
Article:

Hunter, SW, Meyer, C, Divine, A et al. (4 more authors) (2020) The experiences of people with Alzheimer's dementia and their caregivers in acquiring and using a mobility aid: a qualitative study. Disability and Rehabilitation. ISSN 0963-8288

https://doi.org/10.1080/09638288.2020.1741700

Title: The experiences of people with Alzheimer's dementia and their caregivers in acquiring and using a mobility aid: a qualitative study

Running title: Mobility aid use in dementia

Susan W Hunter[1], Claudia Meyer[2], Alison Divine[3], Keith D Hill[4], Andrew Johnson[5], Walter Wittich[6], Jeff Holmes[7].

1. School of Physical Therapy, University of Western Ontario, London, Canada.
2. Bolton Clarke Research Institute, Bentleigh, Australia.
3. Faculty of Biological Sciences, University of Leeds, Leeds, England.
4. Rehabilitation, Ageing and Independent Living (RAIL) Research Centre, Monash University, Melbourne, Australia.
5. School of Health Studies, University of Western Ontario, London, Canada.
6. École d'optométrie, Université de Montréal, Montreal, Canada.
7. School of Occupational Therapy, University of Western Ontario, London, Canada.

Corresponding Author:

Dr. Susan W. Hunter
University of Western Ontario
School of Physical Therapy
Room 1588, Elborn College
London, ON, Canada, N6G 1H1
Phone: +1 519 661 2111 ext 82754
Fax: +1 519 661 3866
Email: susan.hunter@uwo.ca

Declaration of Interest

This study was funded by the Alzheimer's Association (AARG-16-440671) and had no involvement in the conduct of the study.

Acknowledgements**:** The authors thank Karen Johnson, Director of McCormick Dementia Services; Steve Crawford, CEO, McCormick Care Group and the staff and clients at the

McCormick Dementia Services day program for their hospitality, assistance in organizing this project and participation in the data collection process.

The experiences of people with Alzheimer's dementia and their caregivers in acquiring and using a mobility aid: a qualitative study

ABSTRACT

Purpose: Cognitive deficits and gait and balance problems are progressive in people with Alzheimer's dementia. Yet, mobility aids are associated with an increased falls risk in people with dementia. Our objectives were to identify the perceptions of people living with mild-to-moderate Alzheimer's dementia, and their caregivers, on the use of mobility aids.

Methods: A qualitative study using semi-structured, face-to-face interviews was conducted. Community-dwelling older adults with dementia attending a day hospital program were recruited. Thematic analysis was conducted and the text was coded into broad themes aligned with the research questions. The coded text was examined for patterns and similarities, and grouped to form inductive themes.

Results: Twenty-four people (12 living with dementia and their 12 caregivers) participated. Five themes were identified: 1) *acknowledgement of need*; 2) *protecting a sense of self*; 3) *caregiver oversight and relief of burden*; 4) *healthcare professional involvement; 5) environment and design of aids.*

Conclusions: The findings suggest that people with Alzheimer's dementia and their caregivers regard mobility aid use as increasing independence. There is a role for healthcare professionals to be involved in the prescription, provision and training for use of mobility aids among people living with dementia to ensure uptake and safety.

Key Words: mobility, assistive technology, Alzheimer's dementia, qualitative research, balance, gait

Implications for Rehabilitation

- Mobility aid use is regarded as increasing independence by people with Alzheimer’s disease and their caregivers.
- Falls risk associated with mobility aid use was not well known and caregivers perceived mobility aids as a means to reduce falls.
- Most people do not see a healthcare professional when they acquire a mobility aid and there is a role for healthcare professionals to be involved in the prescription, provision and training of people living with dementia in the use of mobility aids in order to increase the uptake of aids and their safe use.

INTRODUCTION

Mobility is fundamental to successful and active aging, and is intimately related to quality of life in older adults. [1] Impaired mobility, however, is common in adults over the age of 65 years, and is associated with an increased risk of falls. In Alzheimer's dementia, cognitive deficits, and balance and gait disorders are inevitable and progressive [2,3], leading to impaired mobility and falls [4]. People living with dementia have an annual fall risk of 60-80% [5], twice that of those without cognitive dysfunction and have a higher risk of major fall-related injuries, such as hip fractures[6]. While literature supports that exercise leads to an improvement in balance [7] and lower extremity strength [8], there is limited evidence that these improvements reduce the occurrence of falls among people with dementia [9].

The provision of a mobility aid, such as a cane or walker, is used to compensate for deficits in balance and strength. [10] Research indicates that for cognitively healthy older adults with balance impairment, appropriate use of a gait aid can improve walking stability. [10,11] Mobility aid use can also significantly improve the quality of life of older adults by allowing greater ambulation and social participation. [10] Paradoxically, use of a mobility aid in people living with Alzheimer's dementia is independently associated with a three-fold increased falls risk. [12] The reasons for this increased risk are likely multifactorial and are an emerging area of research interest in mobility among people with dementia.

