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Slip, Trip and Fall Risk Among Elderly Men and Women Living in the Hawaii Adult Foster Care Home System

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SLIP, TRIP, AND FALL RISK AMONG ELDERLY MEN AND WOMEN LIVING IN THE HAWAII ADULT FOSTER CARE HOME SYSTEM

by

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ABSTRACT

Slip, Trip, and Fall Risk Among Elderly Men and Women

Living In The Hawaii Adult Foster Care Home System

By

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Adults 65 years of age and older (hereby referred to as "elderly") are one of the fastest growing populations in the United States (U.S.). A major public health concern affecting the elderly population is unintentional injuries, particularly slips, trips, and falls (STFs). While there is extensive research on STFs among the elderly living in the community and long-term health care facilities, little to no research is found on STFs among the elderly living in community-based health care facilities. Research has also shown that STFs are caused by the interaction between multiple risk factors. Therefore, the purpose of this quasi-experimental study is to determine the STF risk among elderly men and women living in community-based health care facilities known as Hawaii Adult Foster Care Homes (AFCHs). A total of 105 elderly (50 men, 55 women) were evaluated for STF risk factors (cognitive function, number of medications, home safety hazards, caregiver's knowledge of STFs, physical activity, assessment of the caregiver, and overall STF risk).

Chi-square test, Wilcoxon signed rank test, simple regression, and multiple regression models were used to determine STF risk among elderly men and women. Cognitive function (p=0.048 (men), p=0.048 (women)), number of medication (p=0.015 (both)), home safety hazards (lack of sturdy handrails) (p=0.016 (both)), caregiver's knowledge of STFs (p=0.040 (men)), physical activity (p=0.030 (men)), assessment of the caregiver (p=0.001 (men), p=0.020 (men), p=0.001 (women)), and overall STF risk (p=0.026 (men), p=0.012 (women)) were statistically significant. Overall, STF hazard reduction strategies should be continued and/or implemented to ensure quality of care is being provided to elderly men and women living in the Hawaii AFCH system.

Keywords: Slip; Trip; Fall; Slip, Trip, and Fall Risk; Elderly Men and Women; Older Adults; Adult Foster Care Home System

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DEDICATION

To my Lola,

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you are the main reason why I have dedicated

my research efforts towards elderly injury prevention.

Thank you for watching over me from Heaven.

To my Mom and Dad,

you have made to be the woman I am today.

I am proud to be your daughter.

Because of you faith in me,

I strive to be a better person every day.

Mahal Kita.

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CHAPTER 1

INTRODUCTION

Adults 65 years of age and older (hereby referred to as "elderly") are one of the fastest growing populations in the United States (U.S.) (Healthy People, 2013; Centers for Disease Control and Prevention [CDC], 2009). A major public health concern affecting the elderly population is unintentional injuries, particularly slips, trips, and falls (STFs). While there is extensive research on STFs among the elderly living in the community and long-term health care facilities (CDC, 2008; Fletcher & Hirdes, 2002; Lord, 1994; Runyan et al., 2005; Tinetti et al., 1994), little to no research is found on STFs among the elderly living in community-based health care facilities. Research has also shown that STFs are caused by the interaction between multiple risk factors. Therefore, the purpose of this quasi-experimental study is to determine the STF risk among elderly men and women living in community-based health care facilities known as Hawaii Adult Foster Care Homes (AFCHs). By evaluating the elderly men and women's cognitive function, number of medications, home safety hazards, caregiver knowledge of STFs, physical activity, and overall STF risk, this study will be able to determine the STF risk among elderly men and women living in the Hawaii AFCH system. In addition, this study will determine what STF hazard reduction strategies should be continued or implemented within the Hawaii adult foster care home system in order to ensure quality of care for the elderly men and women living in these care homes.

The research question for this current study is:

(1) What is the STF risk among elderly men and women living in the Hawaii AFCH system?

CHAPTER 2

BACKGROUND & SIGNIFICANCE

Injury

Injury is a major public health concern that affects the health and safety of people worldwide. Every day in the United States (U.S.), there are approximately 400 injury-related deaths, 7,500 injury-related hospitalizations, and 150,000 individuals that suffer from an injury that limits one's ability to perform daily activities and seek medical assistance (Chino, LaValley, Haff, Harris, & Rivers, 2010). While the majority of deaths, hospitalizations, and disabling events are due to road traffic injuries, a large proportion of people are affected by other injuries such as violence, drowning, poisonings, and falls (Chino, LaValley, Haff, Harris, & Rivers, 2010).

Intentional vs. Unintentional Injuries

Injury can either be identified as an intentional or unintentional injury (Krug, Sharma, & Lozano, 2000). Intentional injury (i.e., self-inflicted injuries, interpersonal violence (homicide and violence), and war injuries) is considered to be an injury that is deliberately inflicted on another person on oneself. Unintentional injury (i.e., road traffic injuries, poisoning, falls, fires, choking and suffocation, and drowning) is considered to be an injury that occurs without the intention to harm another person or oneself (Krug, Sharma, & Lozano, 2000).

Trips and Falls and The Elderly Population

Adults 65 years of age and older (hereby referred to as "elderly") are one of the fastest growing populations in the U.S. By 2050, there will be approximately 86 million elderly individuals in the U.S., thus accounting for 20% of the U.S. population (He,

Sengupta, Velkoff, & Debarros, 2005). One of the major public health concerns among the elderly population is unintentional injuries in the home.

In the U.S., unintentional injuries are the fifth leading cause of death among the elderly and the home is the second most common location for unintentional deaths to occur (Rubenstein, 2006, Runyan et al., 2005). About 40% of elderly living at home will fall at least once a year and about one in forty will be hospitalized. Elderly that are hospitalized for a trip or fall-related injury spend about 11.6 days in the hospital and about 50% of the elderly are discharged to a nursing home (CDC, 2003; Sattin et al., 1990). While all elderly are at an increased risk of falling, elderly 75 years of age and older that fall are four to five times more likely than those between 65 and 74 years of age to be admitted to a long-term healthcare facility and stay there for at least one year (CDC, 2013b).

In addition, of those hospitalized after a fall, about half will die within a year (Rubenstein, 2006). From 2000 to 2010, death rates increased by 63% among elderly men and increased by 83% among elderly women (National Conference of State Legislatures [NCSL], 2014).

While there is an overall increase in death rates among the elderly in the U.S., not all states have the same death rates. From 2008 to 2010, the crude death rate (per 100,000) for falls among elderly men and women ranged from 24.08 to 127.04 deaths (**Figure 1**) (CDC, 2013a). Some states with the highest crude death rates for falls among elderly men and women were Washington, Oregon, Colorado, New Mexico, Arizona, and Iowa (between 75.02 and 127.04 deaths). And states, such as Hawaii, had crude death rates for falls among elderly men and women that were between 40.87 and 53.95 deaths.

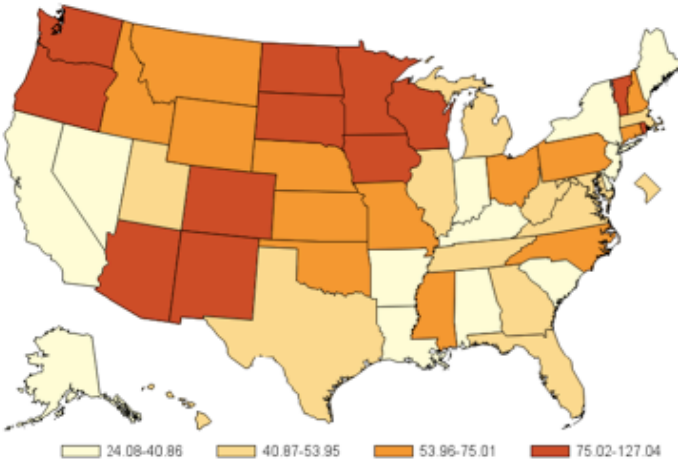


Figure 1. Crude Death Rates due to Falls Among Elderly Men and Women in the United States (2008-2010).

From 2008 to 2010, the crude death rate (per 100,000) for falls among elderly men ranged from 29.13 and 108.16 deaths (**Figure 2**) (CDC, 2013a). Some states with the highest crude death rates for falls among elderly men were Washington, Oregon, Colorado, New Mexico, Arizona, and Iowa (between 73.37 and 108.16 deaths). And states, such as Hawaii, had crude death rates for falls among elderly men that were between 58.09 and 73.36 deaths.

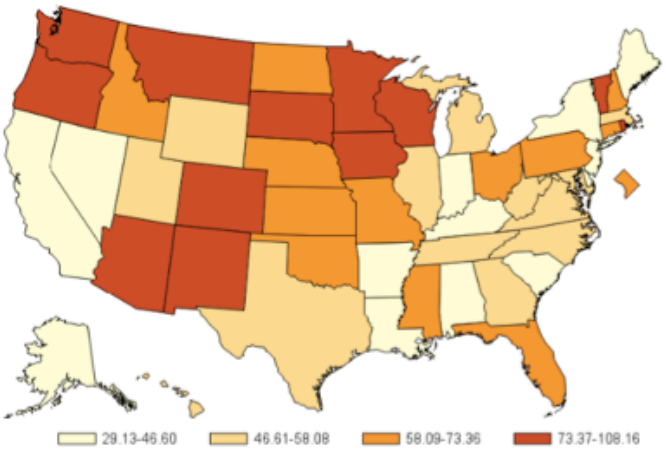


Figure 2. Crude Death Rates due to Falls Among Elderly Men in the United States (2008-2010).

From 2008 to 2010, the crude death rate (per 100,000) for falls among elderly women ranged from 9.74 and 143.59 deaths (**Figure 3**) (CDC, 2013a). Some states with the highest crude death rates for falls among elderly women were Washington, Oregon, Colorado, New Mexico, Arizona, and Iowa (between 73.46 and 143.59 deaths). And states, such as Hawaii, had crude death rates for falls among elderly women that were between 36.53 and 50.71 deaths.

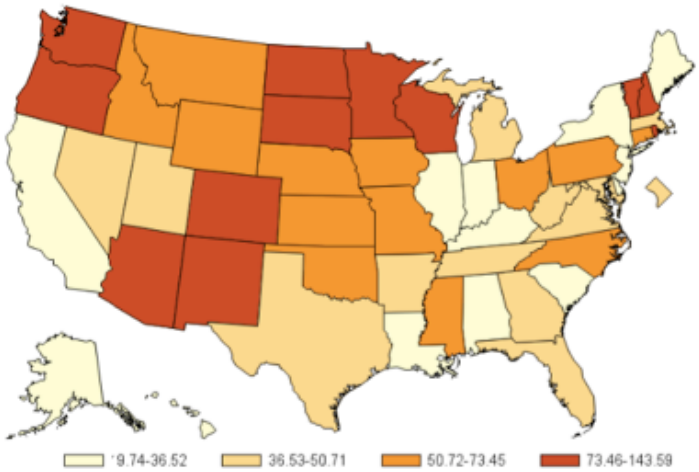


Figure 3. Crude Death Rates due to Falls Among Elderly Women in the United States (2008-2010).

While the crude death rates for falls varied among elderly men and women across the U.S., it also varied among elderly men and women living in Hawaii. From 2004 to 2010, the crude death rate (per 100,000) for falls among elderly men ranged from 0.00 to 143.59 deaths (**Figure 4**) (CDC, 2013a). Falls among elderly men was between 48.17 and 58.18 on Oahu, and between 17.91 and 48.16 on the Big Island. While the Big Island falls within the second highest category of crude death rates, Oahu had the highest crude death rates for the state of Hawaii.

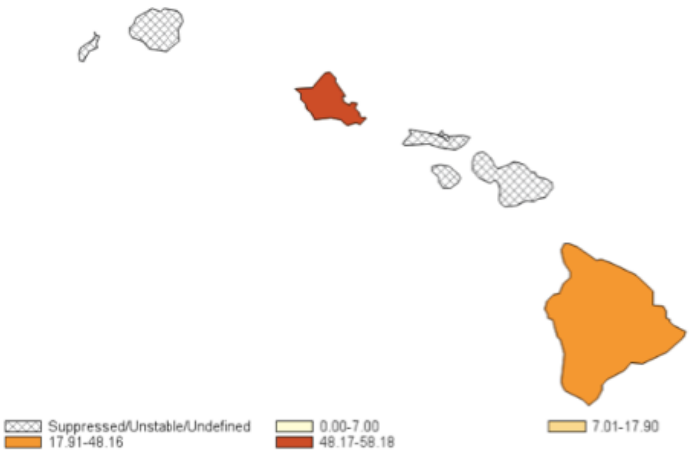


Figure 4. Crude Death Rates due to Falls Among Elderly Men in Hawaii (2004-2010).

