HHS Public Access

Author manuscript

West J Nurs Res. Author manuscript; available in PMC 2016 April 19.

Published in final edited form as:

West J Nurs Res. 2016 April ; 38(4): 411–426. doi:10.1177/0193945915618950.

"Making Do" Decisions: How Home Healthcare Personnel Manage Their Exposure to Home Hazards

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Abstract

This study describes the decision-making processes home healthcare personnel (HHP) use to manage their personal health and safety when managing hazards in client homes. A professionally diverse national sample of 68 HHP participated in individual semi-structured interviews and focus group discussions, and described their decision making and strategies for hazard management in their work environments. HHP described 353 *hazard management dilemmas* within 394 specifically identified hazards, which were clustered within three broader categories: electrical/fire, slip/trip/lift, and environmental exposures. HHP described multiple types of "making do" decisions for hazard management solutions in which perceived and actual resource limitations constrained response options. A majority of hazard management decisions in the broader hazards categories (72.5%, 68.5%, and 63.5%, respectively) were classifiable as less than optimal. These findings stress the need for more support of HHPs, including comprehensive training, to improve HHP decision making and hazard management strategies, especially in context of resource constraints.

Keywords

decision making; home healthcare personnel; home environmental hazards; simulation training

Amid a rapid growth of healthcare provided in home environments, home healthcare personnel (HHP) are exposed to a significant number of health and safety hazards in the

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Authors' Note

Authors following the second author are in alphabetical order of last name. The content of this article is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute for Occupational Safety and Health (NIOSH). Portions of this work were previously presented at the Council for Advancement of Nursing Science State of the Science Congress, Washington, D.C., September 2014, and at the annual Midwest Nursing Research Society conference, Indianapolis, Indiana, April 2015.

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.

home (Markkanen et al., 2007; Sherman et al., 2008). Injuries and illnesses are costly to individuals and society. For example, Czuba, Sommerich, and Lavender (2012) documented that 60% of injuries to home health aides occurred in the home setting and 50% of injuries occurred in context of health and safety hazards. HHP providing home care in publicly funded programs in Oregon had a rate of 352 injuries per 10,000 personnel based on Oregon Home Care Commission data from 2008 to 2010 (Wipfli, Olson, Wright, Garrigues, & Lees, 2012). The development of enhanced training and interventions specifically designed to reduce hazard exposure in this highly variable and unpredictable environment is critical for improving the health and safety of HHP. The National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control and Prevention recommends training for HHP, but does not specify how the training should occur. Most often, standard training emphasizes Occupational Safety and Health Administration (OSHA) and Medicare minimum requirements for training, such as annual blood-borne pathogen training (OSHA, 2011), and is often limited in scope and format, for example, uses of traditional passive learning methods such as written materials in booklet or pamphlet form, lectures, and audiovisual media. Minimum requirements may not be specific to home settings and agency-specific policies are not necessarily included. The limitations of this approach to training result in a lack of awareness among HHP about key health and safety policies designed to protect them or a perception that the policies are not relevant or useful for their particular work settings and functions (Stevenson, McRae, & Mughal, 2008).

Overall, there is a significant gap between traditional health and safety training and the effectiveness of HHP assessment and management of hazards. In addition, there is little published information about HHP perceptions of risk, decision making, perceived response options, and solution development related to managing home hazards. Given that home hazards were reported to account for approximately 60% of injuries and illnesses among HHP (Czuba et al., 2012), there is a need to improve training options that specifically address hazards in client homes. Enhanced training must be designed based on improved understanding of risk perceptions and the decision-making processes HHP use to assess and manage home health hazards. This knowledge-to-practice gap, reflected in high injury/illness rates among HHP, may be particularly pronounced in situations in which HHP lack accurate risk perception, full understanding of their response options, and/or decision-making skills for managing dilemmas. Decision making is more complex in resource-constrained environments that require HHP to assess health and safety risks and evaluate trade-offs when deciding what approaches to use to manage a hazardous situation. These trends and gaps in traditional occupational health and safety training highlight the current need for use of state-of-the-art teaching/learning methods for improved training of HHP to effectively address home health hazards that carry significant risks to worker health and safety.

Study Purpose

Guided by the Griffin et al. risk information seeking and processing model, the purpose of the current research was to describe the decision making and hazard management approaches of 68 professionally diverse HHP for managing their own health and safety

needs in the context of perceived resource constraints for managing health and safety hazards in client homes.