The use of a mobility aid in people with dementia results in increased cognitive demands for walking, due to heightened attentional processing and the greater need for neuromotor control, which results in an unstable gait [10,13–15]. Other possibilities for the increased risk include unsafe use of the equipment due to limited insight and lack of training. It is important to appreciate that the majority of older adults in the general population using a cane or walker obtain the device without consultation with a healthcare professional.

[16],[17] It is unknown if people with dementia using a mobility aid or their caregivers perceive potential negative effects with their use.

Mobility aids also elicit strong emotional responses for older adults, with both positive and negative connotations. The positive effects include enabling people to safely perform normal and essential activities of daily living. [18] However, negative feelings are associated with personal and social consequences for users; in particular, mobility aid use generates feelings of loss [19,20] and stigma associated with aging and physical decline [21]. It is unknown how these feelings may impact the timing of commencing use or the incorporation of the equipment into regular daily use once using an aid.

There is limited research on the perspectives of people who have been prescribed mobility aids, information that aids in understanding the pragmatic aspects of the use of the equipment in their daily life and living situation. In particular, the experiences of people living with Alzheimer's dementia using mobility aids have not been explored, although this is necessary information for healthcare professionals to facilitate their use. There is an emerging drive to appreciate and understand the subjective experiences and needs of people living with Alzheimer's dementia. [22] . The objective of this study was to explore and better understand the perceptions of people living with mild-to-moderate Alzheimer's dementia, and their caregivers, on the use of mobility aids.

METHODS

Design and Methodology

Semi-structured, face-to-face interviews were conducted to gain an in-depth understanding of mobility aid use among people living with Alzheimer's dementia and their caregivers. A constructivist theoretical approach was used as it enables in-depth explorations about how the key stakeholders interpreted their experiences within their social context.[23] Informed consent was provided by the participant with Alzheimer's dementia, either alone or in conjunction with a substitute decision maker, if deemed necessary. All of the substitute decision makers were the caregivers for the person living with Alzheimer's dementia. Caregivers provided written informed consent for themselves. There was a process of reassessment as the interview progressed to ensure that the participant with Alzheimer's dementia felt able to continue. Data collection took place between March 2017 and May 2018. This study was approved by the Health Sciences Ethics Review Board of the University of Western Ontario. The manuscript was prepared using the Consolidated Criteria for Reporting Qualitative Studies (COREQ).[24]

Participants

Participants were recruited from a local dementia services day program where referral is based on a confirmed diagnosis of dementia by a geriatrician according to the criteria of the National Institute of Neurologic and Communicative Disorders and Stroke-AD and Related Disorders Association (NINCDS-ARDRA).[25] Inclusion criteria included: diagnosis of mild-to-moderate Alzheimer's dementia (Mini-Mental State Examination test scores of between 11–20 indicated moderate severity. and scores between 21–24 indicated mild severity of AD); ability to walk 30m independently with use of a mobility aid (e.g., single-point cane or 4-wheeled walker); and current use of a mobility aid for at least 6 months. In addition, participants had a caregiver who either lived with them or visited them most days of the week. Exclusion criteria were the presence of musculoskeletal (e.g., arthritis of knees, feet or hips) or neurological (e.g., Parkinson's disease) conditions.

Data collection

To better characterize the people with Alzheimer's dementia within the study, we collected: demographic information (age, gender, years of formal education): self-report of falls and number of falls in the previous 12 months: and cognitive performance using the Mini-Mental State Examination [26]. Basic and instrumental activities of daily living information were collected using the Lawton-Brody Scales. [27] The Iconographical-Falls Efficacy Scale is validated in older adults living with cognitive impairment and was used to quantify fear of falling. [28,29] The Iconographical-Falls Efficacy Scale compensates for reduced abilities of abstract thinking among people with cognitive impairment by using pictures to match the verbal descriptions for the 10 activities that are rated. Each activity is rated on a 4-point Likert Scale from 1 (not at all concerned) to 4 (very concerned). Items are summed for a total score; higher scores indicate a greater concern about falling. This information is presented in Table 1.

Interview Guide

Participants and their caregivers then participated together in a semi-structured interview either at the dementia services day program or at the participant's home at a time convenient to them. The interviews lasted approximately 30-60 minutes and were audio-recorded. All interviews were conducted by the same interviewer (author AD). The interviewer was female with a PhD in psychology and was working as the Research Associate on the study. The interviewer had previous experience with performing interviews and data analysis in qualitative research.

Participants and their caregivers were asked about their initial experiences with obtaining and using a mobility aid. Specifically, participants were asked to describe: how they obtained the aid and whether training was provided; their level of acceptance when first using the aid and whether it has changed over time; what expectations (if any) they had about using the aid; and how using the aid has impacted their identity. To further elicit narratives that placed the mobility aid within the participants' broader experiences of living with Alzheimer's dementia, probes were used to elicit more in-depth descriptions. For example: In what context is the aid used most often? Are there times when the aid is not used? What is difficult/ positive about using the aid?. Interviews were transcribed verbatim. The interview guide is included in the Appendix.