From 2004 to 2010, the crude death rate (per 100,000) for falls among elderly women ranged from 0.00 to 42.78 deaths (**Figure 5**) (CDC, 2013a). Falls among elderly women was between 38.01 and 42.78 on Oahu, and between 25.83 and 38.00 on the Big Island. While the Big Island falls within the second highest category of crude death rates, Oahu had the highest crude death rates for the state of Hawaii.

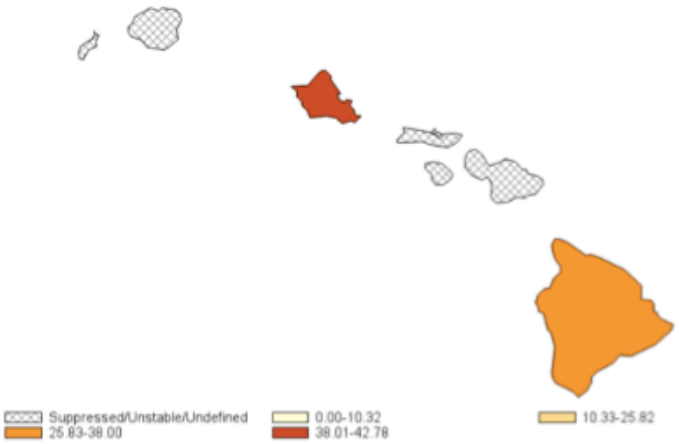


Figure 5. Crude Death Rates due to Falls Among Elderly Women in Hawaii (2004-2010).

Financial Burden of Trip and Fall-Related Injuries

Trips and falls are the leading cause of fatal and nonfatal injuries among the elderly population (CDC, 2013b). Every year, trip and falls are responsible for over 200,00 deaths, 2.3 million emergency department visits, and more than $30 billion in direct costs (NCSL, 2014). By 2020, the annual direct and indirect cost of trip and fall-related injuries is expected to be about $67.7 billion (CDC, 2014).

More than one-third of nonfatal injuries were bone fractures (wrist and hip fractures) and accounted for more than 60% of the total nonfatal injury costs (nearly $20 billion) in 2012 (CDC, 2014). Wrist fractures are common among elderly between 65 and 75 years of age and can occur when elderly people extend their hands when falling forward or backward (Nevitt & Cummings, 1993). Hip fractures are more common among elderly 75 years of age and older and can occur when elderly people fall on their side. Between wrist and hip fractures, the most serious of elderly fractures are hip fractures, which account for nearly 45% of hospitalization costs (average cost of hospitalization for trip and fall-related injuries are $34,294 per elderly). In addition, one in five elderly that sustain a hip fracture will die within a year of their injury (NCSL, 2014).

Risk Factors of STF-Related Injuries

Research has shown that trip and fall-related injuries are caused by the interaction between multiple risk factors (CDC, 2008; National Council on Aging, 2005; WHO, 2007; Tinetti & Kumar, 2010). These risk factors can be identified as either intrinsic (internal) or extrinsic (external) (**Table 1**).

Table 1. Risk Factors (Intrinsic & Extrinsic) of STF-Related Injuries

Intrinsic (Internal) Risk Factors	
Gait and balance impairment	Gender
Lack of exercise (sedentary behavior)*	Excess alcohol intake
Muscle weakness	Advanced age
Chronic conditions*	Vision impairment
Medications*	Unbalanced diet
Impaired activities of daily living (ADLs)	
Extrinsic (External) Risk Factors	
Home safety hazards*	Inappropriate footwear
Community safety hazards	Socioeconomic status

* Risk factors discussed and evaluated in this current study

Intrinsic (Internal) Risk Factors

Risk factors that are considered to be intrinsic risk factors for STF-related injuries are gait and balance impairment, lack of exercise (sedentary behavior), muscle weakness, chronic conditions, medications, impaired activities of daily living (ADLs), gender, excess alcohol intake, advance age, vision impairment, and unbalanced diet. While all intrinsic risk factors are important to assess, this current study focused on the lack of exercise (sedentary behavior), chronic conditions, and medications.

Lack of Exercise (Sedentary Behavior)

Of all age groups, elderly generate the highest medical care expenditures and are the least physically active population (Nelson et al., 2007). Therefore, it is possible that elderly with increased levels of physical activity can yield a reduction in medical care expenditures within at least one year of being physically active. In 1995, the CDC and the American College of Sports Medicine (ACSM) initially recommended that "Every U.S. adult should accumulate 30 minutes or more of moderate-intensity physical activity on most, preferably all, days of the week" (Pate et al., 1995). In 2007, ACSM and the American Heart Association (AHA) updated the 1995 recommendations in order to

clarify recommendations for moderate-intensity aerobic activity, vigorous-intensity aerobic activity, and muscle-strengthening activity for differing age groups and to provide varying options for elderly that have "chronic medical conditions, low fitness levels, and/or functional limitations" (Haskell et al., 2007). The 2007 ACSM and AHA recommendations for physical activity (aerobic activity, muscle-strengthening, flexibility, and balance exercises) for the elderly population can be found in **Table 2**. These recommendations are found to be preventative and reduce the risk of chronic disease, premature mortality, disability, and functional limitations (Nelson et al., 2007).

Table 2. Physical Activity Recommendations for the Elderly (65+ years old) from the American College of Sports Medicine and the American Heart Association

Type of Activity*	**Recommendation**	
Aerobic Activity	***Moderate Intensity*** (noticeable increase in heart rate and breathing)	***Vigorous Intensity*** (large increases in heart rate and breathing)
Frequency	Minimum of 5 days per week	Minimum of 3 days per week
Intensity (0=sitting to 10=all-out effort)	At 5 to 6 on a 10-point scale	At 7 to 8 on a 10-point scale
Duration	Accumulate at least 30 minutes per day, in bouts of at least 10 minutes each	Continuous for at least 20 minutes per day
Muscle-Strengthening Activity		
Frequency	At least 2 days per week	
Number of Exercises	8 to 10 involving the major muscle groups	
Sets and Repetitions	10 to 15 repetitions	
Flexibility Activity & Balance Exercises	At least 2 days per week (for those at risk for falls, include exercises to maintain or improve balance)	

*Description of Types of Activity: Aerobic Activity, to promote and maintain health it is the recommended amount is in addition to routine activities or moderate-intensity activities lasting less than 10 minutes in duration; Muscle-Strengthening Activity, to promote and maintain health and physical independence it is recommended that elderly include activities such as progressive-weight training, weight bearing calisthenics, and similar resistance exercises that use major muscle groups; Flexibility Activity, to maintain flexibility needed for regular physical activity and daily life; Balance Exercises, to reduce risk of injury from falls (Nelson et al., 2007).

Exercise has been proven to improve reaction times, and increase strength, endurance, flexibility, and balance among the elderly population (Jensen, Nyberg, Gustafson, & Lundin-Olsson, 2003; Rubenstein et al., 2000; Province et al., 1995; Tinetti et al., 1994). If elderly are physically active for at least seven hours or more per week, they are less likely to fall in comparison to their counterparts (Lord, Ward, Williams, & Anstey, 1993). Research has shown extensive benefits of regular physical activity. With regular physical activity, elderly can reduce their risk of falls and injuries from falls, prevent or mitigate functional limitations, the management of dementia, and a therapeutic role for osteoporosis and chronic diseases (Nelson et al, 2007).

All in all, there are several areas of emphasis that can promote physical activity among the elderly. One way to promote physical activity among the elderly is to reduce their sedentary behaviors. With a dose-response relationship between physical activity and health benefits, it is important to reduce sedentary behavior (Nelson et al., 2007). For example, research has shown that 45 to 75 minutes of walking per week can reduce an individual's risk of cardiovascular disease (Manson et al., 2002)

Another way to promote physical activity among the elderly is to increase their moderate activity. Even though both moderate and vigorous activity are recommended aerobic activities, it is more beneficial for elderly to perform 30 to 60 minutes of moderate activity per day to minimize risk of injury and low adherence to staying physically active (Nelson et al., 2007).

Another way to promote physical activity among the elderly is to take a gradual or stepwise approach. To reduce risk of injury and gain fitness, self-confidence, and experience, it is important to gradually increase their physical activity. Therefore, it is

advised that elderly start at an effort of 5 on a 10-point scale with multiple periods of greater than or equal to 10 minutes, then gradually increase to higher intensity and continuous bouts (Nelson et al, 2007).

Another way to promote physical activity among the elderly is to have them perform muscle-strengthening activity and to engage them in all recommended types of activity. Even though muscle-strengthening activities have been found to have beneficial effects on functional limitations, only about 12% of elderly perform muscle-strengthening activities at least twice a week (CDC, 2004). With the many health benefits associated with muscle strengthening, it is crucial for elderly to perform muscle-strengthening activities (Nelson et al., 2007).

Another way to promote physical activity among the elderly is to provide them with individual-level and community-level physical activity approaches. Individual-level physical activity involves exercises that can be tailored to an individuals needs and abilities. Community-level physical activity involves exercises that can be tailored to groups of people. With individual-level and community-level approaches, elderly will gain sufficient fitness, experience, and motivation in order to stay physical active (Nelson et al., 2007).

Another way to promote physical activity among the elderly is to use risk management strategies to prevent injury. Chronic conditions (i.e., osteoporosis) can increase an elderly individuals risk of activity-related fractures and can be a major barrier to regular physical activity (Nelson et al., 2007). Research has shown that implementing risk management strategies, especially in studies with an exercise component, are

effective at reducing elderly individuals risk of experiencing a serious adverse health effect, such as a trip or fall-related injury (Buchner & Coleman, 1994).

Chronic Conditions

Research has shown that chronic conditions (i.e., Alzheimer's Disease and related dementias) are associated with an increase in STF-related injuries. Elderly with dementia are two times more likely than cognitively intact individuals and more likely to experience a trip or fall-related injury (Taylor, Delbaere, Close, & Lord, 2012). Elderly with dementia have also been found to account for the highest morbidity, mortality, and institutionalization rates among the elderly population. Cognitive impairment and dementia, often used interchangeably, are increasingly common with increased age. According to Taylor et al. (2012), cognitive impairment refers to "below expected performance in one or more cognitive domains," which does not have an "impact on the individual's ability to function," and dementia refers to "progressive neurodegenerative processes affecting various areas of cognition, such as memory, language, problem solving and attention, which result in impairments in an individual's ability to function. STF-related injuries are more prevalent among elderly with dementia, have more than a threefold increase of hip fractures, poor health outcomes, and death."

Medications

The rate of absorption, distribution, metabolism, and excretion of medication that is administered orally has been found to change with age (Daal & van Lieshout, 2005). While the rate that medication is absorbed in elderly individuals is almost identical to that of younger individuals, the rate that medication is distributed, metabolized, and excreted changes with age. Body components of elderly individuals affect the distribution of

medication in their bodies. With age, body fat increases by over 35% from 20 to 70 years of age, plasma volume decrease by 8%, lean body mass and total body water decrease by about 17%. The metabolism (hepatic biotransformation) of medicine has also been found to change with age where there is a decrease in the efficiency of the phase I reactions (oxidative and hydroxylation process), while the phase II reactions are unaffected. Renal function, including the glomerulus and proximal tubule, is diminished with age due to the reduction in number of functional nephrons and renal blood flow (Daal & van Lieshout, 2005).

