

# The Safe Home Care Intervention Study: Implementation Methods and Effectiveness Evaluation

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## Abstract

Home care (HC) aides experience numerous safety hazards in clients' homes; many hazards also put clients at risk. We hypothesized that safety coaching led by nurse managers (NMs) during their initial HC needs assessment could prompt clients to improve safety conditions in their homes. Following a 2-arm proof-of-concept intervention study design, intervention NMs used motivational interviewing (MI), facilitated by a safety handbook and video, to coach clients on home safety improvements. Control arm NMs performed intake assessments with no changes to usual practices. Intervention effectiveness was assessed by NMs and aides. Three HC agencies and two elder services contributed 35 intervention and 23 control homes. NMs coached 97% of clients and reported that 94% were engaged; 63% implemented improvements. NMs' and aides' assessments were consistent; homes with clients reported by NMs as resistant to safety changes had higher aides' hazard scores. Client coaching can be effective for improving HC safety.

## Keywords

patient safety, home care aide safety, home care safety, home care aides, occupational safety and health, occupational health intervention study, motivational interviewing, home safety checklist

### *What this paper adds*

- Effective methods and resources, developed in collaboration with an extensive home care (HC) practice community, to improve both HC client and aide safety.
- A Nurse Manager led safety intervention designed to coach clients on creating safe HC conditions. Previous HC safety intervention studies have focused mainly on training aides, however, even with adequate training, aides and their employers cannot always ensure safe conditions in private homes.
- Motivational interviewing training adapted to empower HC clients to improve safety in their home environments. Previously, MI has been applied mainly to individual behavioral health changes.

### *Applications of study findings*

- Nurse managers should be supported by their employers to incorporate aide safety into their initial assessments of client HC needs.
- HC clients should be provided with resources to improve safety in their homes for themselves and their caregivers.
- National and international initiatives on aging well, gerontology organizations, HC trade associations, elder services, and government programs on aging should include HC workforce safety solutions.

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## Introduction

Home care (HC) is one of the fastest growing industries, and aides, the largest segment of the workforce, are among the fastest growing occupations (Bureau of Labor Statistics, 2022; Paraprofessional Healthcare Institute, 2023). Aides are urgently needed to care for the rapidly aging population. Most HC recipients ("clients") are 65 years and older, many with complex medical and personal care needs, and prefer receiving care at home. (Binette, 2021) Demand for HC services is outpacing supply of HC aides, and shortages and turnover challenge the industry. (Baron et al., 2022; Gleason et al., 2021; Quinn et al., 2021; Watts et al., 2022) Previous studies demonstrate that, aides experienced serious work-related safety and health risks that can result in lost work time or leaving the workforce entirely, including back injuries and musculoskeletal strain from client lifting and mobilization; needlesticks from used medical sharps lying around the home; respiratory health hazards from exposures to infections and to cleaning and disinfecting chemicals; and experiences of verbal and physical violence. (Brouillette et al., 2017a, 2017b; Karlsson et al., 2019, 2020; Lindberg et al., 2021; Markkanen et al., 2007a, 2014, 2017, 2018; Quinn et al., 2009, 2016, 2017; Sama et al., 2020) Many of these hazards also put clients at risk and burden aides' employers, who are challenged to recruit, train, and retain the workforce.

Home care services include long-term continuous care for assistance with activities of daily living (ADLs), brief or intermittent medical care, and hospice care. HC aides may be employed by private businesses called "agencies" that may be multi-service home health agencies providing nursing and aide services or by an agency employing only aides. In Massachusetts USA, the NM may be employed by a private HC agency or a publicly funded elder services organization that oversees programs for older adults, including HC. (Commonwealth of Massachusetts, 2023) Aides may also be employed directly by clients. This study focuses on HC provided by agencies and elder services.

