WILEY | Hindawi

Research Article

Fall Prevention Education Co-Designed and Evaluated with Community-Dwelling Older People Living with Dementia and Their Caregivers: A Feasibility Study

Jacqueline Francis-Coad [1,2] **Tammy Weselman**,[1,2] **Elissa Burton**,[3,4] **Janet Beilby**,[3] **and Anne-Marie Hill** [1,2]

[1]*The University of Western Australia, School of Allied Health, Crawley, Western Australia, Australia*
[2]*Western Australian Centre for Health & Ageing, University of Western Australia, Perth, Western Australia, Australia*
[3]*Curtin University, School of Allied Health, Bentley, Western Australia, Australia*
[4]*enAble Institute, Curtin University, Bentley, Western Australia, Australia*

Correspondence should be addressed to Jacqueline Francis-Coad; jacqueline.francis-coad@uwa.edu.au

Community-dwelling older people living with dementia are at increased risk of falls and injury that may impact their ability to remain at home. Fall prevention education programs have been effective in reducing falling risks in other older populations, but few studies have reported on programs specifically co-designed with this vulnerable cohort. This study partnered with community-dwelling older people living with dementia and their caregivers to co-design a fall prevention education program and evaluate its feasibility. A two-phase, mixed methods design using a community-based participatory research approach was conducted. A co-designed multimedia suite of 16 evidence-based safety messages (screened video, paper brochures), delivered by staff with support from caregivers, was evaluated using pre-and postprogram consumer engagement panels (clients, $n = 4$ and staff, $n = 4$), pre-and post-program client and caregiver ($n = 18$) surveys, and semi-structured educator staff interviews ($n = 2$). Quantitative data were analysed using Wilcoxon signed-rank tests and qualitative findings were subjected to deductive content analysis and were mapped to known feasibility criteria. Safety messages were positively received, card format delivery was preferred to video, and use of rhymes were fun and engaging. Following the program, older people felt they had a significantly clearer plan to help them prevent falling ($p = 0.01$). Caregivers who were invested in the program facilitated successful implementation and perceived that the program reduced their concerns about the person they cared for falling. Making the program available at an earlier stage (closer to diagnosis) was deemed preferable for a greater impact. Staff time for engagement and caregivers feeling uncomfortable with technology were two identified threats to implementation. Co-designing and evaluating a fall prevention education program with older people living with dementia, their caregivers, and staff were feasible. Safety messages clarified older peoples' awareness of how to prevent falls and alleviated caregiver concerns. Education on falling may assist older people living with dementia to remain safe at home.

1. Introduction

Community-dwelling older people living with dementia and associated cognitive impairment are at twice the risk of falling compared to those with normal cognition [1] due to reductions in postural stability, working memory, ability to concentrate, and executive functioning [2]. Within a given year, 50%–80% of older people living with dementia experience a fall [3], of which over 50% lead to physical injuries [4] including fractured hips, head injuries [5], and unplanned admission to residential care [6]. The health problems and reduced function that result from injuries from falls can also cause stress and burden for caregivers, leading to ill health for them as well [7]. Therefore, it is important that the person living with dementia (PLWD), supported by their caregiver, is enabled to maintain

functional ability and safety to reduce their risk of falling for as long as possible. This could empower a sense of purpose and contribute to the older PLWD managing their safety in order to remain at home [8].

Recent world guidelines on falls prevention have highlighted that engaging older adult understanding about falls is imperative for the prevention of falls and falls injuries [9]. Fall prevention education addresses this recommendation by raising older adults' awareness of falls risk factors and improving falls knowledge, facilitating early preventative action [10]. A systematic review on the effectiveness of fall prevention education to lower falls risks among older people living in the community included six studies from USA, Taiwan, Japan, and Australia. Programs were mostly delivered in group settings and content commonalities included intrinsic (personal) and extrinsic (environmental) fall risk factors. The review concluded that education programs improved falls awareness and knowledge and facilitated fall prevention behaviour change [11]. Our prior research and others have highlighted that fall prevention education had some success in reducing falls in community and hospital populations [12, 13], but the longer-term adoption of falls prevention strategies remains a challenge [14]. It is known that involving community consumers of research in the research process improves their likelihood of participating in an intervention and facilitates research translation [15]. We engaged a large cohort of community-dwelling older people in the design of a peer-led falls prevention education program using a novel world café forum–the first for fall prevention education [16, 17]. Key findings highlighted that older people desired fall prevention messages to be delivered with a positive tone with high levels of respect, empathy, and time to listen to queries [18]. In the hospital setting, we conducted focus groups with patients to gain their perspective on tailored fall prevention education. Patients reported that our education program increased their knowledge and confidence to actively engage in fall prevention strategies, which significantly reduced falls [14, 19]. In residential care homes, we partnered with frail older people and their staff to identify gaps in fall prevention knowledge and preferences for fall prevention education. Findings included the need for positively framed fall prevention messages to promote safety and wellbeing and items to prompt strategy enactment [15]. This body of work has coproduced tailored fall prevention education programs, incorporating a suite of multimedia resources for different populations of older people.

However, consumers of interventions, particularly those who are cognitively impaired, are infrequently consulted regarding the design and development of an intervention [20]. This is problematic as communication difficulties, including comprehension, associated with dementia make designing and delivering fall prevention education challenging. Memory impairment, even in the early stages [21], can also challenge the older person's ability to adopt noncued safety messages that reduce falls risk. It has been demonstrated that strategies and cues to improve communication and memory, including rhymes and graphics, can assist effective processing and recall of messages [22, 23]. Thus, providing cues and strategies face to face, in a structured, direct way may assist older PLWD to

undertake beneficial falls prevention education. Most importantly, older PLWD and their caregivers have made it known that they want to contribute to the development of dementia-specific education programs to ensure the education is appropriate [8, 24]. Hence, there is a demonstrated need to partner with older PLWD and their caregivers to codesign fall prevention education that is meaningful for them by adopting a community-based participatory research (CBPR) approach. CBPR is recognised as a preferred collaborative approach, particularly with vulnerable groups, designed to ensure the community affected by the research have their voices heard and share and participate in all aspects of the research process [25, 26]. Co-designing programs with consumers is beneficial for ensuring that programs are contextually relevant, useful, and effective for consumers, and that their perspectives are prioritised [27]. As older PLWD and their caregivers are our community consumers, they bring knowledge of the lived experience of the disease to the research co-design, ensuring the research meets the needs of their community [26, 27]. This could enable better engagement with education messages and enactments in daily life to reduce the risk of falling.

Therefore, the aim of this study was to partner with older PLWD and their caregivers to co-design a fall prevention education program and evaluate program feasibility in assisting engagement with and enactment of safety messages to reduce the risk of falling in their home environment.

2. Methods

2.1. Study Design. A two-phase mixed method design using a CBPR approach was undertaken. This included pre-and post-program consumer engagement panels, surveys, and semi-structured interviews (see Figure 1) [28]. Feasibility studies for early intervention development seek to answer the question "can it work?" by providing evidence on the criteria: adaptability, acceptability, demand, implementation, practicality, integration, limited efficacy, and expansion as recommended by Bowen et al. [29]. Ethical approval was obtained from the University of Western Australia Human Research Ethics Committee (2022/ET000027) and permission was obtained from the Bethanie group. All participants provided written informed consent.