While the rate of absorption, distribution, metabolism, and excretion of medication has been found to change with age, various classes of drugs have been found to potentially increase fall risk in the elderly (Drug Guide, 2014; Social Work Today, 2012; Berdot et al., 2009; Woolcott et al., 2009; Zeimer, 2008; Daal & van Lieshout, 2005; Ruddock, 2004; Leipzig, Cumming, & Tinetti, 1999; Cumming, 1998; Koski, Luukinen, Laippala, & Kivela, 1996). According to Woolcott et al. (2009), medication can be one of the following medication classes: (1) antihypertensives, (2) diuretics, (3) β-blockers, (4) sedative hypnotics, (5) neuroleptics (or antipsychotics), (6) antidepressants, (7) benzodiazepines, (8) narcotic analgesics, or (9) non-steroidal anti-inflammatory drugs (NSAIDs). Medication class and potential adverse health effects associated with elderly falls is listed in **Table 3** below (Skilled Care Pharmacy, 2014; Ruddock, 2004). Of the nine medication classes, sedatives (hypnotics), antidepressants, and benzodiazepines were significantly associated with elderly falls (Drug Guide, 2012; Woolcott et al., 2009; Daal & van Lieshout, 2005; Ruddock, 2004). Elderly individuals taking benzodiazepines

and neuroleptics are at an increased risk of experiencing a second fall within one year of their first (Daal & van Lieshout, 2005).

If elderly individuals are taking medication from multiple medication classes, they are potentially at an increased risk of experiencing a trip or fall-related injury. Not only are prescribed medication from these nine medication classes related to an increased risk of STF-related injuries among the elderly, so are over-the-counter medications, vitamins, and supplements (Social Work Today, 2012).

Table 3. Medication Class and Potential Adverse Health Effects of Medication on Elderly

Adverse Health Effects	Medication Classes*								
	Hy	**D**	**Be**	**Se**	**N**	**Ad**	**B**	**Na**	**NSAID**
Agitation					X	X		X	
Arrhythmias		X							
Cognitive Impairment, confusion	X	X			X		X	X	
Dizziness, orthostatic hypotension (or dizzy spell)	X	X	X	X	X	X	X	X	X
Gait abnormalities, extrapyramidal reactions (or movement disorders)				X	X	X	X		
Increased ambulation		X							
Postural disturbances (i.e., problems with balance)					X		X		
Sedation, drowsiness			X		X	X	X	X	X
Syncope (or fainting)			X						
Visual disturbances (i.e., blurred vision)		X			X				

*Medication class abbreviations: Hy, antihypertensives; D, diuretics; Be, β-blockers; Se; sedative hypnotics; N, neuroleptics (or antipsychotics); Ad, antidepressants; B, benzodiazepines; Na, narcotic analgesics; NSAID, non-steroidal anti-inflammatory drugs.

Another concern that is associated with medication and STF-related injuries is polypharmacy. Polypharmacy (or medication chaos) is defined as "the use of several different drugs, usually prescribed by different doctors and filled at different pharmacies,

by a patient who may have one or several health problems" (Hijjar, Cafiero, & Hanlon, 2007). It often involves "using a higher dose of one or more medications than is clinically indicated or warranted. Increased adverse drug reactions and drug-drug interactions can result" (Hijjar, Cafiero, & Hanlon, 2007).

Polypharmacy is very common among the elderly population due to their challenges with medication compliance. Some medication compliance issues among the elderly population may be adding over-the-counter drugs, vitamins, and supplements to their medication regimen, getting confused with the complexity or the number of the medication they are taking, having difficulty with finances or transportation to obtain prescribed medication, or accidentally mixing up new medications with the expired ones. Another concern is elderly individuals using several different drugs. Several studies have shown that elderly individuals that are taking greater than or equal to four medications have an increased risk of recurrent falls due to drug interactions (Ruddock, 2004; Leipzig, Cumming, & Tinetti, 1999).

Medications are considered as a preventable risk factor for STF-related injuries (Woolcott et al., 2009). In order to reduce elderly individuals risk of trip or fall-related injuries, medication should be monitored by a geriatric specialist and obtained from one pharmacy (Social Work Today, 2012). When prescribing new medication to elderly individuals, geriatricians should 'start low, go slow' and reassess the elderly individuals medications for potential adverse health effects due to drug interactions or side effects of medication (Daal & van Lieshout, 2005).

Extrinsic (External) Risk Factors

In contrast to intrinsic risk factors, extrinsic risk factors for STF-related injuries can be classified as home safety hazards, community safety hazards, inappropriate footwear, and socioeconomic status. While all extrinsic risk factors are important to assess, this current study focused on home injury hazards.

Home Safety Hazards

According to the Centers for Disease Control and Prevention (2012), falls are typically due to hazards that are easily overlooked, yet easy to fix. It is very important to assess a home by looking at the condition of the floors, conditions that make it unsafe or difficult to use the kitchen (i.e., cabinets that are too high or too low) the degree of lighting in hallways and passageways, the presence of trip and hall hazards, and the presence of non-slip surfaces and grab bars in the bathrooms (Northridge, Nevitt, Kelsey, & Link, 1995). While an elderly individual can potentially get a STF-related injury in any room of the home if home safety hazards are present, the severity of the injury may vary. Elderly that fall on the staircase are more likely to sustain an injury than those that fall elsewhere in the home (Northridge, Nevitt, Kelsey, & Link, 1995).

Research has shown that home safety hazards are responsible for 35% to 45% of elderly trips and falls in the home, however, the existence of home safety hazards alone cannot cause falls (Lord, Menz, & Sherrington, 2006; Rubenstein, 1998; Josephson, Fabacher, & Rubenstein, 1991). Few studies have found that it is more important to assess the interaction between elderly's physical abilities and their exposure to environmental stressors, such as home safety hazards (Lord, Menz, & Sherrington, 2006). While STF rates are lower among vigorous (or active) elderly than frail elderly, home

safety hazards were more likely to contribute to falls among the vigorous elderly because they have an increased exposure to home safety hazards (Lord, Menz, & Sherrington, 2006; Northridge, Nevitt, Kelsey, & Link, 1995; Speechley & Tinetti, 1991; Nevitt, Cummings, Kidd, & Black, 1989; Tinetti, Speechley, & Ginter, 1988). The presence of home safety hazards, such as clutter, rug problems, and storage problems were found to be more predictive of falls among vigorous elderly than frail elderly (Northridge, Nevitt, Kelsey, & Link, 1995). In addition, some studies have found that the elderly with one or more home safety hazards in their home were more likely to report a fall in the last 3 months than those that lacked home safety hazards in their home (Fletcher & Hirdes, 2002).

Several studies examined home safety hazards and the effectiveness of interventions to reduce STF hazards in the home (Rubenstein, 1999). It was determined that home safety hazard reduction, through home safety assessment and household modifications, has been an effective fall prevention strategy if the elderly have a history of falling or have mobility limitations (Connell & Wolf, 1997; Lord, Menz, & Sherrington, 2006). By having a multi-faceted fall prevention strategy that incorporates both intrinsic and extrinsic STF risk factors, a program is more effective at reducing STF-related injuries among the elderly living in the home setting (Lord, Menz, & Sherrington, 2006).

STF-Related Injury Prevention

While falls are a major public health concern, they are injuries that are preventable (CDC, 2013b). There are many ways that STF-related injuries can be prevented. The risk of experiencing an injury can be best understood through the injury

epidemiological model (**Figure 6**). The four components (host, energy, agent, and environment) of the injury epidemiological model are found to affect one another, therefore, by addressing the various components of the model, injuries can be prevented (ElderSafety, 2011). In relation to a common injury, such as a fall, the host represents the individual that is injured (i.e., an adult 65 years of age and older), the energy can be chemical (i.e. medication), electrical, mechanical (i.e., poor balance), or thermal (i.e., dehydration), the agent is the product or vector involved (i.e., the staircase), and the environment can either be the social or physical environment (i.e., the home). By understanding all components of the epidemiological model, injuries can be prevented.

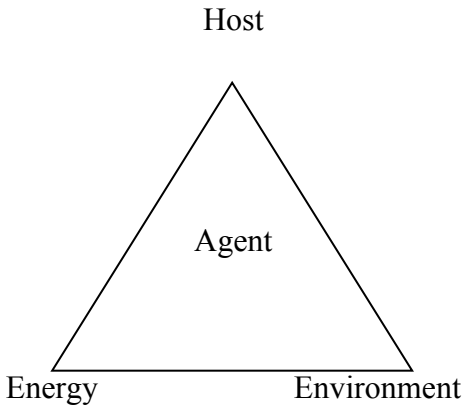


Figure 6. The Injury Epidemiological Model

Another model that is very important for understanding injury and injury prevention is the injury pyramid (**Figure 7**). The injury pyramid is a useful model that graphically depicts relative numbers of fatal and non-fatal injuries in the form of a pyramid (World Health Organization [WHO], 2014). While both fatal and non-fatal injuries are important to address, non-fatal injuries are of great concern due to the

physical injury, fear of falling, functional deterioration, and institutionalization that is associated with it (Tinetti et al, 1994). In total, there are four levels of injury severity in the injury pyramid: (1) fatal injuries (at the top of the pyramid), (2) injuries resulting in hospitalizations, (3) injuries resulting in visits to emergency departments, visit to primary care facilities, etc, and (4) injuries that are treated outside of the health care system, not treated, or not reported (at the base of the pyramid) (WHO, 2014).

Of all the levels of injury severity, the injuries that are treated outside of the health care system, not treated, or not reported are the most abundant and of the greatest concern due to the lack of prevention or treatment for the injury. It is very likely that the elderly at the base of the pyramid do not want to report experiencing a fall because they believe that falling is a consequence of normal aging, are reminded of their increased frailty and dependency, and their fear of reporting will lead to institutionalization or restrictions in their daily activities (Tideiksaar, 1989).

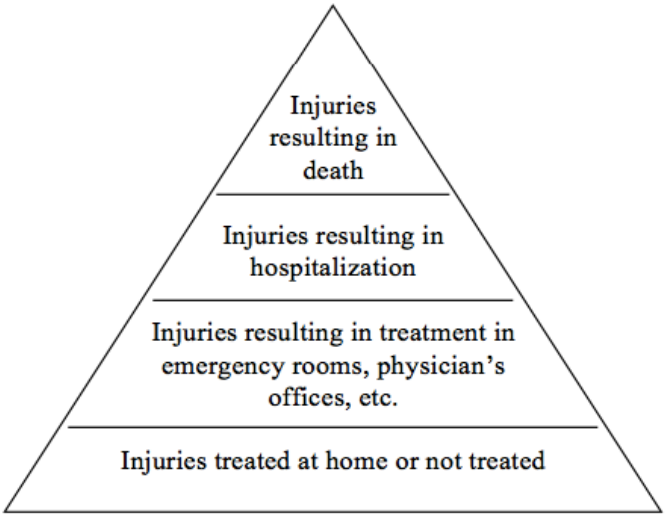


Figure 7. The Injury Pyramid

According to Healthy People 2010, there are four key steps in an epidemiological approach to injury: (Step 1) to determine the magnitude, scope, and characteristics of

injury, (Step 2) to identify the risk factors for injury or disability in order to determine whether or not certain factors are modifiable, (Step 3) to utilize the information from Step 2 to design, pilot test, and evaluate interventions in order to prevent injuries, and (Step 4) to implement interventions on a broad scale (CDC, 2009). To build from the goals of Healthy People 2010, Healthy People 2020 has expanded on injury and violence prevention focus area and has added a new focus area known as older adults (hereby referred to as "elderly") (Healthy People, 2013; CDC, 2009) (**Table 4**). By having new and continued goals, worldwide, there is more reason in striving to prevent STF-related injuries among the elderly population and improve their quality of care.

Table 4. Healthy People 2020 Objective Areas for Elderly, and Injury and Violence Prevention Topic Areas

Topic Area: Elderly (New Topic Area)	
Objectives (Prevention: OA-1 thru OA-7, Long-Term Services and Supports: OA-8 thru OA-12)	
OA-1	Increase the proportion of elderly who use the Welcome to Medicare benefit
OA-2	Increase the proportion of elderly who are up to date on a core set of clinical preventive services
OA-2.1	Men aged 65+
OA-2.2	Women aged 65+
OA-6	Increase the proportion of elderly with reduced physical and cognitive function who engage in light, moderate, or vigorous leisure-time physical activities
OA-7	Increase the proportion of the health care workforce with geriatric certification (i.e., physicians, psychiatrists, registered nurses, dentists, physical therapists, and registered dietitians)
OA-8	Reduce the proportion of non-institutionalized elderly with disabilities who have an unmet need for long-term services and supports (developmental)
OA-9	Reduce the proportion of unpaid caregivers of elderly who report an unmet need for caregiver support services (developmental)
OA-11	Reduce the rate of emergency department (ED) visits due to falls among the elderly
Topic Area: Injury and Violence Prevention (Topic Area in Healthy People 2020)	
Objectives	
IVP-1	Reduce fatal and nonfatal injuries
IVP-1.1	Reduce fatal injuries
IVP-1.2	Reduce hospitalizations for nonfatal injuries
IVP-1.3	Reduce emergency department visits for nonfatal injuries
IVP-23	Prevent an increase in fall-related deaths
IVP-23.2	Prevent an increase in fall-related deaths among the elderly

Some additional strategies that can be used to reduce STF-related injuries among the elderly are (1) providing incentives to health care providers to integrate fall risk assessments and fall prevention programs within their practice, (2) educating health care providers to conduct fall risk assessments, fall reduction through treatment and referrals to evidence-based fall prevention programs (NCSL, 2014).