Delivery of HC services begins with a client and home assessment, usually conducted by a nurse manager (NM) who makes an "intake" visit to each new client and creates a written care plan. The intake assessment provides guidance for the client/family and specifies the aide's duties for subsequent visits, for example, personal care and/or home-making. The NM ensures that clients can be safe at home, but this assessment does not typically consider aide safety.

The objective of this study was to evaluate the extent to which NM-led safety coaching could motivate new HC clients to create safe conditions in their homes for their aides and themselves.

## Methods

### Study Design and Overview

The Safe Home Care Project follows research-to-practice (r2p) methods (National Institute for Occupational Safety and Health, 2011) to gain HC stakeholder input to ensure that

the research is relevant and can translate into HC improvements. Accordingly, development of materials and methods was informed by in-depth interviews with HC agency and elder services managers, clients, leaders in HC trade associations, as well as focus groups and interviews of aides. (Brouillette et al., 2022; Markkanen et al., 2021) The intervention was developed, implemented, and evaluated 2019–2023; the NM survey and aide safety checklist data presented here were collected between July 2022 and January 2023.

We hypothesized that clients would improve safety conditions in their homes if coached by NMs applying the intervention during intake assessment. We conducted a 2-arm proof-of-concept intervention study, applied at the NM level with the client home as the unit of analysis (Sorensen et al., 2019). In the intervention arm, NMs employed by HC agencies and elder services used Motivational Interviewing (MI) techniques (Bischof et al., 2021; Miller et al., 2013) to coach their clients on creating safe conditions in their homes. This was augmented by a printed safety handbook and companion video. NMs in the control arm performed their client intake assessment with no changes to usual practices.

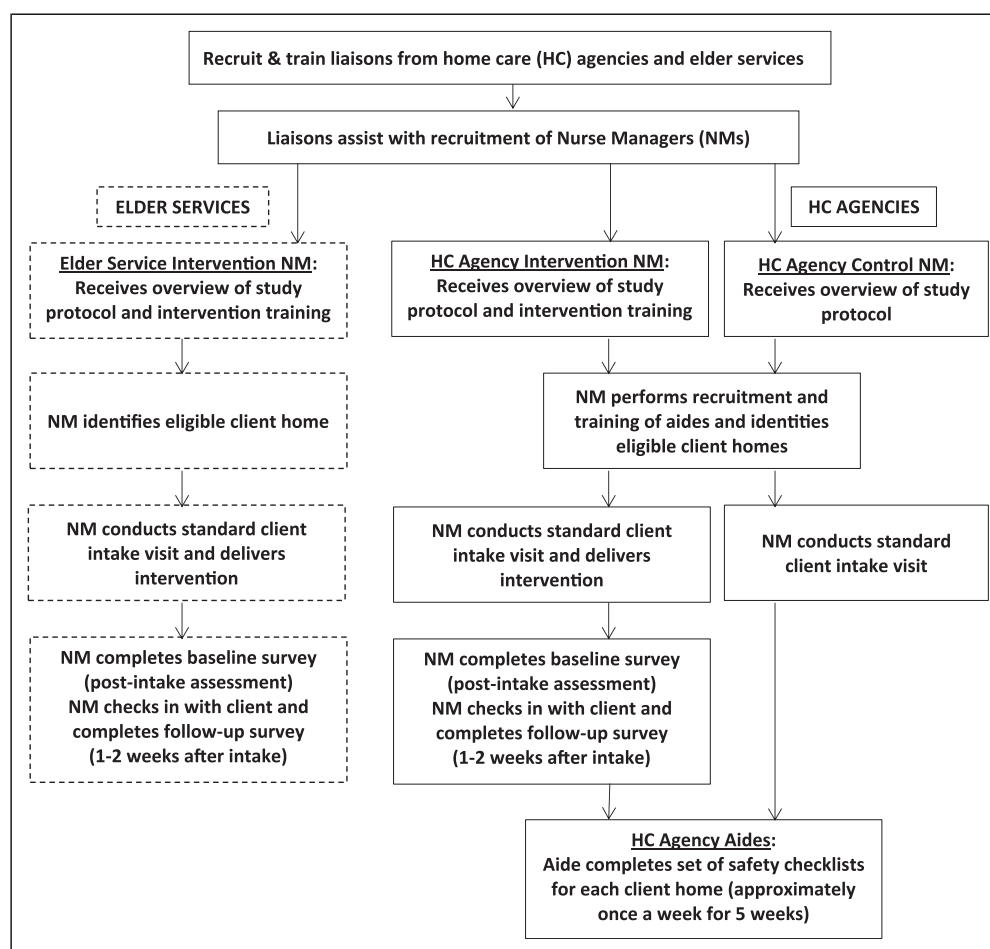
Intervention effectiveness was assessed by NMs and aides. Intervention arm NMs completed a baseline survey at client intake and a follow-up survey two weeks into the delivery of HC services. NM surveys assessed clients' receptivity to coaching, barriers to creating safe conditions, clients' readiness for making changes, and whether specific home safety conditions improved. Aides, who were blind to both the intervention itself and the intervention status of their clients, completed a safety checklist survey approximately weekly for 5 weeks to record hazards in the home. The number of hazards in intervention and control homes were compared. In a sub-set, only the intervention arm was implemented and evaluated by NMs (Figure 1).