2.2. Participants and Setting. This study partnered with a large not-for-profit aged care organisation in Western Australia. The organisation provides over 350 community home care packages (HCP) to support older people with diverse care needs, including dementia care, to live independently at home for as long as they are able. There are four levels of HCP that address low (level 1) to high (level 4) care needs, services can include personal care, nursing, therapy, meals, domestic assistance, and transport (myagedcare, n.d.).

A purposeful sample was drawn from the organisation's HCP clients recruited as dyads (older PLWD and their family caregivers). Eligibility criteria for HCP clients were as follows: aged 65 years and above, a diagnosis of dementia from a medical practitioner (as defined by the organisation's
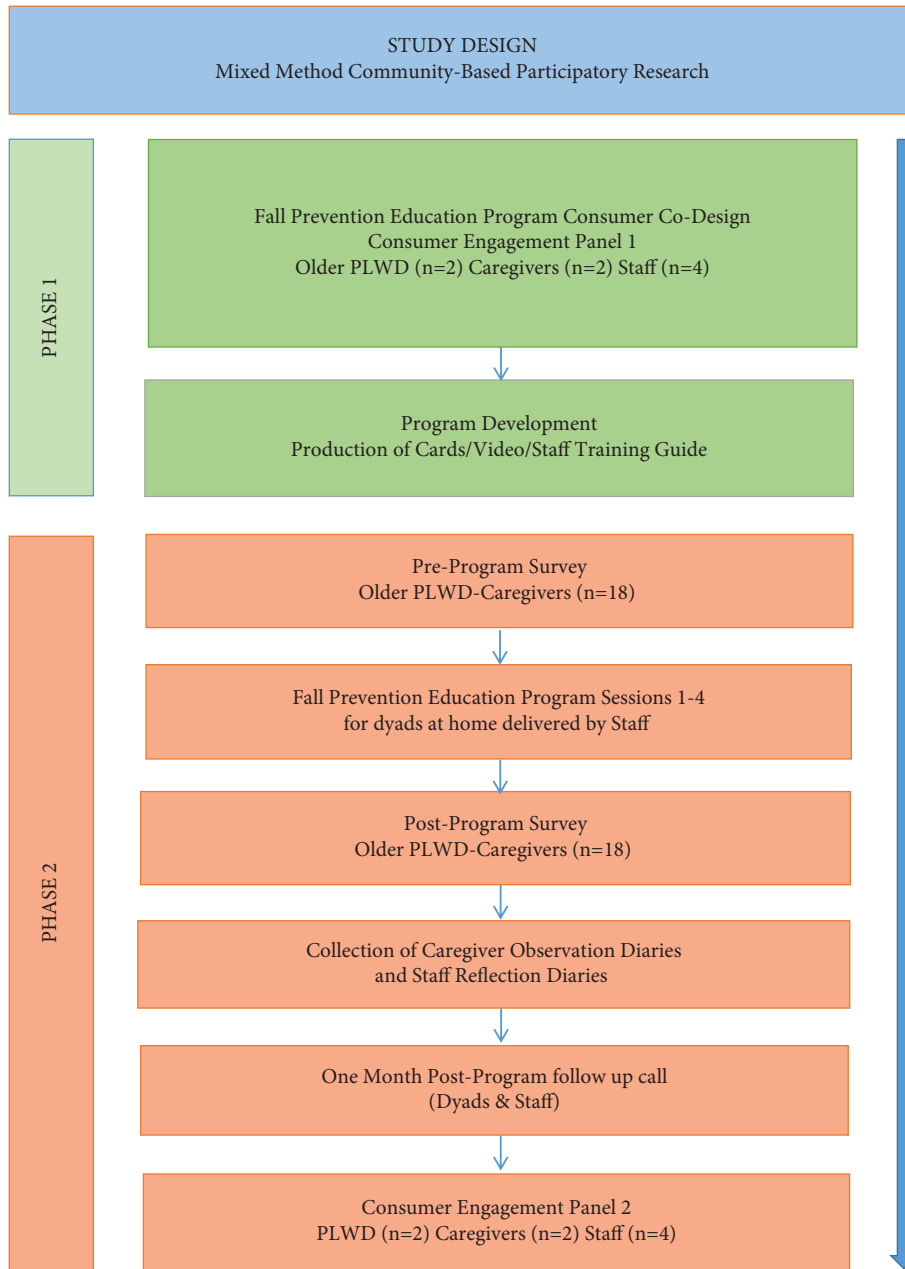
Figure 1: Study design.

electronic medical record), not the subject of a guardianship order (this meant the older PLWD was considered able to make decisions about themselves and understand informed consent as judged by their family caregiver, medical practitioner, and professional HCP provider staff), able to communicate in English, vision sufficient to view program resources, ambulant with or without a walking aid, and receipt of a HCP (level 1–4) that included weekly therapy services. This meant the PLWD had received a physiotherapy assessment that included physical and functional measures to determine their falls risk factors and their ability to mobilise within their home environment in order to engage with the fall prevention program. Family caregivers' eligibility criteria included the ability to communicate in

English and co-habitation with the home care recipient, meaning they had an enduring familial relationship with the PLWD and capacity to observe their cognition and function on a daily basis. Staff delivering HCP services were also invited to participate in the research co-design, for which the eligibility criteria included employment in delivering HCP services for older PLWD for three months or more and ability to communicate in English.

2.3. Recruitment. The organisations' community services manager invited dyads from their HCP recipients and home care staff meeting the eligibility criteria by telephone. Those individuals expressing interest in either phase one or two of

the study were then emailed a participant information statement and were followed up by a member of the research. The lead researcher then visited the dyads in their home to fully explain and verbally discuss the study and answer all their queries. The dyads were then asked to sign the consent forms, with the PLWD signing in the presence of their caregiver.

2.4. Intervention Co-Design

2.4.1. Phase One. The research team, dyads, and home care staff (physiotherapists, therapy assistant, and support workers) participating in the consumer co-design panel met face to face at the organisation's central meeting room. The panel was conducted according to a pre-prepared guide (see supplementary file 1a). Review of the fall prevention education resources, informed by prior research [16, 17, 30], included safety messages portrayed in a screened video, paper brochures and questionnaires followed by a discussion of program delivery facilitated by the lead researcher. Iterative panel dialogue was undertaken in the co-design process that culminated in a program and implementation plan. The theoretical underpinning of this plan was based on behavioural change theory that mapped the co-designed program plan to observable, replicable irreducible techniques designed to change behaviour [31]: in our study changing the behaviours of engaging with and enactment of safety messages to reduce the risk of falling, details are provided in supplementary file 1b. The panel dialogue was audio-recorded using a tablet and field notes documented by the research assistant. Consumer panel dyads also participated in the safety action simulations for the production of video and message card resources. Copies of the co-designed resources were shared electronically with all consumer panel members and reviewed and approved prior to phase 2 testing. The finalised program consisted of a multimedia suite of 16 evidence-based safety messages (see supplementary file 1c) that targeted older PLWD who were still relatively mobile but at high risk of falling. The messages focussed on modifiable fall risk factors, using pictures and rhyming sentences conveying actions to assist fall prevention in and around their home.