Data Analysis

The contents of the joint interviews were analyzed together. Following the process outlined by Braun and Clarke[30], the first step in the analysis involved immersion through repeated and active readings of transcripts. Next, initial codes were generated through line-by-line coding of the transcripts. Coding was performed independently by authors JH and CM, with debriefing sessions with authors SH and AD to confirm saturation was achieved.[30] Themes were then developed out of the list of codes in an iterative, inductive process, first attending to the voices within narratives and then addressing voices across narratives.[31,32] Given there are known deficits in recall and executive functioning within the population under study, we did not review the transcripts with the people with dementia or the caregivers who were interviewed. Therefore, member-checking was not undertaken. The present paper focuses on the across-narrative analysis.

RESULTS

Participants

Twenty-four people or 12 dyads (12 people with Alzheimer's dementia and their 12 caregivers) participated. There were no drop-outs in the study. Characteristics of the people with Alzheimer's dementia are presented in Table 1. For caregivers, three were male and nine female; seven were spousal caregivers, four were adult children, and one was a sibling of the person living with Alzheimer's dementia.

The duration of mobility aid use ranged from 1 to 11 years. Half of the people with Alzheimer's dementia (n=6, 50%) had been prescribed the mobility aid by a healthcare professional, with the other half having obtained the aid on their own initiative. Half the sample reported that the aid had been fitted for the person, yet only four (33%) reported that they received training on how to use the mobility aid. Nine of the participants reported falling in the previous 12 months, but participants or caregivers did not report any falls had occurred while using a 4-wheeled walker.

Thematic analysis results

Five themes were identified: *acknowledgement of need* for balance and stability by the person living with Alzheimer's dementia and the caregiver; *protecting a sense of self,* whereby the person living with Alzheimer's dementia reclaimed dignity, confidence and a sense of identity; *caregiver oversight and relief of burden*, including the need for vigilant reminders for use and reduction in anxiety with improved safety; *healthcare professional involvement* to provide assessment and training; and *environment and design of aids* had an impact on use.

Acknowledgement of need

People living with Alzheimer's dementia acknowledged the need for and positive effect of a mobility aid to assist with balance and stability. There was an expectation that the mobility aid would provide the necessary support to prevent falls.

> *'I need it…there is no doubt about it…I need the cane…I appreciate that' (P1)*
>
> *'I expected that the walker would help me move along the streets and do so without my falling' (P11)*

For caregivers, there was a sense of security that came with the person living with Alzheimer's dementia using a gait aid.

> *'Because she feels secure and that is what it is all about' (C5)*

There was acknowledgement by the person living with Alzheimer's dementia that they needed the mobility aid and while they did not always particularly like it, they accepted it over time.

> *'I don't like it but it helps me with my balance…I feel quite safe walking around with it' (P9)*
>
> *'Still can't get it that I'm not a young guy and that I have to have a walker to walk' (P4)*

Protecting a sense of self

Maintaining dignity in the face of advancing age and frailty was crucial for people living with Alzheimer's dementia. There was a focus on how it assisted them to maintain independence and was a source of protection.

> *'I felt that I'm getting older and this is a device that is there to help me do the things that I want to do (P11)*
>
> *'she loved it…I thought she would hate it because she wasn't to walk by herself…well, she wanted to walk by herself' (C5)*
>
> *'I feel very independent with the cane' (P2)*
>
> *'just helps me to get where I want to go' (P3)*

It appeared there was a generational shift that saw the walker now as more commonplace, making the user of the mobility aid feel less alone and less conspicuous.

> *'There are so many people using walkers that I think the use is taken for granted in the places where walkers are used'* (*P11*)
>
> *'I think people nowadays are used to seeing older people using canes'* (C1)

Building a sense of confidence and security through use of the mobility aid helped to reduce the fear of falling.

> *'To be able to go without falling…I don't want to fall' (P6)*
>
> *'I wasn't sure but [it] made sure that I don't fall so that's why I like it' (P5)*
>
> *'it makes me feel good because I don't like falling especially on cement' (P11)*

With the known symptom of memory loss with Alzheimer's dementia, one would anticipate that the mobility aid may be forgotten to be used. The participants in this study, however, appeared to have an innate sense of safety, perhaps linked to protecting their sense of self, that had them, at times, reaching automatically for the mobility aid for outdoor use.

> *'I know I just want to have the [walker] if I'm going outside.' (P7)*
>
> *'I know [if] I go somewhere where I don't know…I have this…that is something to hold on to' (P5)*

Indoors they appeared to be more confident and not so reliant on the mobility aid, but using the mobility aid outdoors allowed them to engage in their chosen activities.

> *'At home I don't need it…I know where everything is so I go there but outside I don't know…I go with this [the walker]…and I have something to hold onto so that I don't fall' (P5)*

The mobility aid became part of their identity, and identity linked to the mobility aid was one which acknowledged respect for the advancing of age and frailty. Several people living with Alzheimer's dementia strongly asserted they did not care what people thought of their mobility aid use, not feeling any stigma attached to its use.