Understanding risk factors associated with trips and falls is the first step at reducing STF-related injuries (CDC, 2013b). Research has shown that the reduction of STF risk factors significantly reduces STFs among the elderly population living in the health care system and in the community. It is very common that family members and caregivers of elderly individuals are unaware of what actions must be taken to reduce their loved ones risk of falling. Therefore, it is very important that health care professionals incorporate a routine fall risk assessment for elderly individuals even if they have not experienced a trip or fall, or trip or fall-related injury (CDC, 2013b).

When developing interventions for injury prevention, it is important to consider the 7 E's of injury prevention (i.e., education, enforcement, engineering, economic, and evaluation, ergonomic, and empowerment) (Rivera, n.d.). Education is used to inform people of potential injury hazards and risks, and help people adopt behaviors that are safe. Even though education does not necessarily change people's behaviors, it is possible that people will become receptive to adopting injury prevention strategies. For example, elderly and their caregivers should be taught about the risk factors and preventative strategies associated with STF-related injuries. Enforcement through legislation is also useful for injury prevention. For example, requiring all staircases in homes to have at least one handrail can potential reduce an elderly individuals risk of experiencing a STF-

related injury on the staircase. Engineering includes changes made to existing structures in the home. For example, by reducing STF-related hazards in the home, such as installing handrails for staircases, elderly will have a reduced risk of experiencing a STF in the home. Understanding the economic status of various populations is also important for injury prevention effectiveness. For example, elderly have various benefits, such as Social Security, Medicare, and Medicaid. With these benefits, elderly can be given quality care within the healthcare system if they ever experience an STF or STF-related injury in the home. If there are gaps in the healthcare system, issues can be identified and improved in order to provide elderly with quality healthcare. Evaluation is also important to determine if the injury prevention is effective. This should be performed on a regular basis. Ergonomics is an important component of injury prevention because individuals are capable of performing tasks with comfort while avoiding stress or injury. For example, ensuring that caregivers are properly trained to move elderly in and out of a bed or chair can reduce their risk of STFs and STF-related injuries. Knowing the difference between safe and unsafe practices when transferring elderly will protect caregivers and elderly from getting injured. Empowerment is an important component to injury prevention because individuals feel stronger and more confident in taking control of their lives. For example, elderly can be given tools and resources to stay physically active. By encouraging them to be physically active for at least 30 minutes per day can reduce their risk of STFs and STF-related injuries. While each of the components of the 7 E's of injury prevention are important, the most effective injury prevention programs are those that incorporate all 7 E's (Rivera, n.d).

Hawaii Adult Foster Care Home System

Hawaii is the first and only state to implement an AFCH system that utilizes case management agencies and medically trained care home operators and caregivers to provide quality care for elderly individuals in a home-based setting. According to Mollica, Cheek, Farnham, & Reinhard (2009), after receiving a certificate of approval from the Hawaii Department of Health (DOH), the adult foster care homes (AFCH) are certified to provide 24 hour accommodations, personal care, and homemaker services to not more than two elderly individuals. The Hawaii AFCH must have at least one elderly individual that is a Medicaid recipient, elderly individual must be at a nursing home facility level of care, and must be served by a licensed home and community-based care management agency. A physician must certify that the elderly individual needs a nursing facility level of care prior to admission to the Hawaii AFCH system. The case management agency is required to have written policy and procedures describing the services that are available for elderly individual, such as admission, readmission, suspension, eligibility, discharge, and transfer standards and requirements. Case management agencies obtain referrals from various health care facilities (i.e., hospitals, nursing homes, hospice) for the placement of elderly individuals into the Hawaii AFCH system. The case management agencies will match elderly individuals with caregivers in order to increase the quality of care for the elderly individuals living in the care home. Case managers (usually registered nurses) complete a patient assessment, develop a service plan of care for the elderly individual, coordinate services, etc. The case managers from the case management agency ensure that all eligibility requirements are met prior to admission to the Hawaii AFCH system. Case managers may delegate administration of

medication, client care, and services (i.e., personal care, respite, and homemaker services) to the Hawaii AFCH caregiver. A caregiver in the Hawaii AFCH must reside in the home and be a nurse aid, licensed practical nurse, or registered nurse. Care homes in the Hawaii AFCH are issued yearly or two-year certificates depending on the caregivers care home operations. If caregivers are in violation of the Hawaii AFCH requirements, a written corrective action plan must address each of the noncompliance issues. If corrections are not made, the DHS will suspend new patient admissions to the caregiver, transfer current elderly individuals in the Hawaii AFCH, issue fines, or revoke the caregiver's operational certificates (Mollica, Cheek, Farnham, & Reinhard; 2009).

In order to help prevent the long-term consequences of elderly falls, the House Bill 2053 and the Senate Bill 2531 (passed and in effect by July 3, 2014) that establishes a fall prevention and early detection coordinator within the Department of Health (DOH) Emergency Medical Services and Injury Prevention System Branch (NCSL, 2014). According to the Senate Bill 2531:

> *"The legislature finds that falls and fall-related injuries among the elderly impact individuals, families, the community, and the State's health care system. Fall prevention is a major concern for the safety and well-being of the State's elderly residents, which is the fastest-growing segment of Hawaii's population. Among the elderly in Hawaii, falls are the leading cause of fatal injuries (about 44%) and injury-related hospitalizations (about 83%). On average, every five hours an elderly person in Hawaii is injured so severely in a fall that hospitalization is necessary. Falls among Hawaii's elderly also result in a yearly average of 82 deaths and nearly 1,800 hospitalizations. The legislature further finds that hospital costs associated with fall-related injuries average more than $65 million per year. This total does not include the additional significant costs associated with skilled nursing care and rehabilitation. Among Hawaii seniors hospitalized for a fall, 43% are discharged to skilled nursing facilities for additional care, and 12% are moved to rehabilitation facilities…The legislature therefore finds that the department of health's emergency medical services and injury prevention system branch should be permitted to establish and maintain a program dedicated to fall prevention and early*

> *detection for the elderly. This program will serve as a focal point for statewide injury prevention and detection efforts to ensure multi-disciplinary support, coordination of prevention and detection effort, and continuity of implementation of accountability."*

With the a stringent home care system and approved legislation for the prevention of long-term consequences of elderly falls, the Hawaii AFCH is equipped to provide quality of care for its elderly living in these care homes.

CHAPTER 3

METHODOLOGY

Purpose of Study

The purpose of this quasi-experimental study is to determine the slip, trip, and fall (STF) risk among elderly men and women living in community-based health care facilities known as the Hawaii Adult Foster Care Homes (AFCHs). The current study is considered a quasi-experimental study due to its pre-post test design. The same data are collected pre- and post-intervention in order to determine if the current study is effective. By evaluating the elderly men and women's cognitive function, number of medications, home safety hazards, caregiver knowledge of STFs, physical activity, and overall STF risk, this study will be able to determine the STF risk among elderly men and women living in the Hawaii AFCH system. In addition, this study will determine what STF hazard reduction strategies should be continued or implemented within the Hawaii adult foster care home system in order to ensure quality of care for the elderly men and women living in these care homes.

Research Question

What are the STF risks among elderly men and women living in the Hawaii AFCH system?

Hypotheses

Hypothesis 1 (Cognitive Function)

H_0: There is no relationship between cognitive function and the number of STFs among elderly men and women living in the Hawaii AFCH system.

H_A: There is a relationship between cognitive function and the number of STFs among elderly men and women living in the Hawaii AFCH system.

H_{A1}: There is an inverse relationship between cognitive function and the number of STFs among elderly men within the Hawaii AFCH system.

H_{A2}: There is an inverse relationship between cognitive function and the number of STFs among elderly women within the Hawaii AFCH system.

H_{A3}: There is an inverse relationship between cognitive function and the number of STFs among both elderly men and women within the Hawaii AFCH system.

Explanation: Various research studies have shown an inverse relationship between cognitive function and STFs. In addition, it is theorized that elderly women are expected to experience more STFs than the elderly men within the Hawaii AFCH system.

Hypothesis 2 (Medication)

H_0: There is no relationship between the number of medications taken and the number of STFs among elderly men and women within the Hawaii AFCH system.

H_A: There is a relationship between the number of medications taken and the number of STFs among elderly men and women within the Hawaii AFCH system.

H_{A1}: There is a direct relationship between the number of medications taken and the number of STFs among elderly men within the Hawaii AFCH system.

H_{A2}: There is a direct relationship between the number of medications taken and the number of STFs among elderly women within the Hawaii AFCH system.

H_{A3}: There is a direct relationship between cognitive function and the number of STFs among both elderly men and women within the Hawaii AFCH system.

Explanation: Research has shown that elderly taking greater than or equal to 4 medications are more likely to experience STFs. In consistency with past research studies, it is expected that a similar trend of number of medications and STFs will be identified in the AFCHs.

Hypothesis 3 (Home Safety Hazards)

$\mathbf{H_0}$: The number of home safety hazards (in the kitchen, living room, bedroom, hallway, bathroom, and staircase (if applicable)) among elderly men is equal to those among elderly women within in the Hawaii AFCH system.

$\mathbf{H_A}$: The number of home safety hazards among elderly men is not equal to those among elderly women within the Hawaii AFCH system.

$\mathbf{H_{A1}}$: The number of home safety hazards among elderly men is less than those among elderly women within the Hawaii AFCH system.

Explanation: Research has shown that home injury hazards are more likely to contribute to falls among vigorous elderly than frail elderly because vigorous elderly have an increased exposure to home safety hazards than frail elderly. In this study, it is expected that elderly men are vigorous elderly and elderly women are frail elderly. Therefore, elderly men have an increased exposure to home safety hazards than elderly women.

Hypothesis 4 (Caregiver Knowledge of STF Hazards)

$\mathbf{H_0}$: There is no relationship between the caregiver's knowledge of STF hazards and the number of STFs among the elderly men and women within the Hawaii AFCH. system

$\mathbf{H_A}$: There is a relationship between the caregiver's knowledge of STF hazards and the number of STFs among the elderly men and women within the Hawaii AFCH system.

H_{A1}: There is an inverse relationship between the caregiver's knowledge of STF hazards and the number of STFs among elderly men within the Hawaii AFCH system.

H_{A2}: There is an inverse relationship between the caregiver's knowledge of STF hazards and the number of STFs among elderly women within the Hawaii AFCH system.

H_{A3}: There is an inverse relationship between the caregiver's knowledge of STF hazards and the number of STFs among both elderly men and women within the Hawaii AFCH system.

Explanation: It is expected that the caregivers of elderly men in the Hawaii AFCH system will be more knowledgeable about STF hazards in the home than the caregivers of elderly women in the Hawaii AFCH system. It is expected elderly men have an increased exposure to home safety hazards than elderly women, therefore, caregivers of elderly men will be more knowledgeable about STF hazards in the home.

Hypothesis 5 (Pre- and Post-Intervention Physical Activity)

H_0: There is no relationship between the number of daily hours of physical activity and the number of STFs among the elderly men and women within the Hawaii AFCH system.

H_A: There is a relationship between the number of daily hours of physical activity and the number of STFs among the elderly men and women within the Hawaii AFCH system.

H_{A1}: At pre-intervention, there is an inverse relationship between the number of daily hours of physical activity and the number of STFs among elderly men within the Hawaii AFCH system.

H_{A2}: At post-intervention, there is an inverse relationship between the number of daily hours of physical activity and the number of STFs among elderly men within the Hawaii AFCH system.

