studies (Corcoran & Gitlin, 2001; Gibson et al., 2010; La Grow et al., 2006). Additionally, the results generated from the majority of the articles included were completed in older adult populations; as such, the results may not be generalisable to younger population subgroups.

5 | CONCLUSION

Factors influencing implementation are equally significant to consider when providing patients with home

assessment recommendations to improve safety and occupational performance in the home environment. Implementation of home assessment recommendations can be supported using a behaviour change framework such as the COM-B. Facilitating factors include patient centred care, ensuring choice and understanding need. Patients should be provided with individualised and tailored written recommendations. Other facilitating factors include family and carer involvement, service funding and strategies to support implementation including follow-up visits.

ACKNOWLEDGEMENT

Thank you to Colleen O'Brien-Malone for providing feedback during manuscript development. Open access publishing facilitated by Curtin University, as part of the Wiley - Curtin University agreement via the Council of Australian University Librarians.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

AUTHOR CONTRIBUTIONS

All authors made substantial contributions to the design and completion of the research. All authors were involved drafting the manuscript and revising it critically for intellectual content. All authors are in agreement with all aspects of the work.

DATA AVAILABILITY STATEMENT

Data is available in the public domain.

ORCID

Kristie J. Harper  <https://orcid.org/0000-0002-2967-3183>

REFERENCES

- Ainsworth, E., & de Jonge, D. (2011). An occupational therapist's guide to home modification practice. Slack Incorporated.
- Aromataris, E., Munn, Z. (2017). JBI Reviewer's Manual. <https://reviewersmanual.joannabriggs.org/>
- Atwal, A., McIntyre, A., Craik, C., & Hunt, J. (2008). Older adults and carers' perceptions of pre-discharge occupational therapy home visits in acute care. *Age and Ageing*, 37(1), 72–76. <https://doi.org/10.1093/ageing/afm137>
- Bleijlevens, M. H., Hendriks, M. R., van Haastregt, J. C., van Rossum, E., Kempen, G. I., Diederiks, J. P., Crebolder, H. F., & van Eijk, J. T. (2008). Process factors explaining the ineffectiveness of a multidisciplinary fall prevention programme: A process evaluation. *BMC Public Health*, 8(1), 1–11. <https://doi.org/10.1186/1471-2458-8-332>
- Boman, I.-L., Tham, K., Granqvist, A., Bartfai, A., & Hemmingsson, H. (2007). Using electronic aids to daily living after acquired brain injury: A study of the learning process and the usability. *Disability and Rehabilitation: Assistive Technology*, 2(1), 23–33. <https://doi.org/10.1080/17483100600856213>