2.5. Data Collection and Procedure

2.5.1. Phase Two. The research team (JFC, AMH & JB) provided training for the research assistant (RA) and home care staff in preparation for survey and education delivery, respectively (in phase 2). The RA training included specialised communication strategies guided by a speech pathologist experienced in dementia communication management, to facilitate survey delivery and assist the older PLWD in engaging with the program. Briefly, the RA was trained to reassess the participant on each occasion and allow sufficient time for the participant to respond before repeating, prompting, or rephrasing a question. However, if an occasion arose whereby the older PLWD was having difficulty responding to a question following prompting, the RA was trained to invite their caregiver to provide a proxy response. As it has been reported that even in the mild phase of dementia, individuals have significant episodic memory impairments that impact encoding and retrieval capacities [21]. Home care staff were previously trained in communication, managing adverse client behaviours, such as aggression, and COVID-19 infection control measures as part of the organisation's employment policy.

The RA contacted participating dyads by telephone making appointments to conduct the preprogram surveys face to face at home. Copies of the survey questions were made available to participants in a written format for their reference. The RA read all questions to the participants and recorded the responses verbatim. On completion, the RA read the documented responses back to the participants for member checking.

A detailed program implementation plan is available in Supplementary file 1b. Within two days following baseline data collection (to afford participants a break), the home care physiotherapist visited the dyads to assess the older PLWD, determine their falls risk factors, and tailor appropriate safety messages. A maximum of six safety messages were selected and goals set in partnership with the dyads to best meet their needs. Delivery of the education program was conducted across four consecutive weekly therapy home visits. Home care therapy assistants (TA) delivered two safety messages each visit, so as not to overwhelm participants, prior to their usual therapy session with the final week reserved for revision. An electronic link to the program video was emailed to participants for use on their tablet, computer or smart television. Safety message cards were provided laminated (matt) in colour, size A4, and situationally positioned around the home interior or exterior verandah, patio, or courtyard. For example, the message card regarding choosing supportive footwear was placed on the wardrobe door where their shoes were stored or the maintaining a clear pathway message, free of debris, was placed at the entrance to the planted patio. The caregiver completed a weekly observation diary noting any observed changes in safety behaviour relating to their goals, an example diary is provided in supp. file 1d. The TA delivering education also completed a reflection diary providing their perspectives regarding the delivery of the education and any observed uptake of safety messages (goal achievement) by the client-caregiver dyads. The RA returned approximately one-week post-program completion to conduct the final survey with participating dyads as described above and collect the caregiver observation diaries.

Approximately one-month post-program completion, caregivers representing the dyad and TA staff received a follow-up telephone call (10 mins) from the lead researcher for any final comments on the fall prevention education program, responses were audio recorded. Three months post-program completion members of the co-design consumer panel attended an online meeting, due to COVID-19 restrictions, facilitated by the lead researcher to discuss the study findings, formulate recommendations and plan for dissemination.

2.6. Outcome Measures. The custom questionnaire was adapted from designs previously tested in research projects involving older people. Briefly, a small panel of academic health professionals was convened to establish content validity and a further panel of community dwelling older adults established face validity prior to pre-testing on a larger group of older adults for improved clarity and understanding. Test-retest reliability achieved a good level of agreement ($n = 49$, ICC = 0.88) [32]. The finalised questionnaire contained both open and closed response items.

2.6.1. Qualitative Measures. Open response items in the custom questionnaire explored PLWD knowledge of falls/education and fall prevention strategies, reaction to the program resources, and perceived barriers and enablers to engagement with the resources and enactment of safety messages (see supplementary file 1e). Open response items in the caregiver observation diary explored perceived barriers and enablers to engagement with and enactment of the safety messages (see supplementary file 1d).

2.6.2. Quantitative Measures. Closed response items in the custom questionnaire were measured using a 3-point analogue scale (yes, unsure (neutral response), no) and evaluated the older PLWD capability, opportunity, and motivation to engage in health behaviours to prevent falls [16, 17, 33]. Caregiver concerns regarding the older PLWD's risk of falling when performing various activities were evaluated using The Carers' Fall Concern Instrument (CFC-I) [34]. A 5-point Likert scale measured the level of caregiver concern from "Not at all concerned" to "Extremely concerned."

2.7. Data Analysis

2.7.1. Qualitative. Dyads were coded A1 & 2–I1 & 2. Open qualitative responses from dyad survey items and TA educators were managed using NVivo software (QSR International Pty Ltd., Version 12, 2018). Deductive content analysis was utilised to examine feasibility where a category matrix was constructed [35] using questions addressing the criteria of program adaptability, acceptability, demand, implementation, practicality, integration, limited efficacy, and expansion [29]. Data describing the responses of older PLWD, their caregivers, and TA educators to the falls prevention education program were mapped to the Bowen et al. [29] criteria.

2.7.2. Quantitative. Quantitative survey data were entered into Microsoft Excel spreadsheets (Microsoft Office 2019) and analysed using SPSS version 27 statistical software package (IBM SPSS Inc., Chicago, IL, USA). Descriptive statistics (frequencies and percentages) were used to present the dyad survey results. Differences between the pre-and postprogram responses of the PLWD who received the education program were examined using a Wilcoxon signed-rank test. Differences between caregiver concerns for the person they cared for falling pre- and postprogram were examined using a Wilcoxon signed-rank test. The study was conducted in accordance with the Guideline for reporting intervention development studies (GUIDED) criteria (see supp. File 1f) [36].

3. Results

3.1. Participant Characteristics. Twenty-six people participated across the two phases of the study. Eight people participated across phase one and two consumer panels.

3.1.1. PLWD. Older PLWD had a mean age of 87.2 years (SD 5.9), all ($n = 9$, 100%) used a mobility aid and received a level 4 (high level support) HCP. Seven (77.8%) had experienced one or more falls in the past year.

3.1.2. Caregivers. Caregivers had a mean age of 65.6 years (SD 15.4) with five (55.6%) or more years of experience in a caregiver role. Dyads all had familial relationships, with four (44.4%) being husband and wife. Further details of participant characteristics are shown in Table 1.

Findings are reported in response to questions addressing the criteria for determining feasibility by Bowen et al. [29]:

3.1.3. Phase One

(1) Can the Original Program Successfully Adapt for a Different Population? (Program Adaptability). Using a CBPR approach was deemed appropriate for adapting an existing fall prevention education program for a different population (older PLWD and their caregivers), one dyad reflected on their participation in the codesign process, "*it was good to be involved in something so constructive.*" Adaptations to the original program resources are summarised in supp. file 1g, indicating that safety message wording and explanatory text were modified for appropriateness and improved understanding, along with the opportunity to customise resources to meet personal aesthetic preferences. Performance of the adapted program is reported under the criterion "Limited efficacy."