Theoretical Model

Gershon and colleagues (2008) posited that risk perception and decision making affect health and safety outcomes in HHP. The Griffin et al. model of risk information seeking and processing (Griffin, Dunwoody, & Neuwirth, 1999; Griffin, Neuwirth, Dunwoody, & Giese, 2004) was used to guide this research because of its focus on factors that affect both risk perception and decision making about specific actions based on available information. The Griffin et al. model addresses seven types of factors that influence the amount of time and effort on deliberative information processing about risks, thereby affecting the quality of the assessment. These factors are (a) individual characteristics, (b) perceived hazard characteristics, (c) affective responses to risk, (d) felt social pressure to possess relevant information, (e) information sufficiency, (f) personal capacity for learning, and (g) beliefs about information usefulness (importance). The quality of the hazard assessment process is influenced by model components that influence risk perception and information processing, which in turn influence the quality of the decision-making process for hazard management. For the purposes of this research, perceived hazard characteristics, affective responses to risk, information sufficiency, and beliefs about information usefulness were selected conceptual influences from the model, as embedded and relatively most central influences in HHP descriptions of home healthcare hazards management dilemmas and the decision-making processes in regard to managing hazards. A hazard management dilemma was conceptualized as a situation in a client home for which the HHP needed to assess the risks to their own health and to evaluate trade-offs in deciding how to manage the hazard.

Research Questions

In this study, the following research questions were addressed:

Research Question 1: What home healthcare hazard management dilemmas are described by HHP?

Research Question 2: What decision-making processes do HHP engage in to manage these dilemmas?

Research Question 3: What is the level of decision quality for managing these dilemmas?

Method

This research was conducted as part of a larger project to design and test the efficacy of an interactive virtual simulation training system for HHP for assessing and managing home healthcare hazards to prevent HHP illness and injury. An interdisciplinary participatory design process using mixed methods addressed the broader project goal to develop an effective virtual simulation training system. The research began with the intention to better understand, from the perspectives of the HHP themselves, their experiences with hazards, hazard management dilemmas, and the decision-making process they used to manage these

dilemmas. Participatory research methods (Bergold & Thomas, 2012; Cornwall & Jewkes, 1995) include multiple approaches to engage and incorporate stakeholder input for the application of research results. Interdisciplinary representation was purposively designed into the composition of the study research team and sample, within a participatory design goal to achieve broader perspectives, as a basis to inform an ecologically valid virtual simulation training system. The study and procedures were approved by the Institutional Review Boards of The Ohio State University and the University of Louisville.

Sample

Sixty-eight HHP participated in either focus group discussions (n = 31 individuals within eight groups, 2-5 participants/group) or individual interviews (n = 37 individuals, 1-3 participants/interview). Participants included nurses (38%), aides/homemakers (21%), administrators/educators (19%), and physical/occupational therapists (22%). Participants were recruited from multiple states through emails and informational flyers distributed via professional organizations and in home healthcare agencies. The sample included 59 women (95.2%) and three men (4.8%), who worked in home healthcare, were fluent in written and spoken English, ranged in age from 22 to 73 years (M = 49 years, SD = 1.8 years, n = 61), and had 1 to 36 years of home healthcare experience (M = 11.9 years, SD = 9.0 years, n = 61). Approximately half of the sample was located in either Ohio or Kentucky (n = 35, 51.5%; n = 68). Study inclusion criteria were (a) ≥18 years of age; (b) work experience in home healthcare as a primary area of employment as a registered or licensed practical nurse, home health aide, occupational therapist, physical therapist, health and safety professional, health educator, or manager; (c) ability to read and write in English for the purpose of individual or focus group interview participation; and (d) provision of verbal and written consent for study participation.

Survey Instrument

In advance of focus group or interview participation, participants completed the Modified Home Healthcare Worker Questionnaire (M-HHCW; n = 62 of 68 individual or group participants), which included 38 items to assess demographics, types of home healthcare tasks performed by the HHP, any injuries experienced, types of hazards encountered in the home setting, types of occupational safety training done at the HHP's current job, and some health history questions. This questionnaire has been previously validated for face and content validity and is written at a sixth-grade reading level (Gershon et al., 2008). Only responses to the demographic items and types of occupational safety training are reported in this article.