**Human Subjects:** This study included adults (age 18 and older) and all methods and materials were approved by the Institutional Review Board of the University of Massachusetts Lowell: IRB number: 19-112-QUI-XPB. All study participants (liaisons, NMs, and aides) provided signed informed consent.

### Proof-of-Concept Intervention Description

The proof-of-concept intervention study (Sorensen et al., 2019) included materials and methods for study participant recruitment, intervention implementation, and effectiveness evaluation. Main components are described below and available on our website (The Safe Home Care Project, 2023).

**Client Home Care Safety Handbook.** During the intervention development phase in collaboration with HC stakeholders, (Brouillette et al., 2022; Markkanen et al., 2021) we designed a safety handbook to be used by an NM, along with MI (see below), to coach clients on how to prepare for safe HC. The



**Figure 1.** Safe home care study: Intervention implementation methods and effectiveness evaluation by home care agency and elder services staff (2022–2023).

handbook is based on a definition of “safety” which includes psychological and physical safety. For example, a previous study found that clients asking aides for tasks not in their care plan was a risk factor for an aide experiencing verbal abuse (a psychological safety hazard) from a client (Karlsson et al., 2020). Another study showed that the aide’s first visit to a client’s home can be stressful for both parties due to the client’s illness or disability and the aide’s unfamiliarity (Markkanen et al., 2014). While aides experience work-related verbal abuse and other psychological safety hazards, the handbook does not use terms such as “abuse” or “violence” or guide clients on refraining from harmful actions. Instead, the handbook provides positive guidance on establishing mutual respect and good communication which are foundations of positive care relationships (Brouillette et al., 2022; Sundler et al., 2020).

Specific actions related to safe conditions and behaviors a client can take to create a good working relationship with their aide focus on: establishing a pleasant first visit, what their aide needs from them, and what an aide can and cannot do. Handbook topics related to physical safety are based on

risk factors identified in previous research (Lindberg et al., 2021; Markkanen et al., 2007b, 2014, 2017, 2018, 2021; Quinn et al., 2009, 2016; Sama et al., 2020) and address: uncontrolled pets; infection prevention; availability of cleaning supplies; accessibility into and within the home; lighting; slip, trip and fall hazards; bathroom safety; bedroom safety; clutter in common areas; and medical sharps safety and proper disposal. The handbook uses engaging illustrations and concise, reader-friendly text to accommodate both verbal and visual learning styles.

**Companion Video.** In collaboration with a healthcare patient safety organization, we developed a four-minute video to accompany the handbook for those preferring a visual presentation (The Safe Home Care Project, 2023).