3.1.4. Phase Two

(2) Can the New Program be Judged as Suitable, Satisfying and Attractive to Recipients? (Program Acceptability). Older PLWD and their caregivers reported they were satisfied with the content, quality, and aesthetics of the program resources, one caregiver (I2) commented, "*the content was appropriate and extremely relevant for ALL seniors*" another (B2) added, "*this* [program] *was such a consolidation, it brought everything together…and it brought a few things up.*" The photographs were helpful in highlighting the active component of the safety message, one caregiver (G2) commented that "*they brought the words to life*" which supported learning. Others (I1 & 2) expressed their enjoyment of the use of rhymes in the safety messages to help them remember the actions, "*Reading the rhymes out loud was a bit of fun!.*" A few dyads (D1 & 2, G1 & 2) suggested learning the rhymes

TABLE 1: Participant demographics.

Older PLWD ($n = 9$)	n (%)
Age range (years)	76–95
Gender, female n (%)	4 (44)
HCP support level 4	9 (100)
Uses mobility aid	9 (100)
Falls in last 12 months	
None	2 (22)
1–3 falls	4 (44)
4–6 falls	1 (11)
6–8 falls	2 (22)
Caregivers ($n = 9$)	
Age range (years)	48–89
Gender female n (%)	5 (55)
Relationship to PLWD	
Husband	2 (22)
Wife	2 (22)
Son	2 (22)
Daughter	2 (22)
Granddaughter	1 (11)
Years as caregiver	
<5 years	4 (44)
5 to 10 years	4 (44)
More than 10 years	1 (11)
Chronic health issues	
None reported	3 (33)
Joints/arthritis	2 (22)
Cardiovascular	4 (44)
Respiratory	1 (11)

PLWD, person living with dementia, HCP, home care package.

could be more attractive by adding music so they could sing along. Having the autonomy to personalise the resource colour was appreciated by the dyads, the most popular choice was blue, one participant (H2) noted the colour was "*modern*" and another (C2) reflected it was "*good up against the white wall, easy to see.*" This motivated them to display in their homes either on a wall or table where they could be easily seen to prompt fall prevention action, a PLWD (D1) commented "*Well I know myself I've got the thing on the wall* [message card] *to tell me. . .watch what you're doing and all that.*" The length of the video was deemed less suitable for older PLWD with higher care needs as they were unable to attend to the video for its duration (8 minutes) a caregiver (E2) noted, "*I'd put it on. . .but after a few minutes Dad would just get up and walk away.*"

(3) How likely is the New Program to be Used? (Program Demand). The intended usage of the education resources (message cards and/or video) was daily across the four weeks of program participation. The caregiver and TA diaries showed the message cards were utilised more frequently than the video across the four weeks. Message cards were read by dyads between four and 57 times while the video was played between one and 29 times.

(4) Can the New Program be Successfully Delivered to the Intended Participants? (Program Implementation). Most dyads embraced the program with caregivers making every effort to incorporate it in to their daily lives (D2) "*I read*

them [safety messages] *with her in the morning and the evening then I'd put on the video to watch. . .it all helps*" and (B1 & 2) "*We do all the things. . .I'm like a bull terrier I watch him all the time*", another caregiver (H2) summed up stating, "*If the walker isn't next to her, she forgets and tries to get up on her own, I have to set it up. . .so it's all up to me really.*" TA educators supported this, reiterating that caregivers' belief in program benefits and their willingness or availability to participate influenced implementation success, "*When the caregiver was really invested in the program, it made a big difference.*" However, some caregivers had limited time to commit to the program, for example, due to employment outside the home or other familial responsibilities, and a few did not see the relevance of the program, one caregiver (A2) reflected "*It's finding the time to discuss and finding the inclination to discuss. . .it's just common sense.*" Another caregiver (B2) recounted their daughter visiting and removing the safety message cards from being displayed around their parents' home stating, "*What do you want those* [message cards] *up for? They make you look like old people!.*"

A few caregivers (B2, C2) reported they were not very comfortable with using technology like smart phones or tablets for learning and did not persevere (with the video), "*I'm not very good with technology, so we pretty much gave up on the video.*"

(5) Can the New Program be Carried Out with the Intended Participants Using Existing Means/Resources and Circumstances? (Program Practicality). Despite the program being codesigned by older PLWD and their caregivers, feedback indicated the current format of resources were not the best fit for an older PLWD with higher care needs (HCP level 4), a PLWD (I1) reflected "*I read them* [safety messages] *but I don't remember them.*" A caregiver (E2) commented "*It seems to me there should be early engagement in a program like this to learn habits and make it stick.*" TA educators added that they felt the program would be more useful to new caregivers as, "*they are keen for information*" or for dyads who are moving to a new home, "*It could be a great set-up tool if they were in a new environment.*"

Some older PLWD experienced deterioration in their health due to other co-morbid conditions that challenged their ability to participate without increased assistance, one caregiver (E2) commented, "*My father has been receiving treatment for cancer that has left him very tired*" and another (H2) reported "*My wife is much frailer now, it's hard for her to even hold a pen.*" The increased burden of care impacted caregiver participation resilience, one (F2) commented "*Sometimes I feel so tired and just don't feel like going through the additional routine* [assisting program delivery].*" TA educators were challenged by the coaching tasks of reviewing the prior week's activity, action planning for the coming week, problem solving, and demonstrating safety actions in situ with the dyads as some aspects were new to their skill set and in-kind training time was limited to one hour. Delivering education during their home visit was also a challenge when expectations were to deliver their usual therapy treatments, one TA stated "*you always felt you were doing it in a hurry.*"

(6) Can the New Program be Integrated within an Existing System? (Program Integration). The program demonstrated the potential for integration into existing care systems as it aligned with organisational falls prevention policies and physiotherapy exercise programs that targeted falls risk factors, such as reduced strength and balance. TA educators reflected, "*Our team do regular visits. . .and client reviews.*"

(7) Can the New Program Show Promise of Success with the Intended Population? (Program Limited Efficacy)

Qualitative Findings

The program demonstrated some successful outcomes, with older PLWD demonstrating their falls prevention actions related to exercise behaviour, (A1) "*I'm doing the physio exercises keeping strong, keeping muscles active,*" walking aid use, (D1) "*I'd rather use it* [walking frame] *than leave it behind and slip*" and nocturnal behaviour (I2) "*If I get up at night to go to the toilet, I don't just go, I put the light on to see.*" Caregiver observations reiterated behaviour changes in maintaining hydration, adequate lighting, hazard removal, checking vision and staying steady, one (G2) wrote "[name] *did pause on standing before moving off. . .directly after watching the video.*"

Quantitative Findings

There was a significant improvement for older PLWD in their perception that they had a clear plan to help them stay safe (prevent a fall) following the education program ($p = 0.01$), but they did not show significant differences in their opportunity, motivation, or intention to undertake fall prevention behaviours (see Table 2). Promising program findings were attributed to reducing caregiver concerns. Following the education program, caregivers were significantly less concerned about the person they cared for falling, going to the toilet at night ($p = 0.01$), getting in and out of a chair or bed ($p = 0.03$), taking a shower ($p = 0.04$), not recovering from a fall ($p = 0.03$), and requiring extra care after a fall ($p = 0.02$) (see Table 3).