> *'[people] help me and hold open doors' (P3)*
>
> *'It is part of me…it goes where I go…I even like the colour' (P2)*
>
> *'I think, thanks god, I'm just getting more used to being the old lady on the street with the walker' (P7)*
>
> *'I don't care…they can think what they like…it doesn't bother me… obviously I didn't use the walker when I was a little child but at 92 I have a right to…I don't know what they think and I don't care' (P6)*

Yet, some people saw the use of the mobility aid through the lens of internalized ageism, a stigma within the older person with Alzheimer's dementia about aging and frailty.

> *'like a half cripple…I never thought I'd end up having to use a walker to walk (P3)*
>
> *'that I'm a person with a walker…I'm not a person who is free (P4)*

Caregiver oversight and relief of burden

In contrast to the reported sense of safety mentioned above, caregivers were also, at times, instrumental in ensuring that the people living with Alzheimer's dementia remembered to use their mobility aid.

> 'O*h probably three or four times a day [he would] start somewhere without it and I remind him… it's just forgetting it that's the issue' (C12)*

As described above, caregivers were also more vigilant about reminding the person living with Alzheimer's dementia to use the mobility aid when they were heading outdoors.

> *'Ya well I make him… yes I make him do it… when we go out I make him take it…I say wagon [walker] please or he takes it himself but I usually make sure' (C4)*

At times, it was difficult for caregivers to work out whether the person did indeed forget to use the mobility aid or whether it was an act of rebellion on their part, making it challenging to support.

> *'He'll leave it at the table and go to get his cereal and that kind of thing without his walker… ah I can't quite differentiate between [whether] it still the rebellion or does he honestly forget…because he does have Alzheimer's but he uses his memory as an excuse' (C10)*

The burden of caregiving was relieved with the advent of the mobility aid, particularly in relation to preventing falls. The reduction in anxiety was foremost in the caregivers' mind when reflecting on the improved safety for the person with dementia.

> *'For me, it makes me feel more comfortable…I do not know as far as he is concerned, [but] I feel he is a little safer with it than without' (C12)*
>
> *'for me it was a huge relief because he would just be walking along and suddenly tip over face first' (C10)*

The walking aid reduced caregiver burden in relation to preventing falls, but there was no evidence to suggest that, from the perspective of caregivers, the mobility aid actually caused falls.

> ‘*We got it as soon as he really needed it and he's done very well with it until his mind got so bad that, you know, I think it’s more his mental state that causes him to fall’ (C12)*
>
> *‘When I look back on the falls I don't think it [the walker] really had anything to do with them’ (C1)*

Healthcare professional involvement

Some people living with Alzheimer’s dementia were prescribed or recommended a mobility aid by a healthcare professional. Prescription of the mobility aid came along with professional training and advice.

> *‘Physio came in or OT [occupational therapy]…they made sure that the walker was set up for Mom's height, to make it comfortable. They as assessed her that way… yes they did, the physio came in and they showed you how to use the brakes and to walk with it’ (C7)*
>
> *‘He was given lessons…physiotherapy came and showed him how to use it and a number of times they walked with him…and they made a lot of suggestions on posture and so on’ (C10)*

Despite being prescribed the mobility aid by a professional, there were disparate views on the benefits of training in their use.

> *‘You don't need no training…they tell you how to use it and you find out yourself’ (P4)*
>
> *‘I think it is obvious’ (P6)*

> *'They adjusted it, I remember that now that I think about it…they did adjust it for her and that was it. You know, off our go, like you know, but I didn't ask either because…I just figured it's like Wal-Mart…you buy something and you leave' (C 37)*

Numerous caregivers, or other family members, had self-prescribed a mobility aid based on their perception of need and the availability of the aid through friends.

> *'We just got one for him…I just decided that he really needed it and he mentioned it so we thought well we will just get one…I looked up on the Internet for the length and everything' (C1)*
>
> *'She used a cane and then when our friend died…we borrowed a walker from friends' (C6)*

Following the mobility aid prescription, there was an important time of adjustment for the person with the Alzheimer's dementia to master the use of the aid.

> *'At first she was little bit clumsy with it but now she is pretty good…I'm going to say [it took]) probably the first three months maybe even four…at least three months but then all of a sudden it just sort of clicked and she was with it' (C3)*
>
> *'The training was there [in] the actual use…it took a while for the brain to train itself to get into that subconscious mode' (C2)*
>
> *'It took her a while to get used to it' (C6)*

Once that period of adjustment had passed, there appeared to be a greater acceptance of the mobility aid.

> *'I guess it was just getting used to it, you know, I knew I had to have it and so you have to make your mind up you like it' (P10)*
>
> *'It was something new and, as you know with Alzheimer's, things have to be always the same and at the beginning everything was new and it was upsetting. She was never upset about the machine…she was upset about always having to think about*

> *using it and sometimes, at first, especially in the house she wouldn't use it or didn't use it but sooner or later she found that she really can't do much without it' (C6)*

Environment and design of aids

Persuading people living with Alzheimer's dementia to use a mobility aid inside their homes was difficult for reasons of space, practicality and distance.