- Bridge, C., P. Phibbs, N. Gohar, & K. Chaudhary. (2007). Identifying barriers to home modifications: Evidence based research. Home Modification Information Clearinghouse. <https://www.homemods.info/Download.aspx?File=6f732f373bfdd8ce4ac3637e136470ef&C=31342c3233392c30>
- Chu, M. M., Fong, K. N., Lit, A. C., Rainer, T. H., Cheng, S. W., Au, F. L., Fung, H. K., Wong, C. M., & Tong, H. K. (2017). An occupational therapy fall reduction home visit program for community-dwelling older adults in Hong Kong after an Emergency Department visit for a fall. *Journal of the American Geriatrics Society*, 65(2), 364–372. <https://doi.org/10.1111/jgs.14527>
- Clemson, L., Cumming, R. G., Kendig, H., Swann, M., Heard, R., & Taylor, K. (2004). The effectiveness of a community-based program for reducing the incidence of falls in the elderly: A randomized trial. *Journal of the American Geriatrics Society*, 52(9), 1487–1494. <https://doi.org/10.1111/j.1532-5415.2004.52411.x>
- Clemson, L., Stark, S., Pighills, A. C., Torgerson, D. J., Sherrington, C., & Lamb, S. E. (2019). Environmental interventions for preventing falls in older people living in the community. *The Cochrane Database of Systematic Reviews*, 2, CD013258. <https://doi.org/10.1002/14651858.CD013258>
- Corcoran, M. A., & Gitlin, F. N. L. (2001). Family caregiver acceptance and use of environmental strategies provided in an occupational therapy intervention. *Physical & Occupational Therapy in Geriatrics*, 19(1), 1–20. https://doi.org/10.1080/J148v19n01_01
- Cumming, R. G., Thomas, M., Szonyi, G., Frampton, G., Salkeld, G., & Clemson, L. (2001). Adherence to occupational therapist recommendations for home modifications for falls prevention. *American Journal of Occupational Therapy*, 55(6), 641–648. <https://doi.org/10.5014/ajot.55.6.641>
- Cumming, R. G., Thomas, M., Szonyi, G., Salkeld, G., O'Neill, E., Westbury, C., & Frampton, G. (1999). Home visits by an occupational therapist for assessment and modification of environmental hazards: A randomized trial of falls prevention. *Journal of the American Geriatrics Society*, 47(12), 1397–1402. <https://doi.org/10.1111/j.1532-5415.1999.tb01556.x>
- Curran, M. L., Comans, T. A., Heathcote, K., & Haines, T. P. (2012). Staying safe at home. Home environmental audit recommendations and uptake in an older population at high risk of falling. *Australasian Journal on Ageing*, 31(2), 90–95. <https://doi.org/10.1111/j.1741-6612.2011.00545.x>
- Day, L., Fildes, B., Gordon, I., Fitzharris, M., Flamer, H., & Lord, S. (2002). Randomised factorial trial of falls prevention among older people living in their own homes. *BMJ*, 325(7356), 128–134. <https://doi.org/10.1136/bmj.325.7356.128>
- DeForge, R. T., Cormack, C., Byrne, K., Hillier, L. M., MacKenzie, R., & Gutmanis, I. A. (2008). Barriers and facilitators to recommendation adherence following discharge from geriatric rehabilitation. *Topics in Geriatric Rehabilitation*, 24(4), 345–353. <https://doi.org/10.1097/TGR.0b013e31818cd0b7>
- Devor, M., Wang, A., Renvall, M., Feigal, D., & Ramsdell, J. (1994). Compliance with social and safety recommendations in an outpatient comprehensive geriatric assessment program. *Journal of Gerontology*, 49(4), M168–M173. <https://doi.org/10.1093/geronj/49.4.M168>