(8) Can the New Program be Expanded for Further Improvement? (Program Expansion). Overall findings from this study demonstrated the education program was feasible. However, barriers to program feasibility were identified:

(i) Program resources in the current format were not deemed as acceptable for the PLWD as cognitive abilities declined

(ii) Family caregivers/family and other home care staff in a supportive role were not always understanding of falls, fall prevention, and dementia-specific communication requirements

(iii) Some family caregivers were not confident with using the technology required for the video learning resource

(iv) Caregivers experienced some levels of fatigue and burden from providing 24 hr care and additional roles that impacted their ability to support the person they cared for participate in the program

(v) Caregivers perceived the availability of the program to be less practical for the person they cared for as their cognitive abilities declined, as it challenged their ability to engage with and enact safety messages without support

(vi) TA staff delivering the program were time-challenged integrating into their existing duties

Recommendations on expanding the program will focus on addressing the identified barriers to program acceptability, demand, implementation, practicality, and integration for improved feasibility and are detailed in Table 4.

4. Discussion

4.1. Feasibility Enablers. This study used a CBPR approach that provided an opportunity for older PLWD, their caregivers, and homecare staff to have their voices heard and fully participate in the research process that contributed to program authenticity. The active inclusion of these three stakeholder groups has been reported in a systematic review as a key factor for translating falls prevention knowledge to older PLWD and program success [37]. Our findings supported a larger Australian study ($n = 174$) that reported 90% of PLWD and impaired decision-making ability approved to participate in a wide range of research activities. Recommendations championed the need for change in recognising and including PLWD, reflected in law reforms, such as ethics guidelines and frameworks of advance planning for research participation [20]. Our safety messages framed fall prevention under the auspice of "staying safe and mobile at home to keep doing the things you enjoy," which was thought to be highly suitable. This positive framing was engaging for older PLWD possibly because it emphasised retaining mobility and independence rather than the negative connotations associated with being a faller, such as dependence, as reported by other researchers [8, 38]. Demonstrating program benefits to consumers expected to adopt a program has been reported as a key component for successful implementation [39]. We demonstrated program benefits for family caregivers in alleviating their concerns about the person they cared for falling through program knowledge regarding mitigating falls risk factors that could facilitate future program implementation. The use of behavioural change techniques, such as adding safety message cards to the home environment and providing instruction on how to perform fall prevention behaviours [31] enabled older PLWD, supported by their caregivers, to successfully engage with safety messages and enact a range of falls prevention behaviours. These included putting on a light at night when getting up to use the toilet and pausing when rising from a bed or chair to improve postural stability.

4.2. Feasibility Barriers. We identified that the current program safety message cards and video had too much information for some older PLWD, which may have challenged their ability to engage in learning and consequently enact the safety messages. Providing resources in a range of

TABLE 2: Comparison of older people living with dementia's awareness, confidence, opportunity, motivation, and intention for preventing falls.

Item	Yes Pre[a]/Post[b]	No Pre[a]/Post[b]	Unsure[c] Pre[a]/Post[b]	p value
Do you think that older people living with dementia are at risk of falling over?	9/9	0/0	0/0	1.000
Do you think that you will fall over at some time?	4/5	1/3	4/1	0.194
Do you think that if an older person living at home with dementia falls over they are likely to get a serious injury?	7/6	0/0	2/3	0.655
Do you think that if you were to fall over you would be likely to get a serious injury?	5/5	1/2	3/2	0.748
Do you know what you need to do to stay safe and reduce your risk of falling?	8/6	0/0	1/3	0.157
Do you feel confident in your ability to stay safe and reduce your risk of falling?	7/8	0/0	2/1	0.564
Do you feel positive about staying safe and reducing your risk of falling?	6/8	0/0	3/1	0.317
Do you think you have every opportunity to do the things you need to do to stay safe and reduce your risk of falling?	9/6	0/1	0/2	0.102
In the next month, are you planning to do the things you need to do to stay safe and reduce your risk of falling?	8/5	0/2	1/2	0.102
Do you have a clear plan of how you will do the things you need to do to stay safe and reduce your risk of falling?	2/7	1/1	6/11.0	0.014

Notes: [a]Pre-intervention/[b]Post-intervention, the term. [c]Unsure selected by participants in the co-design phase represents a neutral scoring that was fully acknowledged by the phase two participants.

formats to meet the changing needs of the PLWD, such as further simplifying wording with less text and editing shorter video clips, may assist future engagement and enactment. Our findings were similar to those of Rose et al. [40], involving patients with aphasia who better understood health information in patient education materials that used simple wording and relevant pictures. Designing education materials to minimise information overload such as reducing into smaller chunks, as planned for our video, could facilitate future program learning [41, 42]

Additional demand for fall prevention education was identified for all persons in the PLWD's support network. A recent integrative review on the challenges of conducting online education programs for family caregivers of people with dementia living at home, reported caregivers had limited access to dementia-related information [43]. This highlights the need to co-design education resources that meet the needs and preferences of those providing support for a PLWD.

Some family caregivers reflected they were not confident with using the technology required to access the program video resource. This resulted in withdrawal from usage and limited their learning opportunity. Similarly, this was reported as a major challenge to implementation by Wen et al. [43] in which the poor computer literacy of family caregivers constrained access to online education. This suggests that caregiver computer literacy should be addressed, and technology training made available in education programs that use online modalities.

Considering the influence of those who support the older PLWD, including family members, is important when seeking to change falls prevention behaviours, as this is not always positive [8]. Our findings highlighted the negative impact on program implementation by some family members and caregivers in removing or not displaying program resources. This compromised the opportunity for the older PLWD to engage with safety messages and

reminder prompts. This finding was similar to a study conducted in a residential care home setting where a multimedia falls prevention education program was implemented [30]. Some care staff chose not to display safety message posters in residents' rooms as they considered them incompatible with a "home-like" environment. This highlighted the need for everyone involved in supporting the older person to have an understanding of preventing falls and work together, as this has been reported as an important step for successful implementation [16, 18].

Some family caregivers expressed they were already fatigued in their supporting role, particularly as the PLWD they cared for experienced further decline, so adding an additional task (participating in the education program) was perceived as a burden. This increased burden has been reported in other studies of fall prevention management in caregivers of PLWD, where participants disclosed they struggled with the responsibilities of their role and as a consequence failed to take action or withdrew [41, 44]. Working with family caregivers to better understand their needs, and support their role and wellbeing, could also improve outcomes for the PLWD they care for [41, 44].