Data Collection Procedures

After obtaining informed consent, individual and focus group interviews began with the interviewer asking the HHP to describe health and safety hazards they had encountered when providing healthcare in home settings. A standard interview question, "Describe your experiences with hazards in the home healthcare setting," initiated the discussion in relation to a list of often-encountered home health and safety hazards. A number of participants spontaneously described hazard management decision-making dilemmas in response to this question and also described their decision making in regard to managing the dilemma. If a

dilemma was mentioned, but without a spontaneous description of *hazard management decision making*, the interviewer probed with an additional question, "How did you manage that?" This probe supported participants to further elaborate on their solutions to managing hazards and their decision-making processes for resolving dilemmas.

In addition, a second portion of the focus group interview process provided participants with blank floor plans of rooms in a standard home (bedroom, bathroom, kitchen, living room, hallway) with instructions to draw and/or use separately provided cutouts of furniture/objects (e.g., bed, chair) to draw/furnish the contents of rooms represented by the paper floor plans and to add written comments on hazards encountered in these rooms (Polivka et al., 2015). During this task, participants identified specific hazards and collaborated on adding hazard commentary to each other's room drawings. Once the drawings were completed, the interviewer facilitated a general discussion of the priority hazards identified by the participants for each room, which often generated additional discussion about hazard management decision-making dilemmas. Group interview participants who were interviewed using a web-based conference management program were able to view the floor plans on their computer screens and could provide feedback or instructions to the interviewer to complete the floor plan drawings; for example, how to furnish a room and to indicate specific hazards in a room.

Data Coding and Analysis

Data coding process—Digitally recorded individual and focus group interviews were professionally transcribed and validated for accuracy of transcription. Next, at least two research team members independently coded the transcripts for the following four areas of content: (a) types of hazards, (b) hazard management dilemmas, (c) hazard management decision making, and (d) level of decision quality for hazard management decision making. Relevant home healthcare and safety guidelines from national sources and related literature were consulted for best practices for the level of decision quality coding. Discrepancies in coding were highlighted for each area of the coding. The initial coding agreement for the first three areas of coding averaged across transcripts was 89.6%, and was 98.6% for major agreement (defined as a discrepancy of one of decision quality level between coders for three possible levels of coding of decision quality) for the fourth area of coding. All coding discrepancies were reconcilable to 100% agreement among the coders based on discussion and consensus. The described dilemmas were not able to be analyzed as independent observations due to the nature of data collection as an interactive process among focus group and individual interview participants and interviewers. However, the interview approach is consistent with gaining a detailed qualitative understanding of hazards dilemmas and hazard management decision making.

Coding definitions and examples—A hazard management dilemma was defined as a situation in a client home for which HHP needed to assess the risks for their own health and to evaluate trade-offs in deciding how to manage the hazard (hazard management decision making). For example, HHP who noted that clients had not removed slip/trip/fall hazards (e.g., snow on steps, unsecured throw rugs) needed to decide how to manage this hazard, taking into account the advantages and drawbacks of various management options. Level of

decision quality was defined via three levels. "*Optimal*" decision making about hazard management was effective in mitigating the hazard without significant disadvantages for the HHP or client; for example, one home health aide wore rain boots when bathing a client in the shower to prevent slipping on a wet floor. "*Mixed*" decision making may or may not have been effective in mitigating the hazards and/or had significant trade-offs for the HHP and/or client; for example, HHP who sought to prevent falling on snow/ice by shoveling or treating the stairs to clients' homes performed a task not in their job description and exposed themselves to other risk of injury. "*Suboptimal*" decision making was ineffective or otherwise inappropriate in managing the hazard and/or involved setting aside the health needs of the HHP and/or clients; for example, continuing to provide care without necessary safety equipment available, such as grab bars, for transferring a client in the bathroom, carried significant risks of injury for the HHP and their clients.

Results

Hazard Management Dilemmas Described by HHP

Table 1 presents frequently mentioned types of hazard management dilemmas encountered by HHP, clustered by hazard context (electrical/fire, slip/trip/lift, and environmental exposures hazards), together with specific illustrative examples of discussed dilemmas. A broad range of hazards and associated dilemmas were described that varied by location in client homes. Often-described dilemmas included exposure to client tobacco smoke and smoking while using oxygen, non-removal of slip/trip hazards (e.g., snow, ice, throw rugs, clutter), other musculoskeletal risks (e.g., lifting with insufficient assistance, or lack of operative lifting equipment), and environmental hazards (e.g., aggressive unconfined pets, inadequate protection from biohazards).

The percentage of HHP reporting that they received occupational safety training according to domains surveyed in the M-HHCW questionnaire differed by domain and are shown in Table 2. Notably, areas in which HHP reported the least amount of occupational training were also the areas in which hazards management dilemmas were more often discussed. For example, clients persistently smoking when using oxygen was a hazard described by multiple HHP, as well as dilemmas about effectively managing slip/trip hazards and environmental exposures.