- Gibson, K., Greene, D. P., Sample, P. L., & Cabrera, C. (2010). Fall prevention: Relatedness of adherence to recommendations and self-rated knowledge. *Physical & Occupational Therapy in Geriatrics*, 28(3), 215–224. <https://doi.org/10.3109/02703181.2010.509541>
- Gitlin, L. N., Hauck, W. W., Dennis, M. P., Winter, L., Hodgson, N., & Schinfeld, S. (2009). Long-term effect on mortality of a home intervention that reduces functional difficulties in older adults: Results from a randomized trial. *Journal of the American Geriatrics Society*, 57(3), 476–481. <https://doi.org/10.1111/j.1532-5415.2008.02147.x>
- Gosselin, C., Robitaille, Y., Trickey, F., & Maltais, D. (1994). Factors predicting the implementation of home modifications among elderly people with loss of independence. *Physical & Occupational Therapy in Geriatrics*, 12(1), 15–27. https://doi.org/10.1080/J148v12n01_02
- Harper, K. J., Taylor, S. L., & Parsons, D. N. (2021). Barriers and facilitators influencing adherence to occupational therapy home assessment recommendations: A mixed methods systematic review protocol. *JBI Evidence Synthesis*, 19(2), 440–446. <https://doi.org/10.11124/JBIES-20-00162>
- Hill, K. D., Moore, K. J., Dorevitch, M. I., & Day, L. M. (2008). Effectiveness of falls clinics: An evaluation of outcomes and client adherence to recommended interventions. *Journal of the American Geriatrics Society*, 56(4), 600–608. <https://doi.org/10.1111/j.1532-5415.2007.01626.x>
- Hoffmann, T. C., Glasziou, P. P., Boutron, I., Milne, R., Perera, R., Moher, D., Altman, D. G., Barbour, V., Macdonald, H., Johnston, M., Lamb, S. E., Dixon-Woods, M., McCulloch, P., Wyatt, J. C., Chan, A.-W., & Michie, S. (2014). Better reporting of interventions: Template for Intervention Description and Replication (TIDieR) checklist and guide. *BMJ*, 348(mar07 3), g1687. <https://doi.org/10.1136/bmj.g1687>
- Hong, Q. N., Pluye, P., Bujold, M., & Wassef, M. (2017). Convergent and sequential synthesis designs: Implications for conducting and reporting systematic reviews of qualitative and quantitative evidence. *Systematic Reviews*, 6(1), 1–14. <https://doi.org/10.1186/s13643-017-0454-2>
- Jeon, Y. H., Krein, L., Simpson, J. M., Szanton, S. L., Clemson, L., Naismith, S. L., Low, L. F., Mowszowski, L., Gonski, P., Norman, R., Gitlin, L. N., & Brodaty, H. (2019). Feasibility and potential effects of interdisciplinary home-based reablement program (I-HARP) for people with cognitive and functional decline: A pilot trial. *Ageing and Mental Health*, 24(11), 1916–1925. <https://doi.org/10.1080/13607863.2019.1642298>
- Jones, A., de Jonge, D., & Phillips, R. (2008). *The impact of home maintenance and modification services on health, community care and housing outcomes in later life*. Australian Housing and Urban Research Institute.
- La Grow, S. J., Robertson, M. C., Campbell, A. J., Clarke, G. A., & Kerse, N. M. (2006). Reducing hazard related falls in people 75 years and older with significant visual impairment: How did a successful program work? *Injury Prevention*, 12(5), 296–301. <https://doi.org/10.1136/ip.2006.012252>
- Lau, G. W. C., Yu, M. L., Brown, T., & Locke, C. (2018). Clients' perspectives of the effectiveness of home modification recommendations by occupational therapists. *Occupational Therapy Health Care*, 32(3), 230–250. <https://doi.org/10.1080/07380577.2018.1491085>
- Lo Bianco, M., Layton, N., Renda, G., & McDonald, R. (2020). “I think I could have designed it better, but I didn't think that it