Research studies investigating the attitudes of older PLWD and their caregivers have identified the need for providing suitable, accessible, and timely falls prevention information [8, 41]. Many caregivers in our study felt the falls prevention education program provided would have been more useful if accessed at an earlier stage, as recipients of HCP level four tended to be more cognitively and functionally compromised, which challenged their capability to fully engage with and action falls prevention behaviours. Therefore, making the program available for early presentation to health services, memory clinics, or GP practices could prove a more practical program entry point. However, findings from a study examining attitudes to falls amongst older people with early cognitive impairment were diverse, with many resisting identifying as potential "fallers" or

TABLE 3: Comparison of caregiver concerns regarding the person they care for falling.

Item	Not at all concerned Pre[a]/Post[b]	Slightly concerned Pre[a]/Post[b]	Somewhat concerned Pre[a]/Post[b]	Moderately concerned Pre[a]/Post[b]	Extremely concerned Pre[a]/Post[b]	p value
How concerned are you about the person you care for?						
Not recovering from a fall	0/2	0/0	0/3	3/2	6/2	**0.028**
Requiring extra care after a fall	0/0	0/1	1/3	3/4	5/1	**0.020**
Falling when taking a bath or shower	0/3	2/3	4/1	1/1	2/1	**0.041**
Falling when getting in and out of chair/bed	0/3	1/3	3/2	3/1	2/0	**0.026**
Falling when using the stairs	7/4	0/1	2/1	0/1	0/2	0.068
Falling when reaching for something on the ground	1/2	3/3	1/1	2/3	2/0	0.399
Falling when rushing to do things	1/2	1/0	2/2	2/4	3/1	0.429
Falling when going to the toilet at night	0/4	0/3	1/2	6/0	2/0	**0.007**
Falling when being home alone	4/3	2/0	1/3	1/3	1/0	0.340
Falling when going out alone	7/9	0/0	1/0	0/0	1/0	0.180
Falling when walking on a slippery surface	0/2	0/0	3/2	4/4	2/1	0.167
Falling when walking in crowded places	4/5	3/1	1/2	1/1	0/0	1.000
Falling when walking on uneven surfaces	1/1	2/0	2/1	3/4	1/3	0.246
Falling when walking up or down a slope	2/1	2/1	1/2	3/4	1/1	0.380
Falling when walking without a walking aid	1/3	1/0	3/2	2/0	2/4	0.892
Falling when trying to walk without help	2/3	1/1	2/2	2/1	2/2	0.733

Notes: [a]Pre-intervention/[b]Post-intervention. The statistically significant changes are bolded to assist the reader in identifying them.

TABLE 4: Program expansion for improved feasibility.

Feasibility criteria	Recommendations
Adaptation	Provide ongoing participatory research opportunities for older PLWD, their caregivers, and community care staff to co-design and evaluate programs
Acceptability	Provide additional versions of program resources to meet the needs of older people with lower cognitive abilities: (i) Simplified cards without explanatory texts (message only) (ii) Message card rhymes and pictures in colouring book format (iii) Edit video to be shorter learning chunks (single clips) (iv) Add music to messages, so older PLWD can sing along
Demand	Provide additional versions of the program to educate those providing support for the older PLWD in their home environment (other staff, family members) Promote accountability for program adherence with a daily tick-box calendar
Implementation	Educate caregivers, family members, and home care staff to support their role and reduce burden in assisting the older PLWD to reduce their risk of falling across the dementia continuum through: (i) Training in dementia-specific communication and coaching skills (ii) Training in using technology for learning
Practicality	Trial the education program targeting older PLWD at an earlier stage of cognitive decline via: (i) Memory or GP clinics (ii) HCP providers (level 1-2 care package recipients)
Integration	Community care providers could invest in some additional training for their home care staff to effectively deliver the education program: (i) As a dedicated component of the therapy service package (ii) Reiterated within daily care support service delivery Professional allied health staff could incorporate program evaluation within their existing client reviews
Limited efficacy	Further evaluate program implementation and impact on key variables, including functional outcomes, falls, and injurious fall rates, across multiple community care organisations with a larger sample

PLWD, person living with dementia.

acknowledging the need for early intervention to prevent a fall [8]. This suggests that using a positive approach to fall prevention, framing the education program as prolonging mobility and independence for the older PLWD with a flexible range of multimedia resources to address their changing needs as the disease progresses could improve program engagement.

Time to deliver education within the existing therapy assistant sessions was identified as challenging. However, there is potential for the education program to be sustainably delivered through negotiated integration utilising other HCP staff roles. The use of allied health professional staff in delivering restorative type programs to home care clients has been reported as cost prohibitive in the longer-term [45] but other studies have demonstrated it is feasible to train support workers to deliver exercise programs (that addressed falls) to home care clients [45, 46]. Therefore, training support worker staff to deliver fall prevention education programs, including exercise, to home care clients with dementia should be investigated.

4.3. Strengths and Weaknesses. A key strength of this study was it was co-designed with consenting older PLWD supported by a home care package, their caregivers, and home care staff who were the intended users of the education program. As prior research has also reported that older

PLWD are keen for the opportunity to engage in decision-making processes that affect their health [24, 41]. Utilising an inclusive CBPR approach enabled researchers to better understand participant needs for improving both program feasibility and outcomes. Our program also provided the opportunity to accommodate individual preferences (tailoring), through selection of resource aesthetics, which has been reported as both a factor for potentially improving engagement with falls prevention [37] and successful implementation [39]. Multiple data sources were utilised; consumer engagement panel feedback, surveys, staff interviews, and observation diaries to support research rigour [28]. Limitations included the designed program was not suitable for older adults in the late stage of dementia as our inclusion criteria specified higher levels of communication and understanding, as the education program was aimed at older PLWD that could still be involved in decision-making processes and engage with written and audio-visual materials. The use of the term "unsure," selected by participants in the co-design phase, to represent a neutral scoring may be potentially misleading to the reader as meaning missing data, which would compromise analysis and validity. However, the wording was clearly explained to participants by the trained RA and was fully acknowledged as a neutral response by the participants. We included a procedure for appropriate acceptance of a proxy response in our RA

training, as it has been reported that even in the mild phase of dementia individuals have significant episodic memory impairments that impact encoding and retrieval capacities [21]. There is mixed evidence regarding the reliability of proxy responses, and few studies reporting the reliability of proxy responses of caregivers residing with a PLWD. Chappell and Kadlec [47] reported on the accuracy of proxy responses of home care service use by PLWD and found 81% agreement (with government records) for spouses who resided with the PLWD but only 50% for other family members, even if they resided together. However, Lopez et al. [48] found that proxy characteristics such as amount of time they shared with the client, the frequency and intensity of such contact, as well as the quality of their communication and relationship impacted reliability. We considered the enduring relationships and daily contact our dyads had together positively contributed to their response reliability. We did not ask the RA to formally record the number of proxy responses, but our procedural notes indicated only three PLWD required a proxy response to between one and five questions. We acknowledge that physical function contributes to falls risk and requires targeting within a prevention program, but the focus of this study was response to the education, and we did not aim to report any physical/functional outcome measures. Larger future studies of fall prevention education programs should measure functional outcomes along with falls and falls injuries. This study was conducted at a single community service provider organisation with a small sample, partly impacted by the restrictions imposed by the COVID-19 pandemic, so the findings should be interpreted with caution.