**Motivational Interviewing and Occupational Safety and Health Trainings for Nurse Managers.** We adapted MI methods and created a 50-min online training to teach intervention NMs to effectively coach clients on HC safety and specific actions to improve safety conditions in their homes. Additionally, we

developed an MI script for intervention NMs to guide conversations with clients as they reviewed the handbook and video. While the main objective was to improve safety for aides, the conditions addressed in the NM-led intervention could also improve client safety. For example, removing slip, trip, or fall hazards; infection prevention measures; and good communication techniques to reduce psychosocial stress benefited the client and aide. MI is based on person-centered counseling skills designed to identify barriers and enhance clients' motivation to change (Bischof et al., 2021; Miller et al., 2013; Rollnick S, 2004). Although MI is traditionally used to help patients make behavioral changes for smoking cessation or substance abuse, it is increasingly being used to help patients make other healthier changes including diet, physical activity, and treatment adherence (Bischof et al., 2021; Substance Abuse and Mental Health Services Administration, 2019). NMs assigned to the intervention arm earned 1 continuing education unit (CEU) for completing MI training.

Intervention-assigned NMs were offered an optional online training (20 minutes) to identify and abate occupational and client hazards in the home environment. At the end of the study, NMs in the control arm were offered the full set of training materials and the CEU for completing the MI training.

**NM Surveys—Baseline and Follow-Up.** NMs identified new clients as they entered HC. The primary criterion for inclusion was that the adult client would receive services long enough for their aide to complete the safety checklists; approximately six weeks. The research team had no contact with clients and no personal information was collected. Intervention arm NMs completed two 5-min online surveys (Qualtrics, Provo, UT). The baseline survey was completed immediately following client intake assessment and the follow-up survey two weeks into the delivery of HC services.

The NM surveys assessed clients' receptivity to safety coaching, barriers to making safety changes (cognitive, physical, family support, financial, and physical space in the home), clients' readiness for change, and whether safety conditions were created (see Appendix). Clients' readiness to make a safety change was assessed using the standard stages of change behavioral health model with a five-point scale: precontemplation/resistance, contemplation, preparation, action, maintenance and termination (Glovsky, 2013; Rollnick S, 2004; Rural Health Information Hub, 2023). Precontemplation or resistance indicates there is no intention to act, whereas contemplation indicates a client has intentions to take an action in the near term. Preparation indicates some steps have been taken and action means change has already occurred for a short period of time. Maintenance and termination are the final stages including long-term change(s) and zero impulse for relapse, respectively (Rural Health Information Hub, 2023). The surveys assessed client's stage of change with respect to hazards covered in the handbook.

NM surveys documented implementation process elements to measure fidelity (the extent to which the intervention

was delivered as planned) and other process evaluation metrics. These are the focus of another paper (Markkanen et al., 2024).

**Aide Safety Checklist Survey.** We developed a checklist for aides to use for their intervention effectiveness evaluation. The checklist could be completed in under 5 minutes and contains safety conditions covered in the handbook and an optional comment field (see Appendix). Following the NM intake assessment, aides visited the client and completed the safety checklist weekly for five weeks. The five repeated checklists increased the study power to detect differences between intervention and control homes. The study was not designed to evaluate trends in safety improvements over time. The checklist responses were used to calculate a hazard score for each home visit (see data analysis below). Aides completed hard copy checklists and returned them in a postage-paid envelope, as recommended by our partners.

### Recruitment of Study Participants

Recruitment meetings were held with HC agencies and elder services to review the methods and request participation in the full intervention study with both an intervention and control arm. Participating organizations identified a study liaison, typically a manager or director, who provided oversight for the study. In two agencies, NMs were randomized to the intervention and control arms. In a third agency, there was only one NM and the control arm visits were completed first, to avoid spillover. Then the NM conducted training for and implemented the intervention arm visits. Study materials were only shared with designated participants to prevent the intervention from reaching control homes. Research team support was provided via phone and email. HC agencies and elder services were offered incentives (\$300) to participate in the study. NMs were offered incentives: control arm \$150; intervention arm \$250; and both arms \$400. Two organizations were interested in participating but unable to provide a control arm, so were offered only the intervention arm.