> *'I walk in the house by myself but I always got something to hang on to…the house is so small…I just as soon grab onto the wall or something' (P3)*
>
> *'Once we got it I realized we could not use it in the house…it was just too bulky so we only use it going outside' (C11)*

There were numerous challenges associated with the use of a mobility aid, from terrains and crowds to size and weight of the equipment.

> *'Stairs and snow…bad weather can be an issue for you' (C10)*
>
> *'Able to push it over the uneven grass and ground .. but not worth it, too much effort actually it could be more harmful if he loses control.' (C11)*
>
> *'You have to make sure there is a spot to put your walker. like if you go into a restaurant, they have to take it away and put it somewhere otherwise people trip over it or its in everyone's way.(C12)*
>
> *'If it were lighter…I am finding it really difficult lifting it in and out of the car' (C10)*

Alongside challenges come the many practical positives of mobility aid design, such as its ability to fold up, the padded seat and the brakes.

> *'I can fold it up and put it in the trunk' (P4)*
>
> *'I use the seat…I lock the walker and I sit down and have a little rest periodically' (P11)*

DISCUSSION

The objective of this study was to explore and better understand the perceptions of people living with mild-to-moderate Alzheimer's dementia and their caregivers on the use of mobility aids. This is the first study to explore the subjective experiences of the person living with Alzheimer's dementia and their caregivers with the use of mobility aids, adding new information to our understanding of interventions to facilitate mobility and independence in this patient population. Five themes were identified from the interviews.

As identified through this study, mobility and independence were a high priority for people living with Alzheimer's dementia. Caregivers play a critical role in ensuring mobility and independence by providing assistance whenever it is required. In this study, caregiver assistance was in the form of identifying the need for a mobility aid, obtaining a mobility aid, and providing consistent and vigilant reminders for its use. The broader literature suggests that caregivers are often stressed with the intensity and constancy of their role, taking a physical and emotional toll. [33] Meyer et al. [34] found that caregiver strain was significantly higher among those caring for someone at high risk of falls. Caregivers expressed a fear that the person they cared for might fall and a need for constant vigilance which impacted on their ability to care for themselves and nurture their own wellbeing. [35]

Only half of our participants were recommended a mobility aid by a healthcare professional. For the others, the caregivers self-prescribed for the person living with Alzheimer's dementia. Previous research identified a lack of healthcare-practitioner involvement in prescribing the aid and providing training had affected 67% of older adult cane users [16] and 80% of walker users [17]. Lack of a healthcare professional's involvement may lead to problems with fitting of the equipment and lack of training for safe use of the aid. Improper fitting most commonly results in the aid being too low, producing a forward leaning posture in standing that shifts the person's centre of gravity close to their limits of stability. [16,17] The change in posture creates a greater likelihood that balance will be lost with perturbations that occur with normal weight transfer during gait and also with unexpected perturbations, even of a small magnitude. [36] Given that mobility aids can be obtained from informal sources, the review of these aids for height, mechanical soundness (e.g., integrity of brakes, ferrules and screws) and correct use could be part of a regular health check by a healthcare professional (e.g., physical and occupational therapists in healthcare teams).

There were some contrasting views in our present study on the importance of training for use of the mobility aid. Again previous research has demonstrated that the improper technique of equipment use is common among cane users and can include use of a cane on the incorrect side or the inability to appropriately sequence the cane and contralateral leg.[16] In order for people living with Alzheimer's dementia to learn new skills, it is important that they have access to knowledgeable healthcare practitioners. The appropriate skill set to work with this population would include an emphasis on implicit over explicit learning and also effective communication strategies.[37,38]'[39] Caregivers are also a valuable resource for healthcare professionals, and can provide their insight and expertise of strategies that they have used with success to help partner in rehabilitation interventions.

Research in older adults has demonstrated that there can be significant stigma with use of mobility aids due to a negative perception associated with aging. [18] In contrast, our study sample of people living with Alzheimer's dementia mostly saw mobility aids as facilitating stability, preventing falls and aiding independence, and, for them, these factors overcame any external or internal ageism and stigma. Although some of the participants were initially resistant to using the equipment that seemed to decrease over time. The same effect was reported by Gooberman-Hill et al. [18] in their study on community-dwelling older adults. Importantly, a period of learning to use the equipment was needed. This speaks to the role of healthcare professionals in providing education and support to people living with

Alzheimer’s disease who have newly acquired a mobility aid. The perception by the person using a mobility aid of the device’s safety is the strongest predictor for use of the equipment and improved mobility.[21] Consistent with this, we found people with Alzheimer’s dementia and their caregivers considered use of a mobility aid was associated with increased safety and not an increased risk of falls. Opportunities for future research include exploring environmental and design adaptations of mobility aids so they can be more user-friendly, particularly inside the house.