- was my place”: A critical review of home modification practices from the perspectives of health and of design. *Disability Rehabilitation: Assistive Technology*, 15(7), 781–788. <https://doi.org/10.1080/17483107.2020.1749896>
- Lockwood, K. J., Harding, K. E., Boyd, J. N., & Taylor, N. F. (2020). Home visits by occupational therapists improve adherence to recommendations: Process evaluation of a randomised controlled trial. *Australian Occupational Therapy Journal*, 67(4), 287–296. <https://doi.org/10.1111/1440-1630.12651>
- Mann, W. C., Goodall, S., Justiss, M. D., & Tomita, M. (2002). Dissatisfaction and nonuse of assistive devices among frail elders. *Assistive Technology*, 14(2), 130–139. <https://doi.org/10.1080/10400435.2002.10132062>
- Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., Eccles, M. P., Cane, J., & Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an international consensus for the reporting of behavior change interventions. *Annals of Behavioural Medicine*, 46(1), 81–95. <https://doi.org/10.1007/s12160-013-9486-6>
- Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(1), 1–12. <https://doi.org/10.1186/1748-5908-6-42>
- Munn, Z., Aromataris, E., Tufanaru, C., Stern, C., Porritt, K., Farrow, J., Lockwood, C., Stephenson, M., Moola, S., & Lizarondo, L. (2019). The development of software to support multiple systematic review types: The Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI). *International Journal of Evidence-Based Healthcare*, 17(1), 36–43. <https://doi.org/10.1097/XEB.0000000000000152>
- Nikolaus, T., & Bach, M. (2003). Preventing falls in community-dwelling frail older people using a home intervention team (HIT): Results from the randomized falls-HIT trial. *Journal of the American Geriatrics Society*, 51(3), 300–305. <https://doi.org/10.1046/j.1532-5415.2003.51102.x>
- Nygård, L., Grahn, U., Rudenhammar, A., & Hydling, S. (2004). Reflecting on practice: Are home visits prior to discharge worthwhile in geriatric inpatient care? *Scandinavian Journal of Caring Sciences*, 18(2), 193–203. <https://doi.org/10.1111/j.1471-6712.2004.00270.x>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *British Medical Journal*, 372(n71), 1–36. <https://doi.org/10.1136/bmj.n71>
- Pighills, A. C., Torgerson, D. J., Sheldon, T. A., Drummond, A. E., & Bland, J. M. (2011). Environmental assessment and modification to prevent falls in older people. *Journal of the American Geriatrics Society*, 59(1), 26–33. <https://doi.org/10.1111/j.1532-5415.2010.03221.x>
- Sandelowski, M., Leeman, J., Knafl, K., & Crandell, J. L. (2013). Text-in-context: A method for extracting findings in mixed-methods mixed research synthesis studies. *Journal of Advanced Nursing*, 69(6), 1428–1437. <https://doi.org/10.1111/jan.12000>
- Sanford, J. A., Jones, M., Daviou, P., Grogg, K., & Butterfield, T. (2004). Using telerehabilitation to identify home modification needs. *Assistive Technology*, 16(1), 43–53. <https://doi.org/10.1080/10400435.2004.10132073>
- Stark, S., Landsbaum, A., Palmer, J. L., Somerville, E. K., & Morris, J. C. (2009). Client-centred home modifications improve daily activity performance of older adults. *Canadian Journal of Occupational Therapy*, 76(1), 235–245. <https://doi.org/10.1177/000841740907600s09>
- Stern, C., Lizarondo, L., Carrier, J., Godfrey, C., Rieger, K., Salmond, S., Apóstolo, J., Kirkpatrick, P., & Loveday, H. (2020). Methodological guidance for the conduct of mixed methods systematic reviews. *JBI Evidence Synthesis*, 18(10), 2108–2118. <https://doi.org/10.11124/jbisrir-d-19-00169>
- Sturkenboom, I. H., Graff, M. J., Borm, G. F., Veenhuizen, Y., Bloem, B. R., Munneke, M., & Nijhuis-van der Sanden, M. W. (2013). The impact of occupational therapy in Parkinson's disease: A randomized controlled feasibility study. *Clinical Rehabilitation*, 27(2), 99–112. <https://doi.org/10.1177/0269215512448382>
- Sturkenboom, I. H., Nijhuis-van der Sanden, M. W., & Graff, M. J. (2016). A process evaluation of a home-based occupational therapy intervention for Parkinson's patients and their caregivers performed alongside a randomized controlled trial. *Clinical Rehabilitation*, 30(12), 1186–1199. <https://doi.org/10.1177/0269215515622038>
- Szanton, S. L., Thorpe, R. J., Boyd, C., Tanner, E. K., Leff, B., Agree, E., Xue, Q.-L., Allen, J. K., Seplaki, C. L., Weiss, C. O., Guralnik, J. M., & Gitlin, L. N. (2011). Community aging in place, advancing better living for elders: A bio-behavioral-environmental intervention to improve function and health-related quality of life in disabled older adults. *Journal of the American Geriatrics Society*, 59(12), 2314–2320. <https://doi.org/10.1111/j.1532-5415.2011.03698.x>
- Taylor, S. F., Coogle, C. L., Cotter, J. J., Welleford, E. A., & Copolillo, A. (2019). Community-dwelling older adults' adherence to environmental fall prevention recommendations. *Journal of Applied Gerontology*, 38(6), 755–774. <https://doi.org/10.1177/0733464817723087>

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

How to cite this article: Harper, K. J., McAuliffe, K., & Parsons, D. N. (2022). Barriers and facilitating factors influencing implementation of occupational therapy home assessment recommendations: A mixed methods systematic review. *Australian Occupational Therapy Journal*, 69(5), 599–624. <https://doi.org/10.1111/1440-1630.12823>