5. Conclusion

Co-designing and evaluating a falls prevention education program with older PLWD, their caregivers, and HCP staff was deemed a feasible and worthwhile experience. Older PLWD engaged with and enacted safety messages supported by their caregivers, but may benefit more from earlier program exposure. Caregiver concerns regarding the person they cared for falling were significantly reduced. Future program expansion should address identified barriers to program acceptability, demand, implementation, practicality, and integration to further improve feasibility before testing across multiple sites with a larger population. Ultimately, undertaking such a program may enable older PLWD to reduce their risk of falling and remain safely at home.

Data Availability

Datasets can be made available on reasonable request with the approval of the participating organisation.

Additional Points

What is Known. (i) Older people living with dementia in the community are twice as likely to fall compared to those without cognitive impairment. (ii) Fall prevention education programs have been successful in preventing falls for older adults without cognitive impairment in community settings. (iii) Fall prevention education programs rarely include people living with dementia and their caregivers in their co-design and hence may not sufficiently meet their needs. *What This Paper Adds.* (i) Older people living with dementia can participate in co-design research with support from their caregivers and researchers. (ii) Fall prevention education programs comprising a range of multimedia resources, framed around prolonging mobility and independence, were feasible to deliver and positively received by staff, older people living with dementia, and their caregivers. (iii) Caregivers reported that their concerns about the older person falling were reduced after enacting the practical messages provided by the education.

Conflicts of Interest

There are no conflicts of interest amongst the authorship.

Acknowledgments

Supplementary Materials

1a: Consumer panel guides. 1b: Program implementation plan mapped to theoretical behavioural change techniques. 1c: Safety messages for multimedia resources. 1d: Caregiver observation diary. 1e: Older person living with dementia survey. 1f: Completed GUIDED check list. 1g: Adaptations to program suggested by consumer panel (co-design phase 1). (*Supplementary Materials*)

References

[1] M. Montero-Odasso and M. Speechley, "Falls in cognitively impaired older adults: implications for risk assessment and prevention," *Journal of the American Geriatrics Society*, vol. 66, no. 2, pp. 367–375, 2018.

[2] S. W. Muir, K. Gopaul, and M. M. Montero Odasso, "The role of cognitive impairment in fall risk among older adults: a systematic review and meta-analysis," *Age and Ageing*, vol. 41, no. 3, pp. 299–308, 2012.

[3] L. M. Allan, C. G. Ballard, E. N. Rowan, and R. A. Kenny, "Incidence and prediction of falls in dementia: a prospective study in older people," *PLoS One*, vol. 4, no. 5, Article ID e5521, 2009.

[4] A. J. Milat, W. L. Watson, C. Monger, M. Barr, M. Giffin, and M. Reid, "Prevalence, circumstances and consequences of falls among community-dwelling older people: results of the 2009 NSW Falls Prevention Baseline Survey," *New South Wales Public Health Bulletin*, vol. 22, no. 4, pp. 43–48, 2011.

[5] Australian Institute of Health and Welfare, "Trends in hospitalised injury due to falls in older people," 2018, https://www.aihw.gov.au/getmedia/427d3a0d-88c2-45c5-bc23-5e3986375bba/aihw_injcat_206.pdf.aspx?inline=true.

[6] L. D. Gillespie, M. C. Robertson, W. J. Gillespie et al., "Interventions for preventing falls in older people living in the community," *Cochrane Database of Systematic Reviews*, vol. 2012, no. 9, Article ID CD007146, 2012.

[7] K. de Vries, J. Drury-Ruddlesden, and C. Gaul, "'And so I took up residence': the experiences of family members of people with dementia during admission to an acute hospital unit," *Dementia*, vol. 18, no. 1, pp. 36–54, 2019.

[8] T. Peach, K. Pollock, V. van der Wardt, R. das Nair, P. Logan, and R. H. Harwood, "Attitudes of older people with mild dementia and mild cognitive impairment and their relatives about falls risk and prevention: a qualitative study," *PLoS One*, vol. 12, no. 5, Article ID e0177530, 2017.

[9] M. Montero-Odasso, N. van der Velde, F. C. Martin et al., "World guidelines for falls prevention and management for older adults: a global initiative," *Age and Ageing*, vol. 51, no. 9, Article ID afac205, 2022.

[10] L. D. Ott, "The impact of implementing a fall prevention educational session for community-dwelling physical therapy patients," *Nursing Open*, vol. 5, no. 4, pp. 567–574, 2018.

[11] M. F. Ong, K. L. Soh, R. Saimon, M. W. Wai, M. Mortell, and K. G. Soh, "Fall prevention education to reduce fall risk among community-dwelling older persons: a systematic review," *Journal of Nursing Management*, vol. 29, no. 8, pp. 2674–2688, 2021.

[12] A. M. Hill, S. M. McPhail, N. Waldron et al., "Fall rates in hospital rehabilitation units after individualised patient and staff education programmes: a pragmatic, stepped-wedge, cluster-randomised controlled trial," *The Lancet*, vol. 385, no. 9987, pp. 2592–2599, 2015.

[13] S. Hopewell, O. Adedire, B. J. Copsey et al., "Multifactorial and multiple component interventions for preventing falls in older people living in the community," *Cochrane Database of Systematic Reviews*, vol. 7, no. 7, Article ID CD012221, 2018.

[14] T. P. Haines, L. Day, K. D. Hill, L. Clemson, and C. Finch, ""Better for others than for me": a belief that should shape our efforts to promote participation in falls prevention strategies," *Archives of Gerontology and Geriatrics*, vol. 59, no. 1, pp. 136–144, 2014.

[15] J. Francis-Coad, T. Watts, C. Etherton-Beer et al., "Evaluation of older people's knowledge, awareness, motivation and perceptions about falls and falls prevention in residential aged care homes: a tale of two cities," *Ageing and Society*, vol. 39, no. 11, pp. 2541–2559, 2018.

[16] L. D. de Jong, J. Francis-Coad, C. Wortham et al., "Evaluating audio-visual falls prevention messages with community-dwelling older people using a World Café forum approach," *BMC Geriatrics*, vol. 19, no. 1, p. 345, 2019.

[17] L. A. M. Khong, C. Bulsara, K. D. Hill, and A. M. Hill, "How older adults would like falls prevention information delivered: fresh insights from a World Café forum," *Ageing and Society*, vol. 37, no. 6, pp. 1179–1196, 2016.

[18] C. Bulsara, L. A. M. Khong, K. Hill, and A. M. Hill, "Investigating community perspectives on falls prevention information seeking and delivery: older person perceptions regarding preferences for falls prevention education using a World Café approach," *Journal of Community Psychology*, vol. 44, no. 7, pp. 937–944, 2016.

[19] A. M. Hill, J. Francis-Coad, T. P. Haines et al., "'My independent streak may get in the way': how older adults respond to falls prevention education in hospital," *BMJ Open*, vol. 6, no. 7, Article ID e012363, 2016.