A limitation of this study is that we used a convenience sample of individuals who were attending a special program for people with dementia, for which a referral was required. We suggest that further research be conducted in samples across different healthcare settings. Another potential limitation was that the communication abilities of the people with Alzheimer’s dementia varied among our participants, therefore this could have prevented people from being able to fully engage with our interviews. . To help address this potential limitation, we conducted the interviews jointly with the person with dementia and their caregiver if the person with dementia was not able to participate independently in an interview. Strengths of this study were that our data-analysis procedures involved two people independently coding the interviews and that the core group of authors met for debriefing sessions.

CONCLUSIONS

Overall, the study findings suggest that mobility aid use is seen positively by people living with Alzheimer’s dementia and their caregivers for prevention of falls and maintaining independence. Caregiver oversight for use and safety while using the mobility aid was reported, though this effort was balanced by the benefit that the caregivers saw from use of the aids. There is a role for healthcare professionals to be involved in the prescription, provision and training for use of mobility aids among people living with Alzheimer’s dementia to ensure uptake and safety.

REFERENCES

1. Clarke P, Chan P, Santaguida PL, Colantonio A. The use of mobility devices among institutionalized older adults. J Aging Health. 2009;21:611–626.

2. Wittwer JE, Webster KE, Menz HB. A longitudinal study of measures of walking in people with Alzheimer's Disease. Gait Posture [Internet]. 2010;32:113–117. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0966636210001025

3. Suttanon P, Hill KD, Said CM, Dodd KJ. A longitudinal study of change in falls risk and balance andmMobility in healthy older people and people with Alzheimer disease. Am J Phys Med Rehabil [Internet]. 2013;92:676–685. Available from: http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00002060-201308000-00004

4. Taylor ME, Delbaere K, Lord SR, Mikolaizak a S, Close JCT. Physical impairments in cognitively impaired older people: implications for risk of falls. Int Psychogeriatr [Internet]. 2013;25:148–56. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22831907

5. Tinetti ME, Speechley M, Ginter SF. Risk factors for falls among elderly persons living in the community. N Engl J Med. 1988;319:1701–1707.

6. Asada T, Kariya T, Kinoshita T, Asaka A, Morikawa S, Yoshioka M, Kakuma T. Predictors of fall-related injuries among community-dwelling elderly people with dementia. Age Ageing [Internet]. 1996;25:22–28. Available from: http://www.ncbi.nlm.nih.gov/pubmed/8670525

7. Hill KD, LoGiudice D, Lautenschlager NT, Said CM, Dodd KJ, Suttanon P. Effectiveness of balance training exercise in people with mild to moderate severity

Alzheimer's disease: protocol for a randomised trial. BMC Geriatr [Internet]. 2009;9:29. Available from: http://www.biomedcentral.com/1471-2318/9/29

8. Shaw FE, Bond J, Richardson D a, Dawson P, Steen IN, Mckeith IG. Multifactorial intervention after a fall in older people. Br Med J. 2003;326:1–6.

9. Burton E, Cavalheri V, Adams R, Browne CO, Bovery-Spencer P, Fenton AM, Campbell BW, Hill KD. Effectiveness of exercise programs to reduce falls in older people with dementia living in the community: a systematic review and meta-analysis. Clin Interv Aging [Internet]. 2015;10:421–34. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4330004&tool=pmcentrez&rendertype=abstract

10. Bateni H, Maki BE. Assistive devices for balance and mobility: Benefits, demands, and adverse consequences. Arch Phys Med Rehabil. 2005;86:134–145.

11. Härdi I, Bridenbaugh SA, Gschwind YJ, Kressig RW. The effect of three different types of walking aids on spatiotemporal gait parameters in community-dwelling older adults. Aging Clin Exp Res. 2014;26:221–228.

12. Pellfolk T, Gustafsson T, Gustafson Y, Karlsson S. Risk factors for falls among residents with dementia living in group dwellings. Int Psychogeriatrics [Internet]. 2009;21:187. Available from: http://www.journals.cambridge.org/abstract_S1041610208007837

13. Muir-Hunter S., Montero-Odasso M, Montero Odasso M. The attentional demands of ambulating with an assistive device in older adults with Alzheimer's disease. Gait Posture. 2017;54:202–208.

14. Hunter SW, Divine A, Omana H, Wittich W, Hill KD, Johnson AM, Holmes JD.

Effect of Learning to Use a Mobility Aid on Gait and Cognitive Demands in People with Mild to Moderate Alzheimer's Disease: Part II – 4-Wheeled Walker. J Alzheimer's Dis. 2019;71:S115–S124.

15. Hunter SW, Divine A, Omana H, Wittich W, Hill KD, Johnson AM, Holmes JD. Effect of Learning to Use a Mobility Aid on Gait and Cognitive Demands in People with Mild to Moderate Alzheimer's Disease: Part I – Cane. J Alzheimer's Dis. 2019;71:s105–s114.

16. Liu H (Howe), Eaves J, Wang W, Womack J, Bullock P. Assessment of canes used by older adults in senior living communities. Arch Gerontol Geriatr [Internet]. 2011;52:299–303. Available from: http://dx.doi.org/10.1016/j.archger.2010.04.003

17. Liu H. Assessment of rolling walkers used by older adults in senior-living communities. Geriatr Gerontol Int. 2009;9:124–130.