Aides in participating agencies were then recruited and trained to evaluate safety in homes (intervention and control). To prevent contamination across groups, aides were blinded to the intervention itself and the intervention status of client homes. Aides were paid an initial incentive (\$20) after training for the study and another incentive (\$100) once they completed a set of 5 surveys in a household.

### Data Management and Statistical Analyses

NM surveys were entered in Qualtrics, and aide checklists were entered in REDCap (Research Electronic Data Capture, <https://www.project-redcap.org>). For both NM surveys (intervention homes) and aide safety checklists (intervention and control homes), descriptive analyses were conducted and

frequencies of responses to specific questions were examined. Chi-squared analyses were used to compare conditions reported by NMs at baseline versus follow-up. For the aide safety checklist data, the hazard score for each home was calculated as the mean number of hazards reported by an aide immediately following 4–5 visits. Differences in the average hazard score between intervention and control homes were compared using a mixed model (to control for repeated measures) with client home as a random effect. For clients' homes having both NM assessments and aide safety checklists (only agency intervention homes), correlations were calculated between the client stage of change reported by NMs and the average hazard scores calculated from the aide safety checklists. Within intervention homes, a mixed model was used to compare consistency between NM-reported post-intervention safety changes and aide checklist hazard scores. All analyses were performed using SAS 9.4 (SAS Institute Inc., Cary, NC, USA).

### Dissemination of Findings and Intervention

At the end of the study, access to the full set of materials was made available to participants and key stakeholders. Study partners in the HC practice and patient safety communities also distributed the materials ([The Safe Home Care Project, 2023](#)).

## Results

Overall, our methods and materials were delivered with good fidelity. NMs reported that in almost all cases (34/35), the intervention was delivered as planned. Across participating agencies, response and completion rates for survey and checklist data collected both by NMs and aides were consistently high.

### Study Participants: Home Care Agencies and Elder Services, Liaisons, Nurse Managers, and Aides

Three HC agencies were recruited to participate in both intervention and control arms, providing a total of 3 liaisons (one at each agency), 5 NMs, 33 aides, and 43 client homes. Additionally, we recruited 2 elder services that agreed to conduct only the intervention arm, contributing 2 liaisons, 3 NMs, 15 homes, and no aides. [Table 1](#) describes the characteristics of participating aides who completed and returned their demographic information forms (24 out of 33). Nurse managers and liaisons averaged 44 years of age and 92% ( $n = 11$ ) were white females.

### Home Care Services Provided to Intervention Homes

Nurse manager baseline surveys collected information on HC services provided to 35 intervention homes ([Table 2](#)). During structured post-intervention interviews, liaisons and NMs

confirmed that the distribution of services among control homes was similar.

### Nurse Manager Intervention Effectiveness Evaluation

Among the 35 intervention homes, NMs were able to coach all but one client (97%) using the handbook. NMs completed 34 baseline and 30/34 (88%) follow-up surveys. (Four clients could not be reached for various reasons.) The mean time between NM intake and follow-up visits was 15 days. Of those coached, 94% were reported to be very interested or maybe interested in the material. Seventy-three percent ( $n = 22$ ) of the follow-up visits were conducted by telephone; eight were in-person. 63% of clients in the intervention arm had implemented safety changes and NMs estimated that over

**Table 1.** Demographic Characteristics of Home Care Aides. Safe Home Care Intervention Study, July 2022–January 2023.

Demographic variable	Aides $n = 24^b$
Gender: (Female) $n$ (%)	22 (91.7%)
Age: Mean (SD)	54.4 (12.1)
Years worked in home care: mean (SD)	17.5 (10.4)
Race: $n$ (%)	
American Indian/Alaska native	0 (0%)
Asian	0 (0%)
Native Hawaiian or other Pacific Islander	0 (0%)
Black or African American	13 (54.2%)
White	10 (41.7%)
More than one race	0 (0%)
Unknown/not reported	1 (4.2%)
Ethnicity	
Hispanic or Latino $n$ (%)	1 (4.2%)
Current job title: <sup>a</sup> $n$ (%)	
Certified nurse assistant	8 (33%)
Home health aide	19 (79.2%)
Home care aide	3 (12.5%)
Homemaker	2 (8.3%)

<sup>a</sup>Not mutually exclusive. Aides can have more than one job title.