[20] N. Ries, E. Mansfield, and R. Sanson-Fisher, "Planning ahead for dementia research participation: insights from a survey of older Australians and implications for ethics, law and practice," *Journal of bioethical inquiry*, vol. 16, no. 3, pp. 415–429, 2019.

[21] E. Grandmaison and M. Simard, "A critical review of memory stimulation programs in Alzheimer's disease," *Journal of Neuropsychiatry and Clinical Neurosciences*, vol. 15, no. 2, pp. 130–144, 2003.

[22] D. L. Nelson and D. H. Brooks, "Relative effectiveness of rhymes and synonyms as retrieval cues," *Journal of Experimental Psychology*, vol. 102, no. 3, pp. 503–507, 1974.

[23] E. Vasse, M. Vernooij-Dassen, A. Spijker, M. O. Rikkert, and R. Koopmans, "A systematic review of communication strategies for people with dementia in residential and nursing homes," *International Psychogeriatrics*, vol. 22, no. 2, pp. 189–200, 2010.

[24] M. Polacsek, A. Goh, S. Malta et al., "'I know they are not trained in dementia': addressing the need for specialist dementia training for home care workers," *Health and Social Care in the Community*, vol. 28, no. 2, pp. 475–484, 2020.

[25] D. S. Blumenthal, R. J. DiClemente, R. Braithwaite, and S. Smith, *Community-based Participatory Health Research: Issues, Methods, and Translation to Practice*, Springer Publishing Company, Berlin, Germany, 2nd edition, 2013.

[26] D. J. T. Campbell, R. B. Campbell, A. DiGiandomenico et al., "Using a community-based participatory research approach to meaningfully engage those with lived experience of diabetes and homelessness," *BMJ Open Diabetes Research & Care*, vol. 9, no. 1, Article ID e002154, 2021.

[27] M. Bird, M. McGillion, E. M. Chambers et al., "A generative co-design framework for healthcare innovation: development and application of an end-user engagement framework," *Research Involvement and Engagement*, vol. 7, no. 1, p. 12, 2021.

[28] J. W. Creswell and V. L. Plano Clark, *Designing and Conducting Mixed Methods Research*, SAGE, New York, NY, USA, 2nd edition, 2011.

[29] D. J. Bowen, M. Kreuter, B. Spring et al., "How we design feasibility studies," *American Journal of Preventive Medicine*, vol. 36, no. 5, pp. 452–457, 2009.

[30] J. Francis-Coad, T. Watts, C. Bulsara, and A. M. Hill, "Designing and evaluating falls prevention education with residents and staff in aged care homes: a feasibility study," *Health Education*, vol. 122, no. 5, pp. 546–563, 2022.

[31] S. Michie, L. Atkins, and R. West, *The Behaviour Change Wheel: A Guide to Designing Interventions*, Silverback, Stuttgart, Germany, 2014.

[32] L. A. M. Khong, R. G. Berlach, K. D. Hill, and A. M. Hill, "Can peer education improve beliefs, knowledge, motivation and intention to engage in falls prevention amongst community-dwelling older adults?" *European Journal of Ageing*, vol. 14, no. 3, pp. 243–255, 2017.

[33] L. Beuscher and V. T. Grando, "Challenges in conducting qualitative research with individuals with dementia," *Research in Gerontological Nursing*, vol. 2, no. 1, pp. 6–11, 2009.

[34] S. G. M. Ang, A. P. O'Brien, and A. Wilson, "Investigating the psychometric properties of the Carers' Fall Concern instrument to measure carers' concern for older people at risk of falling at home: a cross-sectional study," *International Journal of Older People Nursing*, vol. 15, no. 4, Article ID e12338, 2020.

[35] S. Elo and H. Kyngäs, "The qualitative content analysis process," *Journal of Advanced Nursing*, vol. 62, no. 1, pp. 107–115, 2008.

[36] E. Duncan, A. O'Cathain, N. Rousseau et al., "Guidance for reporting intervention development studies in health research (GUIDED): an evidence-based consensus study," *BMJ Open*, vol. 10, no. 4, Article ID e033516, 2020.

[37] C. Meyer, S. Hill, B. Dow, A. Synnot, and K. Hill, "Translating falls prevention knowledge to community-dwelling older PLWD: a mixed-method systematic review," *The Gerontologist*, vol. 55, no. 4, pp. 560–574, 2015.

[38] L. Yardley, M. Donovan-Hall, K. Francis, and C. Todd, "Older people's views of advice about falls prevention: a qualitative study," *Health Education Research*, vol. 21, no. 4, pp. 508–517, 2005.

[39] V. Goodwin, T. Jones-Hughes, J. Thompson-Coon, K. Boddy, and K. Stein, "Implementing the evidence for preventing falls among community-dwelling older people: a systematic review," *Journal of Safety Research*, vol. 42, no. 6, pp. 443–451, 2011.

[40] T. A. Rose, L. E. Worrall, L. M. Hickson, and T. C. Hoffmann, "Guiding principles for printed education materials: design preferences of people with aphasia," *International Journal of Speech Language Pathology*, vol. 14, no. 1, pp. 11–23, 2012.

[41] C. Goodman and K. Lambert, "Scoping review of the preferences of older adults for patient education materials," *Patient Education and Counseling*, vol. 108, 2023.

[42] C. Meyer, B. Dow, K. D. Hill, J. Tinney, and S. Hill, ""The right way at the right time": insights on the uptake of falls prevention strategies from people with dementia and their caregivers," *Frontiers in Public Health*, vol. 4, p. 244, 2016.

[43] Y. Wen, Y. Xing, Y. Ding, W. Xu, and X. Wang, "Challenges of conducting of online educational programs for family caregivers of people with dementia living at home: An integrative review," *International Journal of Nursing Sciences*, vol. 10, no. 1, pp. 121–128, 2023.

[44] Y. Zhou, A. T. Strayer, E. A. Phelan, T. Sadak, and N. R. Hooyman, "A mixed methods systematic review of informal caregivers' experiences of fall risk among community-dwelling elders with dementia," *Health and Social Care in the Community*, vol. 29, no. 4, pp. 1126–1144, 2020.

[45] E. Burton, G. Lewin, H. O'Connell, M. Petrich, E. Boyle, and K. D. Hill, "Can community care workers deliver a falls prevention exercise program? A feasibility study," *Clinical Interventions in Aging*, vol. 13, pp. 485–495, 2018.

[46] W. Walsh, C. Meyer, and E. V. Cyarto, "Home care worker-supported exercise program to address falls: a feasibility study," *Australian Journal of Primary Health*, vol. 2023, 2023.

[47] N. L. Chappell and H. Kadlec, "Accuracy of caregiver proxy reports of home care service use," *Journal of Applied Gerontology*, vol. 38, no. 3, pp. 434–442, 2019.

[48] A. Lopez, L. Tinella, A. Caffo, and A. Bosco, "Measuring the reliability of proxy respondents in behavioural assessments: an open question," *Aging Clinical and Experimental Research*, vol. 35, no. 10, pp. 2173–2190, 2023.