Decision-Making Processes Used by HHP to Manage Hazard Dilemmas

HHP engaged in a variety of suboptimal, mixed, and optimal hazard management approaches. Optimal decision making addressed advantages and drawbacks of various courses or action, or otherwise identified a way forward through a dilemma that achieved a feasible and effective resolution without significant drawbacks for HHP or client health and safety. A clear resolution of the dilemma was achieved. For example, an HHP who was concerned about slipping on snow and ice wore coil traction ice grips on her boots when walking from her automobile to the entrance of clients' homes. An HHP who was concerned about contact with biohazards (e.g., pet feces) on furniture in a client home brought in a small, lightweight stool to sit on in the client's home. Another HHP who was concerned about a potential hazard from use of ungrounded electrical outlets in a client's home brought

a portable power supply to use with her electrical equipment in the client's home. Only approximately one in three dilemmas (33.5%) met these criteria for effective hazard management.

A majority of the hazard management approaches were classifiable as less than optimal. Three distinct but often-interrelated approaches were identified based on HHP descriptions of their own decision making and solutions for hazards management dilemmas. First, a majority of less-than-optimal responses involved HHP setting aside their own health and safety needs to accomplish healthcare tasks. For example, some HHP noted that they continued to provide home healthcare services to clients despite their awareness of health and safety risks, for example, such as providing home care to a client who declined to refrain from smoking while a home health aide was present for an 8-hr work shift (constituting a significant length of exposure to secondhand smoke), because, " … she doesn't have anyone else to take care of her." Approaches to the HHP managing the hazard exposure dilemma were often ineffective (e.g., using an office chair to transfer a client to or from various locations in the home) or involved the HHP concluding that there were no other options other than to "make do" with the current situation (e.g., HHP at heightened risk of urinary health problems due to setting aside personal elimination needs while working in client homes for lengthy periods of time).

A second less-than-optimal approach relied upon persisting with a current hazard management strategy that was not effective while deferring additional action on addressing hazards. For example, an HHP who cared for a client who continued to smoke while using oxygen described using a management approach of, "Educate, educate, and re-educate," although the approach was clearly not effective (at least in the short term) in mitigating this significant safety hazard for the HHP and the client. Another HHP who had requested lift equipment or additional assistance for lifting and transferring an immobile client continued to lift/transfer the client pending receipt of the needed equipment/assistance. When probed for further ideas about how they manage hazards, HHP often did not discuss alternative options other than those identified in the described dilemmas, and often summarized a need to "make do" with the present situation until such time as a more effective solution would be identified.

The third less-than-optimal approach was for the HHP to refocus their efforts to address hazard dilemmas by "making do." This approach was often interrelated with the other two described approaches, but was distinct in terms of the HHP refocusing their attention to "making do" based on the assessment that nothing else could be done, or a belief that the current approach was the *best* that could be done. This third approach is perhaps the least preferred because it implied that the HHP held the relatively firmer belief that no alternatives existed for moving forward to a more preferable solution. For example, an HHP with serious personal health conditions that were adversely affected by exposure to summer heat continued to provide care for a client in a home that lacked a home cooling system, based on a belief that there were no alternatives to address the limited resource situation.

Levels of Decision Quality Represented in HHP Hazard Management Responses

As shown in Table 3, approximately two in three hazard management responses (66.5%) were classifiable as less than optimal, reflecting suboptimal or mixed levels of decision quality. As described above, mixed and suboptimal responses included HHP setting aside their own needs, deferring action, and/or refocusing to suboptimally address hazards by "making do." The percentage range of less-than-optimal responses varied somewhat by type of overall hazard category, with the greatest percentage of less-than-optimal responses for electrical and fire hazards (72.5%) and the lowest percentage for environmental exposures (63.5%), with slip/trip/fall hazard responses falling in between (68.5%). This overall rank order for hazard management decision quality is also consistent with the extent to which HHP reported training in occupational safety on the M-HHCW questionnaire (Table 2), with fewer participants reporting having received training for fire and electrical hazards, more participants reporting training for environmental exposures hazards (standard precautions/infection control), and approximately half of the participants reporting training in slip/trip/fall prevention.