H_{A3}: At pre-intervention, there is an inverse relationship between the number of daily hours of physical activity and the number of STFs among elderly women within the Hawaii AFCH system.

H_{A4}: At post-intervention, there is an inverse relationship between the number of daily hours of physical activity and the number of STFs among elderly women within the Hawaii AFCH system.

H_{A5}: At pre-intervention, there is an inverse relationship between the number of daily hours of physical activity and the number of STFs among both elderly men and women within the Hawaii AFCH system.

H_{A6}: At post-intervention, there is an inverse relationship between the number of daily hours of physical activity and the number of STFs among both elderly men and women within the Hawaii AFCH system.

Explanation: For this current study, it is theorized that elderly men will be more physically active than elderly women at pre- and post-intervention in the Hawaii AFCH. It is expected that elderly men are vigorous elderly while elderly women are frail elderly.

Hypothesis 6 (Pre- and Post-Intervention Assessment of the Care Home Caregiver)

H_0: Pre-intervention assessment of the care home caregiver is equal to post-intervention assessment of the care home caregiver among the elderly men and women living in the Hawaii AFCH system.

H_A: Pre-intervention assessment of the care home caregiver is not equal to post-intervention assessment of the care home caregiver among the elderly men and women living in the Hawaii AFCH system.

H_{A1}: The elderly men's assessment of the Hawaii AFCH caregiver will increase from pre- to post-intervention.

H_{A2}: The elderly women's assessment of the Hawaii AFCH caregiver will increase from pre- to post-intervention.

H_{A3}: The elderly men and women's assessment of the Hawaii AFCH caregiver will increase from pre- to post-intervention.

Explanation: In this current study, it is theorized that the elderly men and women will have an increased satisfaction with their current caregiver from pre- to post-intervention. Assuming that there were more STF hazards, less time to exercise, and difficulty adhering to a medication regimen pre-intervention, there should be a decrease in STF hazards, more time to exercise, and improved adherence to medication regimen by post-intervention.

Hypothesis 7 (Overall STF Risk)

H_0: There is no relationship between risk factors of trips and falls (cognitive function, medication, knowledge of trips and falls, and physical activity) and the number of STFs among elderly men and women within the Hawaii AFCH system.

H_A: There is a relationship between risk factors of trips and falls (cognitive function, medication, knowledge of trips and falls, and physical activity) and the number of STFs among elderly men and women within the Hawaii AFCH system.

H_{A1}: There is an inverse relationship (cognitive function, knowledge of trips and falls, and physical activity) and a direct relationship (medication) between risk factors of trips and falls and the number of STFs among elderly men within the Hawaii AFCH system.

H_{A2}: There is an inverse relationship (cognitive function, knowledge of trips and falls, and physical activity) and a direct relationship (medication) between risk factors of trips and falls and the number of STFs among elderly women within the Hawaii AFCH system.

H_{A3}: There is an inverse relationship (cognitive function, knowledge of trips and falls, and physical activity) and a direct relationship (medication) between risk factors of trips and falls and the number of STFs among both elderly men and women within the Hawaii AFCH system.

Explanation: STFs have multiple risk factors, such as cognitive function, medications, knowledge of trips and falls, and physical activity. The results of this hypothesis will determine how multiple risk factors affect the number of STFs among elderly men and women in the Hawaii AFCH system.

Note: Adjustment for age, education, prevalence of stroke (if ever, excluding transient ischemic attack (TIA) strokes), gender, ethnicity, and marital status) were used for multiple regression models within and in between elderly men and women in the Hawaii AFCH system. Age was a continuous variable. Education, prevalence of stroke, gender, ethnicity, and marital status were recoded as dummy variables. Female, widowed, Japanese, high school diploma or equivalent, and not having a stroke were used as reference groups.

Treatment of Data

From June 2014 to January 2015, the Department of Environmental and Occupational Health (DEOH) at the University of Nevada, Las Vegas (UNLV) conducted

a quasi-experimental study to determine the effectiveness of the Hawaii AFCH system at reducing STF risk among the elderly men and women living in these care homes. This study received initial IRB approval on June 19, 2014, and modification IRB approval on November 18, 2014. The current IRB approval can be found in **Appendix 1**.

Target Population

The target population includes elderly men and women (65 years of age and older) living in AFCHs in Hawaii.

Study Procedure

The study process from recruitment, consent, home visit, intervention, follow-up phone call, to closure of the elderly individuals and their caregivers files is detailed below and can be seen in a visual flow chart in **Appendix 2**.

Table 5 shows the timeline, the type of documentation, and the type of intervention that will be completed in this study.

Table 5. Study Timeline, Documentation, and Interventions

	Timeline	**Documentation**	**Interventions**
Home Visit		**Consent Forms** Pre- and Post-Consent Questionnaire, Care Home Resident Consent Form, Caregiver Consent Form, Authorization to Use and Share Health Information for Research Purposes **Questionnaire** Memory Test, Assessment of Elderly Physical Functioning, Medication List, Trip and Fall Assessment, Caregiver Trip and Fall Test	Personalized Injury Prevention Checklist, Automatic nightlights, Non-slip grip tape, Exercise DVD Program
Follow-Up Phone Call	2-3 months after home visit	**Questionnaire** Follow-up phone interview	

Recruitment

Elderly individuals and their caregivers in the Hawaii AFCH system were recruited by contacting case management agencies (in-person or over the telephone). A research team member met with various case management agencies to obtain a list of elderly individuals and their caregivers that fit the study inclusion criteria below. Research team members continued contacting case management agencies in Hawaii until a sufficient number of elderly individuals and their caregivers were enrolled in the research project.

Selection Criteria

Inclusion Criteria

1. Elderly adults 65 years of age and older living in Oahu, Hawaii.
2. Elderly adults that were expected to live for more than 3 months.
3. Elderly adults that had at least 1 slip, trip, or fall in the past.

Exclusion Criteria

1. Elderly adults that were expected to live for less than 3 months.
2. Elderly adults that did not have a slip, trip, or fall in the past.
3. Elderly adults that were bedridden.
4. Those (i.e., elderly adults or caregivers) that refuse to consent to participation in the study.

Consent

Prior to the elderly participating in the current study, it was required for them to answer pre- and post-consent questionnaire (**Appendix 3**). Elderly that answered at least three of the four pre-consent questions correctly were enrolled in the current study. Then

participants were given informed consent and asked post-consent questions such as "what are some activities that we will do today," "what is a benefit of participating in this study," and "what is a risk of participating in this study." Based on the elderly's response on the pre-and post-questionnaire, the research team certified that the elderly understands the purpose, nature, risks, benefits, and alternatives (including nonparticipation) of the research, making a decision about participation, and understanding that the decision about participation in the research will involve no penalty or loss of benefits to which the subject is otherwise entitled.

For this study, there were three consent forms: (1) The Care Home Resident Consent Form (for the elderly participant) (**Appendix 4**), (2) The Caregiver Consent Form (for the elderly participant's caregivers) (**Appendix 5**), and (3) The Authorization to Use and Share Health Information for Research Purposes Form (for the elderly participants) (**Appendix 6**).

The consenting process for the elderly participant and his/her caregiver will take place at the care home. Informed consent occurred in-person at the care home.

If the elderly individual or the caregiver declined from signing the consent forms, then the elderly individual and his/her caregiver were not be enrolled into the study.

Home visit

After obtaining consent, the research team conducted several tasks at the home visit with the elderly participant and their caregiver. While the elderly participant completed a memory test (**Appendix 7**), and assessment of elderly physical functioning questionnaire (**Appendix 8**), the researcher obtained a current list of medications the elderly participant is taking (**Appendix 9**), and conduct a trip and fall visual assessment

of the care home (**Appendix 10**). Further, the caregiver completed a caregiver trip and fall test (**Appendix 11**). If injury hazards were found in the home, an injury prevention checklist along with various intervention supplies and an exercise program were given to elderly participants in the study (**Appendix 12**).

1. **Memory Test** (**Appendix 7**)

   Research team members that have been trained to administer the Cognitive Abilities Screening Instrument (CASI) memory test (score 0 to 100) conducted the test with the elderly participants. The CASI is a comprehensive screening test of cognitive abilities that takes between 15 to 20 minutes and is considered to be a relatively culture-fair test. The CASI consists of 25 test items that "provides quantitative assessment on 9 domains: (1) long-term memory, (2) short-term memory, (3) attention, (4) mental manipulation and concentration, (5) orientation, (6) drawing, (7) judgment and abstract thinking, (8) word fluency, and (9) language (Teng et al., 1994). The CASI contains items and scores identical or similar to items used in the Mini-Mental State Examination (MMSE), the Modified Mini-Mental State (3MS), and the Hasegawa Screening Test for Dementia (HSTD). Therefore, researchers and medical professionals can utilize the CASI as a reliable memory test. Various research studies have utilized the CASI to assess elderly individuals cognitive abilities, such as the Honolulu Heart Program and Honolulu Asia Aging Study (Honolulu Heart Program, personal communication, May 2, 2014; Teng et al., 1994).

2. **Assessment of Elderly Physical Functioning Questionnaire** (**Appendix 8**)

   In the assessment of elderly physical functioning questionnaire, elderly participants were asked questions related to physical ability, physical activity, injury

in the care home, and their overall assessment of the care home they live in. If the elderly participant had difficulty hearing the questions, the caregiver may assist the elderly participant answer each of the questions. However, the "Elderly Assessment of the Care Home" section of the questionnaire must be completed with the elderly participant.

3. **Medication List** (**Appendix 9**)

The elderly participant's provided all medication (including prescription, non-prescription, and herbal medicines) that they have been taking within two weeks prior to the home visit. The research team recorded the names of the medication, how often the medication was taken (i.e., daily, every other day, at least once a week), and if the medication was expired. Medications were categorized based on the class of medication by a medical professional, such as a registered nurse.

4. **Trip and Fall Visual Assessment** (**Appendix 10**)

At least one research team member conducted a visual assessment of the care home in order to identify injury hazards in the home. The rooms that were inspected are the top 6 most used rooms (bedroom, hallway, staircase (if applicable), kitchen, living room, and bathroom). Depending on the room, room measurement, lighting, exposed telephone/electrical cords, height of beds and toilets, clutter, non-slip rugs/carpet, night lights, grab bars, non-skid mats in the shower, floor safety, sturdy plastic seats in the shower, and sturdy handrails were identified in order to determine the hazard density scores for each of the top 6 most used rooms in the home.

5. **Caregiver Trip and Fall Test** (**Appendix 11**)

Questionnaire assessed the caregiver's knowledge about STF hazards and what to do if the elderly participant trips or falls in the home.

6. **Intervention**

All documentation (i.e., memory test, assessment of elderly physical functioning, medication list, trip and fall visual assessment) were used to assess the fall risk prior to intervention. At the home visit, the research team members reviewed trip or fall hazards found in the home with the elderly participant and the caregiver (and case management agency if applicable). The elderly participant and the caregiver were notified of any trip or fall hazards in the home that needed to be addressed immediately. The research team provided a personalized injury prevention checklist (**Appendix 12**) if any trip or fall hazards were found in the home. To reduce future trip or fall hazards in the home, various intervention supplies (i.e., night lights, non-slip grip tape) were provided to the elderly participants. The research team also provided an exercise DVD program that is based off of the Centers for Disease Control and Prevention (CDC) Barnett Stay Safe Stay Active Daily Exercise Program (Stage 1 & 2) (CDC, 2012a; CDC, 2012b).

The CDC Barnett Stay Safe Stay Active Daily Exercise Program is an exercise program that has been found to improve balance and coordination, muscle strength, reaction time, and aerobic activity (Barnett, Smith, Lord, Williams, & Baumand, 2003). With the various mobility, strength, flexibility, and stretching exercises, elderly are staying physically active and reducing their risk of experiencing a trip or

fall, or a trip or fall-related injury in the care home (Barnett, Smith, Lord, Williams, & Baumand, 2003) (**Appendix 13**).

Follow-up Phone Call

Two to three months after the home visit, a research team member contacted the elderly participant and the caregiver over the telephone. Follow-up questions consist of "Physical Activity" and "Elderly Injury" sections of the Assessment of Elderly Physical Functioning questionnaire. Additional questions were asked pertaining to the exercise DVD program. If the elderly participant had difficulty of hearing over the telephone, the caregiver could answer the questions on behalf of the elderly participant. However, the "Assessment of the Care Homes and Exercise Program" section must be completed with the elderly participant (**Appendix 14**).