<sup>b</sup>Nine aides did not return the form.

**Table 2.** Services Provided to Intervention Homes ( $n = 35$ ). Safe Home Care Intervention Study, July 2022–January 2023.

Service	$n$ (%) <sup>a</sup>
Home health care	21 (60%)
Homemaking	20 (57%)
Personal care	17 (49%)
Supportive home health care	5 (14%)
Skilled nursing care	1 (3%)
Other <sup>b</sup>	10 (29%)

<sup>a</sup>Percentages sum to >100 because multiple services were provided during a single client visit.

<sup>b</sup>Including: delivered meals, medication assistance, laundry, and other special program services.



half (53%,  $n = 16$ ) would make future safety changes. NMs reported that approximately 70% of clients willing to implement safety changes at the intake visit remained interested at the follow-up visit.

After safety coaching, NMs reported that clients were generally amenable to addressing a wide range of safety conditions, particularly hazards that limited accessibility and mobility (Table 3).

### *Aide Intervention Effectiveness Evaluation*

Home care aides completed 204/210 (97%) safety checklist surveys for 42 clients' homes (average number of completed surveys per home = 4.6). These included clients from both the intervention ( $n = 19$ ) and control ( $n = 23$ ) arms. Of the 204 safety checklists submitted, 11/204 (5%) were omitted from analyses because they were erroneously completed prior to the intake visit. In intervention homes, aides began collecting checklist data approximately 5 days after the NM intake visit over approximately 26 days. These data were used to create the average hazard score for each home. The overall mean hazard score was 0.98 hazards with a range of 0–6.4 hazards.

### *Baseline Prevalence of Hazards from Aide Hazard Checklists*

The most common hazards that the aides reported on the first survey conducted in a client home (both intervention and control) was loose pets in the home, reported in one in five homes (Table 4). Other frequently reported hazards were not taking COVID-19 precautions, and aides being asked to do extra tasks outside of their care plan. Table 4 presents key examples of individual hazards; the study was not designed to evaluate the impact of the intervention on any single hazard.

### *Intervention Effectiveness Evaluation Using Aide Hazard Scores*

The hazard scores (total count) calculated from aides' checklists following the first client visit did not differ between intervention and control homes, indicating that at the outset of the study, the intervention and control homes were similar with respect to safety conditions. We hypothesized that the

**Table 4.** Prevalence of Hazards Reported by Aides at the First Visit ( $n = 42$ ). Safe Home Care Intervention Study, July 2022–January 2023.

Hazard category	$n$ (%)
Pets loose in the home during visit = yes	9 (21%)
Client not taking COVID-19 precautions	7 (17%)
Aide asked to do extra tasks	6 (14%)
Bathroom not set up safely	6 (14%)
Smoking or vaping in the home during visit	3 (7%)
Trip hazards observed in the home	3 (7%)

intervention would result in lower mean hazard scores between intervention and control homes by the end of the intervention evaluation period; however, the mean hazard score did not differ significantly between the two groups. In a mixed model with client home as a random effect, no difference was found between the hazard scores from the control (0.8 hazards) versus intervention (1.2 hazards) homes ( $-0.4$  hazards,  $p = .36$ ).