Discussion

Consistent with concepts in the Griffin et al. model of risk information seeking and processing (Griffin et al., 1999; Griffin et al., 2004), the quality of decision making about home healthcare health and safety hazard management dilemmas and hazard management responses was influenced by HHP perceptions of hazard characteristics and information sufficiency. Affective responses (e.g., desire to provide care for clients overriding the personal health and safety needs of the HHP) and beliefs about information usefulness (e.g., HHP beliefs about decision-making options to manage hazard dilemmas) also influenced HHP responses to dilemmas. Hazard management dilemmas were often spontaneously discussed or otherwise elicited in focus group and individual interview discussions; that is, 68 participants generated 353 discrete decision-making dilemmas for analysis. Approximately two in three hazard management responses were classifiable as either "mixed" or "suboptimal" quality, highlighting significant room for improvement in training and support to protect the safety and health of HHP. In addition, the findings revealed important specific details about priority areas of need for the development and implementation of standardized policies at the agency level to protect HHP health and safety, for example, need for an enforced no smoking policy while HHP are providing home healthcare services. HHP often mentioned resource constraints or lack of agency policy implementation as barriers to effective management of hazards, all too often resulting in HHP perceiving a need to "make do" with a hazardous situation.

For each of the three documented less-than-optimal decision-making approaches that led to less-than-optimal responses, more effective approaches based on best practices should include individual-level solutions that are controllable by HHP, as well as policy development and implementation at the agency level. The results also provide some evidence that HHP are most challenged by hazard management dilemmas for which they report the least amount of on-the-job training and for which they do not perceive useful options for managing hazards. Some recent qualitative research has examined the

perceptions of home healthcare workers about home hazards such as exposure to secondhand tobacco smoke. Berg et al. documented findings from a qualitative study of licensed practical nurses (LPNs) that are consistent with the present findings for less-than-optimal hazards management approaches; that is, HHP placing their own health and safety needs secondary to the client's preference to smoke, perceiving a lack of support from their agency to set limits on client smoking, reporting feeling unable to control the situation, and/or reporting not being able to resolve the situation in a way that would better protect the health and safety of the HHP (Berg, Clausson, & Bokberg, 2012).

Without appropriate training, HHP are likely to end up "making do" with hazards in ways that may represent, at best, mixed hazard management responses, and may represent clearly suboptimal responses that contribute to worker injury and illness. These results document the need to improve HHP decision making about home health hazards management as means of favorably affecting HHP health, safety, and costs due to preventable injuries and illness. Improved decision making about hazards, in turn, can promote improved health, safety, and financial cost outcomes in the rapidly expanding HHP workforce. Beyond the training of the individual HHP, at an agency level, improved training would address a broader range of hazards, especially those that present the greatest risk to HHP and/or for which HHP may need additional information and skills for managing the hazards, as well as those hazards for which a standardized and consistently implemented agency policy is needed. Economic factors constraining decision making and hazard management also need to be addressed by allocating resources to be sure necessary equipment and safety features are available and functioning.

The relatively small sample that was predominantly comprised of White mid-life women limits the ability to more fully generalize the results to populations of HHP and settings that may be dissimilar to those studied in the present project. Representativeness is somewhat enhanced by sampling diverse types of HHP from a variety of urban and rural settings in multiple states, as well as a range of years of home healthcare work experience. The overall types of hazards and hazard management dilemmas reported by HHP in a range of health professions could be expected to be representative of home healthcare in a range of settings and populations. Due to non-independence of observations, it was not possible to quantitatively analyze these qualitative observations, but the data nonetheless provide essential, detailed information about the scope, context, and specific dilemmas faced by HHP that will be used in the larger project to design the virtual simulation training system. During interviews, HHP may have more readily recalled hazard management dilemmas that were more stressful due to a perceived or actual lack of effective hazard management approaches. This may have over-represented hazard management dilemmas in the interview transcripts relative to hazards management situations not representing problematic dilemmas. However, training that can appropriately address specific hazard management dilemmas is more likely to be valued as useful by HHP, as well as to better support development of critical thinking skills, in comparison with standard training that provides general information only about hazards.