Closure

Once all questionnaires were complete, the case was closed and a research team member entered all the data into Microsoft Excel and SPSS in preparation for statistical analyses.

Privacy & Confidentiality

Protection of participant's identity is very important and will be protected to the extent of the law. All research team members have completed the Collaborative Institutional Training Initiative (CITI) training course on "The Protection of Human Subjects" and understand the importance of confidentiality, National Environmental Health Association (NEHA) certified Healthy Homes Specialists, and trained to administer the CASI memory test.

To protect the privacy of elderly participants and their caregivers, research team members spoke with elderly participants and their caregivers individually for certain components of the home visit. Elderly participants completed the Memory Test, the Assessment of Elderly Physical Functioning (VI. Elderly Assessment of the Care Home), and the Follow-up Phone Interview (VI. Elderly Assessment of the Care Home & Exercise Program) on their own, and their caregivers completed the Caregiver Trip and Fall Test and Fall Test on their own. For all other components of the project, a research team member verified if the elderly participants were comfortable to have their caregivers present during the rest of the home visit and vice versa.

Information provided to the research team were not discussed with anyone else in the home, any family members or friends, or any affiliated health care professionals or agencies, but were discussed sensitively and carefully if any components of the care home were considered to be life-threatening to either the elderly participants or their caregivers.

Observational Data

Demographic Information

Demographic information for the elderly participants (such as gender, age, marital status, race and ethnicity, highest level of education, and insurance status) and demographic information for the caregivers (such as gender, age, marital status, race and ethnicity, highest level of education, and total number of years as a certified caregiver) was obtained during the home visit. Frequency distributions will be calculated for all demographic information in this study.

Data Collection

All data files were stored in a locked office on password protected computers. Additionally, to protect participant's personal information, each participant was assigned a unique case number. No personal information was used in any reports or publications. After data were entered into a spreadsheet, data were transferred into an IBM SPSS Statistics, Version 20 software.

Statistical Methods

Cognitive Function

To be consistent with other research studies evaluating elderly (living independently or in long-term health care settings) STFs and cognitive function, similar trends should also be found among the elderly living in the AFCH system. Several descriptive statistics (i.e., CASI scores and number of STFs based on gender, age, and AFCH, types of injuries, and seeking medical assistance) will be used to supplement the analyses of hypothesis 1. For the analyses of hypothesis 1, a multiple regression model is used to compare the number of STFs among elderly men and women living in the Hawaii AFCH system (**Table 6**). The independent variable is the elderly participants cognitive function based on the CASI memory test and the dependent variable is the number of STFs the elderly participants have experienced in the home based on their response on the assessment of elderly physical functioning.

If there is a statistically significant difference between elderly men and women, the multiple regression model will be stratified based on gender (i.e., two separate multiple regression models). If there is no statistically significant difference between elderly men and women, the multiple regression will not be stratified. Gender, age of the

elderly participant, marital status, race/ethnicity, highest level of education, and stroke (excluding transient ischemic attack (TIA) or stroke) will be used as covariates. All variables except for cognitive function and age will be transformed to dummy variables.

Table 6. Name and Scale of Variables, Questionnaire, and Questions for Cognitive Function

H #	Name of Variable	Original Scale	Transformed Scale	Questionnaire	Question
Men H_{A1}	IV Cognitive Function	Continuous (0-100)	NA	CASI Memory Test	Total Score
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experienced a slip, trip or fall in the past?
Women H_{A2}	IV Cognitive Function	Continuous (0-100)	NA	CASI Memory Test	Total Score
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experienced a slip, trip or fall in the past?
Men & Women H_{A3}	IV Cognitive Function	Continuous (0-100)	NA	CASI Memory Test	Total Score
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experienced a slip, trip or fall in the past?

Abbreviations: H, Hypothesis; IV, Independent Variable; DV, Dependent Variable; NA, not applicable; TBD, to be determined

Medication

To be consistent with other research studies evaluating elderly (living independently or in long-term health care settings) STFs and the number of medication taken, similar trends should also be found among the elderly in the AFCH system. Several descriptive statistics (i.e., classification of medication based on gender, age, and AFCH, total number of medication, medication available for inspection at home visit,

expired medication, types of injuries, and seeking medical assistance) were used to supplement the analyses of hypothesis 2. For the analyses of hypothesis 2, a simple linear regression model was used to compare the number of STFs among elderly men and women living in the Hawaii AFCH system (**Table 7**). The independent variable is the number of medication the elderly participant is taking and the dependent variable is the number of STFs the elderly participants have experienced in the home based on their response on the assessment of elderly physical functioning. Gender (men or women) will be a covariate in the model. Elderly men will be the reference group. If there is a statistically significant difference between elderly men and women, the simple linear regression model will be stratified based on gender (i.e., two separate simple linear regression models). If there is no statistically significant difference between elderly men and women, the simple linear regression will not be stratified.

Table 7. Name and Scale of Variables, Questionnaire, and Questions for Medication

H #	Name of Variable	Original Scale	Transformed Scale	Questionnaire	Question
Men H_{A1}	IV # of Medication	Continuous (0-20)	NA	Medications and Vitamins	In the past 2 weeks, have you taken any medicines on a regular basis at lease once daily or once every other day (including all prescription, non-prescription, and herbal medicines).
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experienced a slip, trip or fall in the past?
Women H_{A2}	IV # of Medication	Continuous (0-20)	NA	Medications and Vitamins	In the past 2 weeks, have you taken any medicines on a regular basis at lease once daily or once every other day (including all prescription, non-prescription, and herbal medicines).
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experienced a slip, trip or fall in the past?
Men & Women H_{A3}	IV # of Medication	Continuous (0-20)	NA	Medications and Vitamins	In the past 2 weeks, have you taken any medicines on a regular basis at lease once daily or once every other day (including all prescription, non-prescription, and herbal medicines).
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experienced a slip, trip or fall in the past?

Abbreviations: H, Hypothesis; IV, Independent Variable; DV, Dependent Variable; NA, not applicable

Home Safety Hazards

To assess the number of home safety hazards among the elderly men and women living in the Hawaii AFCH, the top six most used rooms in the home were be evaluated

for home safety hazards. The six rooms evaluated in this study were the living room, kitchen, bedroom, bathroom, hallway, and staircase (if applicable). Several descriptive statistics (i.e., location of STFs in the home, location of home injury hazards, hazard density score, distributed intervention supplies) will be used to supplement the analysis of hypothesis 3. For the analyses of hypothesis 3, a chi-square test ($n > 50$) or a fishers exact test ($n < 50$) was used to compare the number of home safety hazards in the top six rooms among elderly men and women within the Hawaii AFCHs (**Table 8**). Gender (either elderly men or women in the Hawaii AFCH) and the presence or absence of home injury hazards in each of the top six most used rooms in the home (i.e., kitchen, living room, bedroom, bathroom, hallway, and staircase (if applicable)) were evaluated.

Table 8. Name and Scale of Variables, Questionnaire, and Questions for Home Safety Hazards

Name of Variable	Original Scale	Transformed Scale	Questionnaire	Question
Gender	Binomial Men or Women	NA	Trip and Fall Visual Assessment	Either elderly men or women in the Hawaii AFCH
Home Safety Hazards	Binomial Present or Absent	NA	Trip and Fall Visual Assessment	Presence or absence of home injury hazards*

Abbreviations: IV, Independent Variable; DV, Dependent Variable; NA, not applicable

* Home injury hazards: Examined for the presence or absence of poor lighting, exposed telephone or electrical cords, height of furniture, clutter, rug/carpet hazards, lack of night lights, lack of grab bars, lack of non-skid mats in shower, lack of sturdy plastic seats in shower, and lack of sturdy handrails

Caregiver Knowledge of STF Hazards

For analysis of hypothesis 4, a multiple regression model is used to compare the caregiver's knowledge of STF hazards among elderly men and women within the Hawaii AFCH (**Table 9**). The independent variable is the caregiver's total score on the caregiver's STF test and the dependent variable is the number of STFs the elderly

participants have experienced in the home based on their response on the assessment of elderly physical functioning.

If there is a statistically significant difference between elderly men and women, the multiple regression model will be stratified based on gender (i.e., two separate multiple regression models). If there is no statistically significant difference between elderly men and women, the multiple regression will not be stratified. Caregiver's years of experience, age of the caregiver, and age of the elderly participant will be used as covariates. All variables will be kept as continuous variables.

Table 9. Name and Scale of Variables, Questionnaire, and Questions for Caregiver Knowledge of STF Hazards

H #	Name of Variable	Original Scale	Transformed Scale	Questionnaire	Question
Men H_{A1}	IV Knowledge of STF Hazards	Continuous (0-15 correct answers)	NA	Caregiver Trip and Fall Test	Total Score
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experience a slip, trip, or fall in the past?
Women H_{A2}	IV Knowledge of STF Hazards	Continuous (0-15 correct answers)	NA	Caregiver Trip and Fall Test	Total Score
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experience a slip, trip, or fall in the past?
Men & Women H_{A3}	IV Knowledge of STF Hazards	Continuous (0-15 correct answers)	NA	Caregiver Trip and Fall Test	Total Score
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experience a slip, trip, or fall in the past?

Abbreviations: IV, Independent Variable; DV, Dependent Variable; NA, not applicable

Pre- and Post-Intervention Physical Activity

To assess the elderly participants physical activity at pre- and post-intervention, several descriptive statistics (i.e., pre- and post-intervention physical ability, physical activity, and types of exercises, the distribution of the CDC Barnett Stay Safe Stay Active Daily Exercise DVD Program (Stage 1 & 2), and at post-intervention the elderly assessment of the exercise DVD program) will be used to supplement the analysis for this hypothesis. (Note: The timeframe between pre- and post-intervention data collection was between two to three months).

Prior to conducting a simple linear regression model, a paired t test will be used to determine if physical activity and the number of STFs change from pre- to post-intervention due to the DVD exercise program that is being provided to the elderly participants at the home visit. The paired t test will be conducted:

(1) For physical activity at pre- and post-intervention among elderly men within the Hawaii AFCH system

(2) For STFs at pre- and post-intervention among elderly men within the Hawaii AFCH system

(3) For physical activity at pre- and post-intervention among elderly women within the Hawaii AFCH system

(4) For STFs at pre- and post-intervention among elderly women within the Hawaii AFCH system

In doing so, the paired t test will determine if physical activity and STFs change from pre- to post-intervention due to the DVD exercise program that is provided to the elderly participants at the home visit.

After performing a paired t test, a simple linear regression model will be used to compare pre- and post-intervention physical activity of elderly living in the Hawaii AFCH system (**Table 10**).

The independent variable is the daily hours of physical activity (pre- and post-intervention) and the dependent variable is the number of STFs the elderly participants have experienced in the home based on their response on the assessment of elderly physical functioning and the follow-up phone interview. Gender (Men or Women) will be a covariate in the model. Elderly women will be the reference group. If there is a statistically significant difference between elderly men and women, the simple linear regression model will be stratified based on gender (i.e., two separate simple linear regression models). If there is no statistically significant difference between elderly men and women, the simple linear regression will not be stratified.

If there is a small range of daily hours of physical activity or the number of STF-related injuries, an alternative test (i.e., Spearman's correlation) will be considered.

Table 10. Name and Scale of Variables, Questionnaire, and Questions for Pre- and Post-Intervention Physical Activity

H #	Name of Variable	Original Scale	Transformed Scale	Questionnaire	Question
Men H_{A1}	IV Physical activity Pre-intervention	Continuous (Hours per day 0-24)	NA	Assessment of Physical Functioning	Physical Activity
	DV # of Trips or Falls Pre-intervention	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experience a slip, trip, or fall in the past?
Men H_{A2}	IV Physical activity Post-intervention	Continuous (Hours per day 0-24)	NA	Follow-up Phone Interview	Physical Activity
	DV # of Trips or Falls Post-intervention	Continuous (0-15)	NA	Follow-up Phone Interview	Since our last visit, have you experienced a slip, trip, or fall?
Women H_{A3}	IV Physical activity Pre-intervention	Continuous (Hours per day 0-24)	NA	Assessment of Physical Functioning	Physical Activity
	DV # of Trips or Falls Pre-intervention	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experience a slip, trip, or fall in the past?
Women H_{A4}	IV Physical activity Post-intervention	Continuous (Hours per day 0-24)	NA	Follow-up Phone Interview	Physical Activity
	DV # of Trips or Falls Post-intervention	Continuous (0-15)	NA	Follow-up Phone Interview	Since our last visit, have you experienced a slip, trip, or fall?
Men & Women H_{A5}	IV Physical activity Pre-intervention	Continuous (Hours per day 0-24)	NA	Assessment of Physical Functioning	Physical Activity
	DV # of Trips or Falls Pre-intervention	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experience a slip, trip, or fall in the past?
Men & Women H_{A6}	IV Physical activity Post-intervention	Continuous (Hours per day 0-24)	NA	Follow-up Phone Interview	Physical Activity
	DV # of Trips or Falls Post-intervention	Continuous (0-15)	NA	Follow-up Phone Interview	Since our last visit, have you experienced a slip, trip, or fall?