18. Gooberman-Hill R, Ebrahim S. Making decisions about simple interventions: Older people's use of walking aids. Age Ageing. 2007;36:569–573.

19. Aminzadeh F, Edwards N. Exploring Seniors' Views on the Use of Assistive Devices in Fall Prevention. Public Health Nurs. 1998;15:297–304.

20. Gitlin L, Schemm R, Landsberg L, Burgh D. Factors predicting assistive device use in the home by older people following rehabilitation. J Aging Health. 1996;8:554–575.

21. Resnik L, Allen S, Isenstadt D, Wasserman M, Iezzoni L. Perspectives on mobility aid use in a diverse population of seniors: implications for intervention. Disabil Heal J. 2009;2:77–85.

22. Hall AJ, Burrows L, Lang IA, Endacott R, Goodwin VA. Are physiotherapists employing person-centred care for people with dementia? An exploratory qualitative

study examining the experiences of people with dementia and their carers. BMC Geriatr. 2018;18:1–10.

23. Lincoln Y, Guba E. Paradigmatic controverisies, contradictions, and emerging confluences. In: Denzin N, Lincoln Y, editors. The landscape of qualitative research: Theories and issues. 2nd ed. Thousand Oaks, CA: Sage Publishing; 2003. pp 253–291.

24. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. Int J Qual Heal Care. 2007;19:349–357.

25. Albert MS, DeKosky ST, Dickson D, Dubois B, Feldman HH, Fox NC, Gamst A, Holtzman DM, Jagust WJ, Petersen RC, et al. The diagnosis of mild cognitive impairment due to Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease. Alzheimer's Dement [Internet]. 2011;7:270–279. Available from: http://linkinghub.elsevier.com/retrieve/pii/S155252601100104X

26. Folstein MF, Folstein SE, McHugh PR. Mini-Mental State: A practical method for grading the state of patients for the clinician. J Psychiatr Res. 1975;12:189–198.

27. Lawton MP, Brody EM. Assessment of Older People: Self-Maintaining and Instrumental Activities of Daily Living. Gerontologist. 1969 September;9:179–186.

28. Delbaere K, T. Smith S, Lord SR. Development and Initial Validation of the Iconographical Falls Efficacy Scale. Journals Gerontol Ser A Biol Sci Med Sci. 2011 June;66A:674–680.

29. Delbaere K, Close JCT, Taylor M, Wesson J, Lord SR. Validation of the iconographical falls efficacy scale in cognitively impaired older people. Journals

Gerontol - Ser A Biol Sci Med Sci. 2013;68:1098–1102.

30. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3:77–101.

31. Cresswell J. Qualitative Inquiry and Research Design: Choosing Among Five Approaches. Los Angeles, CA: Sage Publishing; 2013.

32. Reissman C. Narrative methods for the human sciences. Thousand Oaks, CA: Sage Publishing; 2008.

33. Pinquart M, Sorensen S. Differences between caregivers and noncaregivers in psychological health and physical health: a meta-analysis. Psychol Aging. 2003;18:250–267.

34. Meyer C, Dow B, Bilney BE, Moore KJ, Bingham AL, Hill KD. Falls in older people receiving in-home informal care across Victoria: Influence on care recipients and caregivers. Australas J Ageing. 2012;31:6–12.

35. Dow B, Meyer C, Moore K, Hill K. The impact on caregivers of care recipient falls. Aust Heal Rev. 2013;37:152–157.

36. Choi HJ, Ko CY, Kang S, Ryu J, Mun M, Jeon HS. Effects of balance ability and handgrip height on kinematics of the gait, torso, and pelvis in elderly women using a four-wheeled walker. Geriatr Gerontol Int. 2015;15:182–188.

37. Ries JD. Rehabilitation for Individuals with Dementia: Facilitating Success. Curr Geriatr Reports. 2018;7:59–70.

38. White L, Ford M, Brown C, Peel C, Triebel K. Facilitating the use of implicit memory and learning in the physical therapy management of individuals with Alzheimer disease: A case series. J Geriatr Phys Ther. 2014;37:35–44.

39. Creighton AAS, Davison TTE TE, van der Ploeg ES, Camp CCJ, O'Connor D, O'Connor DW. Using spaced retrieval training to teach people with dementia to independently use their walking aids: two case studies. Clin Gerontol [Internet]. 2015;38:170–178. Available from: http://dx.doi.org/10.1080/07317115.2014.988899

Table 1. Demographic characteristics of participants with Alzheimer's dementia (n=12).