This descriptive research of HHP perspectives on home health and safety hazards was conducted to inform the design of a virtual training simulation system for use in preparing

HHP to recognize, assess, and respond to hazards in the home healthcare environment using appropriate risk perception and decision-making processes. To our knowledge, this research is among the first to examine risk perception and decision making of HHP for managing home health and safety hazards within a participatory design process for a virtual simulation training system. The results of this study emphasize the need to improve training approaches addressing decision making of HHP regarding their management of home health and safety hazards. Newer technologies, such as computerized virtual simulation trainings, have significant advantages over traditional approaches. Simulation training provides an ability to address a broader range of multiple complex and interacting home health hazards in an ecologically valid and engaging training format that may be more likely to be valued by HHP, leading to improved learning and retention of key content. Simulation training can be used for both training and evaluation purposes. For training purposes, simulations can be designed to be repeatable and with progressive and individually tailored levels of difficulty to support mastery of key concepts and principles. Optimal training would also incorporate explicit training about typical types of resource constraints and interacting factors that may be encountered in a realistic home environment that represent hazards to HHP, for example, the co-occurrence of clutter and tight maneuvering spaces in the home. The training would be optimally informed by incorporating the perspectives of HHP on the types of hazards and hazards management dilemmas they face in home healthcare. These features of an enriched simulation training experience could more optimally support the development of accurate risk perceptions and/or needed decision-making skills within a safe and realistic training environment. Beyond imparting information only, more optimal approaches provide training in how to assess and analyze information, as well as skills training in decision making, which can lead to improved quality of decisions to reduce the high rate of worker injuries and excess healthcare costs attributable to avoidable injuries in the home setting.

In summary, HHP often described less-than-optimal approaches to hazard management dilemmas, highlighting significant room for improving existing training methods for assessing and managing hazards encountered when providing home healthcare services. The results of this study will inform the design and testing of a virtual simulation training system that is intended to enhance the quality of risk perception and decision making for managing home health and safety hazards for HHP. The multiple advantages of interactive web-based simulation training over traditional passive learning methods have potential to favorably affect the incidence of work-related injuries and illness among the rapidly expanding HHP workforce.

Acknowledgments

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was supported in part by the National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control and Prevention under Award R01OH010425.

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Table 1

Frequently Mentioned Types of Hazard Management Dilemmas.

Hazards Context	Examples of Dilemmas
Electrical and fire hazards	
Smoking with oxygen in use	Client does not refrain from smoking with oxygen
Stove or oven left on	Client uses stove/oven for heating home
	Client often forgets to turn off stove/ oven
Overloaded/unsafe outlets electrical outlets	Client has limited numbers of electrical outlets
	Client does not fix damaged or unsafe outlets
Slip, trip, and lift hazards	
Snow/ice at entry to home	Client unable to remove snow/ice
Throw rugs, unsafe flooring	Throw rugs that a client does not remove
	Flooring unsafe; holes in floor
Clutter, lack of space	Insufficient space or positioning to provide care
Missing or broken patient handling equipment	Inadequate equipment or assistance for patient lifting/transfers
Environmental exposures Pests/rodents	Risk of transporting pests from client home
Aggressive/underfoot pets	Client does not confine pets
Tobacco smoke/lack of ventilation	Exposure to secondhand tobacco smoke
Infectious diseases, waste	Inadequate protection from biohazards

Table 2

HHP-Reported Occupational Safety Training by Domains of M-HHCW Questionnaire.

Training Domains	% Reporting Training
Standard precautions/infection control	73.2
Body mechanics	69.6
Personal safety/security	69.6
Respiratory protection	62.5
Fire safety/evacuation	57.1
Slip/trip/fall prevention	51.8
Home hazards	48.2
Use of lift equipment	30.4
Electrical safety	28.6

Note. HHP = home healthcare personnel; M-HHCW = Modified Home Healthcare Worker.

Table 3

Decision-Making Quality by Overall Types of Hazard Management Dilemmas.

Levels of Decision Quality Within Types of Hazard Management Dilemmas	*n* (%)
Electrical and fire hazards	
Optimal	11 (27.5)
Mixed	16 (40.0)
Suboptimal	13 (32.5)
Total *N* and % of decisions	40 (10.2)
Fall, trip, slip hazards	
Optimal	51 (31.5)
Mixed	49 (30.2)
Suboptimal	62 (38.3)
Total *N* and % of decisions	162 (41.1)
Environmental exposures	
Optimal	70 (36.5)
Mixed	65 (33.8)
Suboptimal	57 (29.7)
Total *N* and % of decisions	192 (48.7)
Totals for decision quality levels across types of hazards	394 (100)
Optimal	132 (33.5)
Mixed	130 (35.3)
Suboptimal	132 (33.5)

Note. Analysis is based on 394 specific types of hazards within 353 decision-making dilemmas. Some hazards management responses ($n = 41$) were coded for more than one category of hazard; therefore, analysis of differences in proportions is not presented due to the non-independence of the coded data.