Abbreviations: IV, Independent Variable; DV, Dependent Variable; NA, not applicable

Pre- and Post-Intervention Assessment of the Care Home Caregiver

For the analysis of hypothesis 6, a Wilcoxon signed rank test will be used to compare pre- and post-intervention elderly assessment of the care home caregiver they are living with in each respective AFCH (**Table 11**). Elderly assessment of the care home evaluated the caregiver's ability to help the elderly participant exercise, adhere to their medication regimen, and reduce STF hazards in the care home. Among the elderly men within the Hawaii AFCH, the independent variable (treated as a continuous variable) is the elderly participants assessment of the care home caregiver at pre-intervention and the dependent variable is the elderly participants assessment of the care home caregiver at post-intervention. Among the elderly women within the Hawaii AFCH, the independent variable is the elderly participants assessment of the care home caregiver at pre-intervention and the dependent variable is the elderly participants assessment of the care home caregiver at post-intervention. For a Wilcoxon signed rank test output from SPSS, a "negative ranks" mean that the elderly participants were more satisfied with their caregiver pre-intervention than post-intervention. A "positive ranks" mean that the elderly participants were more satisfied with their caregiver post-intervention than pre-intervention. A "ties" mean that the elderly participants were equally satisfied with their caregiver at pre- and post-intervention.

Table 11. Name and Scale of Variables, Questionnaire, and Questions for Pre- and Post-Intervention Assessment of the Care Home Caregiver

H #	Name of Variable	Original Scale	Transformed Scale	Questionnaire	Question
Men H_{A1}	IV Elderly Assessment Pre-Intervention	Categorical" (1=Poor, 2=Fair, 3=Average, 4=Good 5=Excellent)	NA	Assessment of Elderly Physical Functioning	Elderly Assessment of the Care Home at Home Visit*
	DV Elderly Assessment Post-Intervention	Categorical" (1=Poor, 2=Fair, 3=Average, 4=Good 5=Excellent)	NA	Follow-up Phone Interview	Elderly Assessment of the Care Home since Home Visit^
Women H_{A2}	IV Elderly Assessment Pre-Intervention	Categorical" (1=Poor, 2=Fair, 3=Average, 4=Good 5=Excellent)	NA	Assessment of Elderly Physical Functioning	Elderly Assessment of the Care Home at Home Visit*
	DV Elderly Assessment Post-Intervention	Categorical" (1=Poor, 2=Fair, 3=Average, 4=Good 5=Excellent)	NA	Follow-up Phone Interview	Elderly Assessment of the Care Home since Home Visit^
Men & Women H_{A3}	IV Elderly Assessment Pre-Intervention	Categorical" (1=Poor, 2=Fair, 3=Average, 4=Good 5=Excellent)	NA	Assessment of Elderly Physical Functioning	Elderly Assessment of the Care Home at Home Visit*
	DV Elderly Assessment Post-Intervention	Categorical" (1=Poor, 2=Fair, 3=Average, 4=Good 5=Excellent)	NA	Follow-up Phone Interview	Elderly Assessment of the Care Home since Home Visit^

Abbreviations: H, Hypothesis; IV, Independent Variable; DV, Dependent Variable; NA, not applicable
"Categorical variable treated as continuous variables
* On a scale of 1 to 5, how is this current care home at (1) Helping you exercise at least 30 minutes per day, (2) Helping you adhere to your medication regimen?, and (3) Reducing trip or fall hazards in the care home?
^ Since our last visit, on a scale of 1 to 5, how is this current care home at (1) Helping you exercise at least 30 minutes per day, (2) Helping you adhere to your medication regimen?, and (3) Reducing trip or fall hazards in the care home?

Overall STF Risk

For analysis of hypothesis 7, a multiple linear regression model is used to compare the multiple risk factors of STFs (i.e., cognitive function, medication, knowledge of trips and falls, and physical activity) among elderly men and women within the Hawaii AFCH (**Table 12**). The independent variable is cognitive function, medication, knowledge of trips and falls, and physical activity and the dependent variable is the number of STFs among elderly men and women within the Hawaii AFCH based on their response on the assessment of elderly physical functioning.

Table 12. Name and Scale of Variables, Questionnaire, and Questions for Overall STF Risk

H #	Name of Variable	Original Scale	Transformed Scale	Questionnaire	Question
Men H_{A1}	IVs Cognitive Function, Medication, Knowledge of trips and falls, Physical activity	Continuous (0-100, 0-20, 0-15, & 0-24 respectively)	NA	Refer to Hypothesis 1, 2, 4, & 5	Refer to Hypothesis 1, 2, 4, & 5
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experience a slip, trip, or fall in the past?
Women H_{A2}	IVs Cognitive Function, Medication, Knowledge of trips and falls, Physical activity	Continuous (0-100, 0-20, 0-15, & 0-24 respectively)	NA	Refer to Hypothesis 1, 2, 4, & 5	Refer to Hypothesis 1, 2, 4, & 5
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experience a slip, trip, or fall in the past?
Men & Women H_{A3}	IVs Cognitive Function, Medication, Knowledge of trips and falls, Physical activity	Continuous (0-100, 0-20, 0-15, & 0-24 respectively)	NA	Refer to Hypothesis 1, 2, 4, & 5	Refer to Hypothesis 1, 2, 4, & 5
	DV # of Trips or Falls	Continuous (0-15)	NA	Assessment of Elderly Physical Functioning	Have you ever experience a slip, trip, or fall in the past?

Abbreviations: IV, Independent Variable; DV, Dependent Variable; NA, not applicable
Adjustment for age, education, prevalence of stroke (if ever, excluding transient ischemic attack (TIA) strokes), gender, ethnicity, and marital status) will be considered for multiple regression models within and in between elderly men and women in the Hawaii AFCH system.

CHAPTER 4

RESULTS

Demographic information (i.e., age, marital status, race/ethnicity, highest level of education attained, and insurance status) was collected for elderly men, elderly women, and both elderly men and women. Demographic information (i.e., gender, age, marital status, race/ethnicity, highest level of education attained, total number of years as a certified caregiver, and total number of patients enrolled in the current study) was obtained for all the caregiver's of the elderly participants. The number of STFs, the location of these incidences, and the types of STF-related injuries among the elderly men, elderly women, and both elderly men and women were collected. Of the elderly participants that experienced STFs, those that required medical assistance, were admitted to the hospital, and the number of nights spent in the hospital were also obtained.

The mean, median, and standard deviation for the elderly participant's final Cognitive Abilities Screening Instrument (CASI) score and each of the nine CASI domains was calculated prior to performing a multiple regression model for elderly men, elderly women, and both elderly men and women. Age, gender, marital status, race/ethnicity, highest level of education attained, and a history of stroke were used as covariates in the multiple regression models. All covariates, except for age were converted into dummy variables. Multiple regression models were used to determine if cognitive function predicts the number of STFs among elderly men, elderly women, and both elderly men and women.

Descriptive statistics (i.e., number of physicians prescribing medications, number of medications, and classes of medication) were collected for elderly men, elderly

women, and both elderly men and women. Simple linear regression models were used to determine if the number of medications predicts the number of STFs among elderly men, elderly women, and both elderly men and women.

The mean and standard deviation for the elderly participant's room measurements (i.e., living room, kitchen, bedroom, bathroom, and hallway), and bed and toilet heights were calculated. Total number of intervention supplies and education provided after the home visit visual assessment were obtained. Chi-square test and fisher's exact test were used to determine if the number of home safety hazards were different between elderly men and elderly women.

Simple linear regression models and multiple regression models were used to determine if the caregiver's knowledge of STFs predicts the number of STFs among elderly men, elderly women, and both elderly men and women. Years of experience as a certified caregiver, age of the caregiver, and age of the elderly participant were used as covariates in the multiple regression models.

The elderly participants were asked questions about their physical abilities and the types of routine exercises they do on a daily basis. The mean and standard deviation of the elderly participants physical activity (i.e., no activity, heavy activity, moderate activity, slight activity, and sedentary activity) were obtained. Spearman's correlation was used to determine if there was a correlation between pre- and post-intervention physical activity. Multiple regression models were used to determine if physical activity at pre- and post-intervention predicts the number of STFs among elderly men, elderly women, and both elderly men and women.

Wilcoxon signed rank test was used to determine if the elderly men and elderly women's assessment of the caregiver (i.e., helping the participant exercise, adhere to medication regimen, and reduce hazards in the care home) increased from pre- to post-intervention.

Multiple regression models were used to determine if overall STF risk predicts the number of STFs among elderly men, elderly women, and both elderly men and women. Age of the elderly participant, gender, marital status, race/ethnicity, highest level of education attained, history of stroke, years of experience, and the age of the caregiver were used as covariates in the multiple regression models. All covariates, except for the age of the elderly participant and the caregiver were converted into dummy variables.

Demographic Information

Data collection on July 25, 2014 and ended on January 20, 2015. A total of 105 participants (50 men and 55 women) and 78 caregivers were enrolled the study. Fifty-six caregivers had one elderly patient that participated in the study, 17 caregivers with two patients, and five caregivers with three patients.

While the majority of elderly men that participated in this study were between the ages of 65 and 69 years old (32.0%) and single (40.0%), the majority of elderly women were between 85 and 89 years old (27.3%) and widowed (60.0%) (**Table 13**). Both elderly men and women were primarily Japanese (46.7%), obtained a high school diploma or equivalent (38.1%), and had Medicaid (36.2%).

Table 13. Demographic Information Among the Elderly Men and Women Living in the Hawaii AFCH System (n=105)

	Men (%)	Women (%)	Total (%)
Total	50 (47.6)	55 (52.4)	105 (100)
Age (years)			
65-69	16 (32.0)	5 (9.1)	21 (20.0)
70-74	8 (16.0)	5 (9.1)	13 (12.4)
75-79	8 (16.0)	3 (5.4)	11 (10.5)
80-84	5 (10.0)	10 (18.2)	15 (14.3)
85-89	4 (8.0)	15 (27.3)	19 (18.1)
90-94	7 (14.0)	11 (20.0)	18 (17.1)
95-99	2 (4.0)	6 (10.9)	8 (7.6)
Marital Status			
Single	20 (40.0)	9 (16.4)	29 (27.6)
Married	5 (10.0)	2 (3.6)	7 (6.7)
Divorced	11 (22.0)	10 (18.2)	21 (20.0)
Separated	0 (0.0)	1 (1.8)	1 (1.0)
Widowed	14 (28.0)	33 (60.0)	47 (44.8)
Race/Ethnicity			
Caucasian	10 (20.0)	7 (12.7)	17(16.2)
Chinese	0 (0.0)	4 (7.3)	4 (3.8)
Filipino	3 (6.0)	9 (16.4)	12 (11.4)
Japanese	22 (44.0)	27 (49.1)	49 (46.7)
Multi-racial	15 (30.0)	8 (14.5)	23 (21.9)
Highest Level of Education			
Less than high school	6 (12.0)	14 (25.5)	20 (19.0)
High school diploma or equivalent	18 (32.0)	22 (40.0)	40 (38.1)
Some college, no degree	9 (18.0)	6 (10.9)	15 (14.3)
Postsecondary non-degree award	0 (0.0)	1 (1.8)	1 (1.0)
Associate's degree	5 (10.0)	3 (5.5)	8 (7.6)
Bachelor's degree	10 (20.0)	9 (16.4)	19 (18.1)
Master's degree	2 (4.0)	0 (0.0)	2 (1.9)
Insurance Status			
Medicaid	20 (40.0)	18 (32.7)	38 (36.2)
Medicare	2 (4.0)	4 (7.3)	6 (5.7)
Private	8 (16.0)	17 (30.9)	25 (23.8)
Medicaid + Medicare	13 (26.0)	12 (21.8)	25 (23.8)
Medicaid + Private	1 (2.0)	2 (3.6)	3 (2.9)
Medicare + Private	6 (12.0)	2 (3.6)	8 (7.6)

Of the 78 caregivers, the majority of them were women (91.0%), between 40 and 49 years old (32.1%), married (71.8%), Filipino (96.2%), had some college education

(24.4%), been a certified caregiver between 10 to 14 years (32.1%), and has one patient enrolled in the current study (71.8%) (**Table 14**).