### *Consistency of Nurse Manager and Aide Intervention Effectiveness Evaluations*

Following the intervention effectiveness evaluation, we compared hazard reports from the aides versus safety changes reported by NMs in the intervention homes. Among homes where NMs reported that safety changes had been made, aides reported an average of 0.45 hazards compared to homes where NMs reported that safety changes had not been made, and aides reported an average of 2.40 hazards ( $p = .005$  from a mixed model).

We also found that clients' readiness for change as reported by the NM was associated with aide hazard scores. Specifically, clients judged by NMs to be more resistant to safety changes were more likely to have higher aides' hazard scores ( $r = 0.52$ ,  $p = .02$ ).

## **Discussion**

Unsafe home conditions are obstacles to independent living and put aides at risk. (Brouillette et al., 2017a, 2017b; Gershon et al., 2008; Karlsson et al., 2019; Markkanen et al., 2007b, 2014; Quinn et al., 2009, 2015, 2016; Schoenfisch et al., 2017) During client interviews conducted prior to this study, elders said they would like to ensure safety for their aides, but did not know what to do (Markkanen et al., 2014). The safety handbook with NM-led MI-based coaching intervention helped clients create safer conditions in their homes. Importantly, the handbook addressed psychological and physical safety. Psychological safety hazards, such as those related to emotional abuse, can be more difficult to address in HC than physical hazards, such as a loose throw rug trip hazard. In collaboration with our HC partners, we

**Table 3.** Most Common Improvements Reported in Follow-Up Nurse Manager Surveys ( $n = 30$ ). Safe Home Care Intervention Study, July 2022–January 2023.

Improvement	$n$ (%)
Improved accessibility into the home	13 (43%)
Reduced slip, trip, fall hazards	11 (37%)
Improved accessibility within the home	10 (33%)
Reduced clutter in common areas	10 (33%)
Improved bedroom safety	8 (27%)

developed multiple sections of the safety handbook to provide guidance on specific, positive actions clients can take to establish mutual respect and good communication with aides, foundations of positive care relationships.

MI is a participatory method developed to enable patients to identify and resolve barriers to making healthy behavioral changes (Bischof et al., 2021; Miller et al., 2013; Rollnick S, 2004). To our knowledge, MI methods have not been applied previously for coaching individuals to make healthy changes to their environments. In this study, the MI coaching facilitated by the safety handbook and video was well received by agency liaisons, NMs, and clients, suggesting that this relatively low-cost intervention could be implemented with substantial participation rates industry-wide. Notably, MI techniques were useful for almost all clients, even those who conveyed resistance. This was supported in our intervention arm, when the NM evaluating a resistant client reported: *“It seems like the booklet was informative for [the] elder, and the motivational interviewing assisted him with understanding what he could do better on his end in order to minimize service disruptions.”* In another instance an NM noted: *“... After the safety coaching, he seems to have a better understanding of his own expectations and his previous behaviors toward staff. It seems as though the training helped him think about his role in receiving services.”*

The most common changes made by clients following the intervention were reducing clutter and increasing accessibility to and within the home, as well as other slips, trips, and falls hazards. Slips, trips, and falls cause substantial injuries in elders and HC workers. In the US, falls are the leading cause of injury and death for elders 65 years and older (Centers for Disease Control and Prevention, 2023). A study of workers' compensation claims in Ohio found that falls were the second most frequent causal contributor for workers' compensation claims among HC nurses (34.2%) and HC nursing aides (26.3%) (Davis et al., 2021). Because the intervention was based on continuous improvement, for resistant clients or those challenged with creating safe home environments, we recommend that NMs first apply the intervention with a focus on clutter and accessibility to successfully engage clients and then reapply the intervention to empower clients to improve other conditions.