	Mean ± SD or Frequency (%)
Age (years)	86.8 ± 5.0
Education (years)	10.0 ± 3.0
Gender (males, %)	8 (67%)
History of falls in previous 12 months (Yes, %)	9 (75%)
Number of falls in the previous 12 months (range)	0 – 10
Mini-Mental State Examination Score	20.1 ± 5.8
Iconographic Falls Efficacy Scale	17.5 ± 7.9
Living alone	4 (33%)
Lawton Brody Basic Activities of Daily Living (number)	5.5 ± 0.7
Lawton Brody Instrumental Activities of Daily Living (number)	1.3 ± 1.4
Mobility aid (n,%)	
4-wheeled walker	10 (83%)
Single-point cane	2 (17%)

Table 2. Summary of the interview dyads involving the person with Alzheimer's dementia and their caregiver.

	Subject ID											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Gender	M	M	F	M	F	F	F	M	F	M	M	M
Age (years)	87	84	79	88	89	92	86	71	96	87	86	79
Years with aid	4	1.5	2	1	1	8	1	11	2	2.5	1	1.5
Aid	Cane	Cane	Walker	Walker	Walker	Walker	Walker	Walker	Walker	Walker	Walker	Walker
Caregiver	Spouse	Son	Spouse	Spouse	Daughter	Sister	Daughter	Spouse	Daughter	Spouse	Spouse	Spouse

Note: M, male; F, female.

Appendix: Interview Guide

To interviewer:

Alzheimer’s disease is a chronic neurodegenerative disease that may elicit an emotional response from participants and their caregivers. Participants may also experience symptoms such as memory problems, frustration, and difficulty following instructions during the course of the interview. The following is a list of occurrences that require you to stop the interview. In addition to this list, use your discretion in assessing circumstances that might indicate a participant is feeling too uncomfortable or upset to continue with the interview.

1. If a participant or caregiver explicitly says to stop the interview
2. If the participant or caregiver verbally or physically implies that they would like the interview to stop (e.g., a hand gesture of “stop”, saying “I don’t think I can do this”, etc.)
3. If the participant or caregiver is emotionally upset and is unable to speak.

Upon stopping, ask the participant or caregiver if they would like to take a break from questioning and continue the interview after a short while, if they would like to reschedule the rest of the interview at a later date, or if they would like to withdraw from the study.

To participants and caregivers:

Today we are interested in learning about your experiences with your wheeled walker. We have a set of questions prepared to guide our discussion, but you may skip any you would rather not answer. Feel free to include as much or as little detail as you feel comfortable. The purpose of the interview is to help health care professionals understand the perceptions of 4-wheeled walker use by individuals living with Alzheimer’s disease. This information will inform health care professionals on ways to enhance wheeled walker use.

Do you have any questions?
Do I have your consent to record the interview as it takes place?

For the benefit of the tape, it is (date/time) and present there is me and (participant’s study number).
Before we start, I have a few questions that you may answer yes or no to:

Do you understand what the interview is about?
Do you understand the purpose of the interview?
Do I have your verbal consent to take part in the interview and be recorded?

Everything you say during the interview is confidential; however, if you disclose any information that highlights a breach of the law or dangerous practice, I will have a duty to break confidentiality. This means that, if during the session, you tell me the law has been broken, or something dangerous has been done that may result in harm to yourself or others, I will have to report it to the necessary people.

If anything we speak about today makes you feel uncomfortable, you are free to not discuss a particular topic. You may request the recorder to be switched off, or to resume the interview after a short break, or you can ask to terminate the interview altogether at any point. If, after the interview, you wish to remove your comments from the study, please contact us, and none of your comments will be used when performing the analysis.

<u>Interview questions:</u>

1. How long have you (or your loved one) had the 4-wheeled walker?

2. What did you expect from getting the 4-wheeled walker?
   a. Did you think it would help you? How?

3. How did you feel when you (or your loved one) first got the 4-wheeled walker?
   a. Compared to then, how do you feel about the 4-wheeled walker now?
   b. What has changed/why has your perspective changed?

4. Do you (or your loved one) use the 4-wheeled walker that was prescribed?
   a. How often do you (or your loved one) use the 4-wheeled walker?
   b. Are there certain times you (or your loved one) don't use it?" Why or why not?
   c. How often do you (or your loved one) leave the house with the 4-wheeled walker?
   d. What kind of activities do you (or your loved one) use the 4-wheeled walker for?
   e. Does the walker make you (or your loved one) feel steady on your feet when you use it?
   f. Is it useful? Why or why not?
   g. How often do you (or your loved one) need to be reminded to use the 4-wheeled walker?

5. Are there things that make it more difficult for you to use the 4-wheeled walker? Things that make it easier?
   a. Social settings? Support from another person?
   b. Environmental settings?
   c. Transportation?

6. What advice were you given, if any, when you were first prescribed the 4-wheeled walker?
   a. Did someone fit it for you?
   b. What did they say?
   c. Did you feel your received enough training?
   d. Have you fallen while using the 4 wheeled walker?

7. Can you tell me what you like about the 4-wheeled walker? What do you dislike?
   a. Physically?

    b. Emotionally?

8. How do you think people view you while you are using the 4-wheeled walker?
    a. Does that affect your willingness to use the 4-wheeled walker?
    b. Do you think it changes based on the setting you are in?
    c. Do you ever worry about what people think of you when you use the 4-wheeled walker?