Nearly all clients who received coaching were interested and willing to make safety changes. Few HC clients expressed no interest in reducing hazards and their homes had a higher average number of hazards reported by aides. Conversely, clients who were open to making changes had a lower average number of hazards. However, despite the favorable uptake of the safety coaching by intervention clients, the mean hazard scores calculated from aides' checklists were no different in intervention versus control homes. As it turned out, the baseline prevalence of hazards was lower than expected (Quinn et al., 2016), which limited our power to observe a significant difference between arms. Another possible explanation was that the checklist used by aides to

score clients' home hazards may itself have served as a safety intervention. Aides were informed only that they were participating in a safety assessment survey and were blind to the intervention. Checklists are often used to promote safety (Gawande, 2009) and aides are effective communicators. Notes made by aides on the safety checklist survey indicated that aides did ask clients to make safety changes. For example, in one control home, an aide noted some broken floor tiles, creating a trip hazard. She notified the client and by the last study visit, the aide reported the floor tiles were repaired, remediating the trip hazard. Although this was not part of the study design, our findings suggest that the aide safety checklist may be a useful tool for promoting HC safety, in addition to the NM MI coaching with the safety handbook. Gershon and colleagues also have shown the effectiveness of a HC safety checklist (Gershon et al., 2012).

A limitation of our methods was the relatively short follow-up time for measuring change in home hazard prevalence. It is possible that clients needed more than the 5-week assessment period to create safer conditions. Additionally, because the research team has been working to improve safety for the HC workforce for two decades, it is possible that some of the participating agencies had already implemented safety measures in response to earlier collaborations. Our safety materials have been requested by many in the HC practice community. It seems likely that agencies willing to participate are more safety conscious than agencies in general. For some agencies, safety improvements encouraged by our intervention had already become a routine part of their intake visits and may have diluted our ability to see differences in hazard scores when comparing intervention versus control homes.

Strengths of this study include the long-established HC safety and health research team and our extensive, actively engaged HC stakeholder partnership network that provided essential input at every stage. Together, we mapped the HC services delivery system and identified HC clients as a new and potentially powerful leverage point for creating safer home conditions. Home care stakeholders were important in identifying safety hazards and especially in identifying effective solutions that they could embrace in their professional practice.

## Conclusion

NM-led safety coaching evaluated in this study can empower HC clients to create safer conditions in their home environments to improve safety for themselves and the aides who visit them. This low-cost intervention has the potential to be scaled up and distributed more widely to agencies, unions, aides, care recipients, and family members including those who directly hire aides. In consumer-directed programs, neither the client nor their aide receives formal guidance on respective roles and responsibilities. The safety handbook could serve this population by providing both education and the basis for establishing safe HC and adhering to reasonable boundaries.

## Acknowledgments

We thank our Safe Home Care research partners including home care agencies, elder services, labor unions, the frontline workforce, home care trade associations, patient safety advocates, and government agencies. We are especially grateful to Professor Glorian Sorensen and colleagues at the Harvard Chan Center for Work, Health, and Well-Being for review of the intervention study design and guidance on the implementation and effectiveness evaluation methods. Many thanks to the Massachusetts Executive Office of Elder Affairs for assistance with home care agency recruiting and review of the safety handbook, to the Betsy Lehman Center for Patient Safety for leadership on the home care safety video, and to 1199SEIU United Healthcare Workers East for recruiting aides for the video and contributing to the safety handbook. A special thanks to all home care aides, nurses, and other caregivers who stepped up during a pandemic and continue to provide the essential care that enables millions of people to age in their homes with dignity and respect.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Ethical Statement

### Ethical Approval

The University of Massachusetts Lowell Institutional Review Board (IRB) approved all study protocols and materials: approval number 19-112-QUI-XPB. All study procedures were followed in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

### Informed Consent

All study participants provided signed informed consent prior to participation in pre-intervention in-person focus groups or interviews as well as the intervention study. Electronic or verbal consent procedures were applied to phone interviews. All informed consent procedures were approved by the University of Massachusetts Lowell IRB.

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## Data Availability Statement

The data for this study are confidential as required by the IRB approval. To protect the anonymity of the participants, the data are not publicly available. The data collection instruments are available upon reasonable request to the corresponding author. All research products are publicly available.

## Supplemental Material

Supplemental material for this article is available online.

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