Table 14. Caregiver Demographic Information (n=78)

Variable	No. (%)	Variable	No. (%)
Gender		**Highest Level of Education**	
Male	7 (9.0)	Less than high school	1 (1.3)
Female	71 (91.0)	High school diploma or equivalent	14 (17.9)
Age (years)		Some college, no degree	19 (24.4)
20-29	5 (6.4)	Postsecondary non-degree award	0 (0.0)
30-39	13 (16.7)	Associate's degree	17 (21.8)
40-49	25 (32.1)	Bachelor's degree	25 (32.1)
50-59	20 (25.6)	Master's degree	0 (0.0)
60-69	9 (11.5)	Doctoral or professional degree	2 (2.6)
70-79	6 (7.7)	**Total Number of Years as a Certified Caregiver**	
Marital Status		0-4	13 (16.7)
Single	7 (9.0)	5-9	20 (25.6)
Married	56 (71.8)	10-14	25 (32.1)
Divorced	4 (5.1)	15-19	11 (14.1)
Separated	4 (5.1)	20-24	3 (3.8)
Widowed	7 (9.0)	25-29	3 (3.8)
Race/Ethnicity		30-34	2 (2.6)
Caucasian	1 (1.3)	35-39	0 (0.0)
Filipino	75 (96.2)	40+	1 (1.3)
Hawaiian	1 (1.3)	**Total Number of Patients Enrolled in Current Study**	
Multi-racial	1 (1.3)	One	56 (71.8)
		Two	17 (21.8)
		Three	5 (6.4)

A total of 96 (out of 105) (91.4%) elderly participants reported a history of falls alone, slips and falls, or trips and falls (**Table 15**). A total of 89 elderly participants reported a history of falls alone (84.8%), 3 reported a history of slips and falls (2.9%), and 4 reported a history of trips and falls (3.8%). The greatest number of slips, trips, and falls among the elderly men was one, twelve, and ten, respectively. The highest total number of STFs among the elderly men was nineteen. The greatest number of slips, trips, and falls among the elderly women was four, eight, and twelve, respectively. The highest total number of STFs among the elderly women was twelve.

Table 15. Number of STFs Among the Elderly Men and Women Living in the Hawaii AFCH System

	Men (%)	Women (%)	Total (%)
Type			
Slip	2 (4.0)	2 (3.6)	4 (3.8)
Trip	0 (0.0)	4 (7.3)	4 (3.8)
Fall	43 (86.0)	46 (83.6)	89 (84.8)
Slip + Trip	1 (2.0)	0 (0.0)	1 (1.0)
Slip + Fall	1 (2.0)	2 (3.6)	3 (2.9)
Trip + Fall	3 (6.0)	1 (1.8)	4 (3.8)
Total	50 (100)	55 (100)	105 (100)
Slips			
0	46 (92.0)	51 (92.7)	97 (92.4)
1	4 (8.0)	1 (1.8)	5 (4.8)
2	0 (0.0)	2 (3.6)	2 (1.9)
3 or more	0 (0.0)	1 (1.8)	1 (1.0)
Total	4 (8.0)	4 (7.3)	8 (7.6)
Trips			
0	46 (92.0)	50 (90.9)	96 (91.4)
1	2 (4.0)	4 (7.3)	6 (5.7)
2	1 (2.0)	0 (0.0)	1 (1.0)
3 or more	1 (2.0)	1 (1.8)	1 (1.0)
Total	4 (8.0)	5 (9.1)	9 (8.6)
Falls			
0	3 (6.0)	6 (10.9)	9 (8.6)
1	27 (54.0)	25 (45.5)	52 (49.5)
2	6 (12.0)	12 (21.8)	18 (17.1)
3	6 (12.0)	4 (7.3)	10 (9.5)
4	4 (8.0)	2 (3.6)	6 (5.7)
5	2 (4.0)	1 (1.8)	3 (2.9)
6 or more	2 (4.0)	5 (9.1)	7 (6.9)
Total	47 (94.0)	49 (89.1)	96 (91.0)
Total Number of STFs			
1	27 (54.0)	28 (50.9)	55 (52.4)
2	9 (18.0)	14 (25.5)	23 (21.9)
3	6 (12.0)	4 (7.3)	10 (9.5)
4	4 (8.0)	2 (3.6)	6 (5.7)
5	1 (2.0)	0 (0.0)	1 (1.0)
6 or more	3 (6.0)	7 (12.7)	10 (9.5)
Total	50 (100)	55 (100)	105 (100)

The one location inside of the home that elderly men and women participants experienced STFs was in the bedroom (n=23, 21.9%), however, the majority of the elderly participants experienced STFs outside of the home (i.e., garden, driveway) (n=28, 26.7%) (**Table 16**). A total of 15 elderly men experienced STFs in more than one

location. Twelve elderly men experienced STFs in two locations (1= living room and bathroom, 1= kitchen and hallway, 4= bedroom and bathroom, 1= bedroom and hallway, 2= bathroom and outside the home, 1= hallway and staircase, 2= bathroom and outside of home). Three elderly men experienced STFs in four locations (1= living room, bedroom, hallway, and outside the home; 1= kitchen, bedroom, bathroom, and outside the home; 1= bedroom, bathroom, hallway, and outside the home).

Table 16. Location and Type of Slip, Trip, and Fall-Related Injuries Among the Elderly Men and Women Living in the Hawaii AFCH System

	Men (%)	**Women (%)**	**Total (%)**
Location			
One Location	**35 (70.0)**	**43 (78.2)**	**78 (74.3)**
Living Room	1 (2.0)	3 (5.5)	4 (3.8)
Kitchen	2 (4.0)	2 (3.6)	4 (3.8)
Bedroom	9 (18.0)	14 (25.5)	23 (21.9)
Bathroom	7 (14.0)	5 (9.1)	12 (11.4)
Hallway	3 (6.0)	2 (3.6)	5 (4.8)
Staircase	0 (0.0)	2 (3.6)	2 (1.9)
Outside of Home (i.e., garden, driveway)	13 (26.0)	15 (27.3)	28 (26.7)
Two Locations	**12 (24.0)**	**11 (20.0)**	**23 (21.9)**
Three Locations	**0 (0.0)**	**1 (1.8)**	**1 (1.0)**
Four Locations	**3 (6.0)**	**0 (0.0)**	**3 (2.9)**
Type of Injury			
No injury	**20 (40.0)**	**21 (38.2)**	**41 (39.0)**
One Type of Injury	**27 (54.0)**	**29 (52.7)**	**56 (53.3)**
Bruise(s)	14 (28.0)	7 (12.7)	21 (20.0)
Cut(s)	4 (8.0)	6 (10.9)	10 (9.5)
Fracture(s)	7 (14.0)	15 (27.3)	22 (21.0)
Broken bone(s)	2 (4.0)	1 (1.8)	3 (2.9)
Two Types of Injuries	**2 (4.0)**	**4 (7.3)**	**6 (5.7)**
Three Types of Injuries	**1 (2.0)**	**0 (0.0)**	**1 (1.0)**
Four Types of Injuries	**0 (0.0)**	**1 (1.8)**	**1 (1.0)**

A total of 56 elderly participants (53.3%) had one type of slip, trip, or fall-related injury, six had two types of injuries (5.7%), one had three types of injuries (1.0%), and one had all four types of injuries (1.0%) (**Table 16**). Of the elderly participants that experienced one type of slip, trip, or fall-related injury, the majority of men reported bruising (n=14, 28%) and the majority of women reported fractures (n=15). Among the

elderly men that participated in this study, a total of two elderly men reported bruising and cuts (4.0%), and one reported bruising, cuts, and broken bones (2.0%). Among the elderly women that participated in this study, a total of three elderly women reported bruising and cuts (5.5%), one reported fractures and broken bones (1.8%), and one reported bruising, cuts, fractures, and broken bones (1.8%).

Fifty-five elderly participants required medical assistance for their slip, trip, or fall-related injuries (52.4%) (**Table 17**). Majority of elderly participants required medical assistance for one type of slip, trip, or fall-related injury. A total of 28 participants reported an admission to the hospital for their slip, trip, or fall-related injury (26.7%), and four participants reported two admissions to the hospital for their slip, trip, or fall-related injury (3.8%). Among the elderly participants that were admitted to the hospital, majority spent between one to six nights in the hospital (8.6%), and 38 or more nights in the hospital (8.6%).

Table 17. Hawaii AFCH System Elderly Men and Women that Required Medical Assistance, Admitted to the Hospital, and Number of Nights Spent in the Hospital due to Slip, Trip, and Fall-Related Injuries

	Men (%)	Women (%)	Total (%)
Required Medical Assistance			
No	**24 (48.0)**	**26 (47.3)**	**50 (47.6)**
Yes	**26 (52.0)**	**29 (52.7)**	**55 (52.4)**
1 time	23 (46.0)	26 (47.3)	49 (46.7)
2 times	3 (6.0)	1 (1.8)	4 (3.8)
3 or more times	0 (0.0)	2 (3.6)	2 (1.9)
Admission to Hospital			
0 times	35 (70.0)	38 (69.1)	73 (69.5)
1 time	13 (26.0)	15 (27.3)	28 (26.7)
2 or more times	2 (4.0)	2 (3.6)	4 (3.8)
Number of Nights Spent in the Hospital			
0	35 (0.0)	42 (76.4)	77 (73.3)
1-6	5 (10.0)	4 (7.3)	9 (8.6)
7-13	3 (6.0)	2 (3.6)	5 (4.8)
14-20	3 (6.0)	1 (1.8)	4 (3.8)
21-27	1 (2.0)	0 (0.0)	1 (1.0)
28 or more	3 (6.0)	6 (10.9)	9 (8.6)

Statistical Analyses of Research Questions

Cognitive Function

A total of 51 participants completed the Cognitive Abilities Screening Instrument (CASI) memory test in-person during the home visit, and the other 54 participants completed the CASI memory test over the telephone. Participants that completed the CASI in-person were asked all the questions from the 9 CASI domains. Participants that completed the CASI over the telephone partially answered questions from the short-term memory domain, and answered none of the questions from the visuospatial and language domains. The participants that completed the CASI over the telephone may have a final CASI score that is ≤ 22.5 points less than those that completed the CASI in-person. A Microsoft Excel spreadsheet was utilized to compute participants CASI domain scores and final CASI score with the CASI scoring calculations in **Table 18**.

Table 18. Cognitive Abilities Screening Instrument (CASI) Domains and Scoring

Domain	**Points (100)**	**CASI Scoring Calculation***	**CASI Item No.***
Long-term memory	10	BPL + BYR + BDAY + MNT + SUN	1, 2, 4, 5
Short-term memory	12	(RC1A x 0.5) + (RC1B x 0.5) + (RC1C x 0.5) + (RC2A x 0.5) + (RC2B x 0.5) + (RC2C x 0.5) + (RCOBJ x 0.5)	8, 22, **25**
Attention	8	RGS1 + RPTA + RPTB	6a, 17a, 17b
Mental manipulation/ concentration	10	DBA + DBB + DBC + SUB7A + SUB7B + SUB7C	7, 9a, 9b, 9c
Orientation	18	AGE + YR + MO + DATE + DAY + SSN + SPA + SPB	3, 10, 11, 12, 13a, 13b
Visuospatial	10	DRAW	**20**
Judgment/ abstract thinking	12	SIM + JGMT	15, 16
Word fluency	10	ANML	14
Language	10	(READ x 0.5) + (WRITE x 0.5) + CMD + (BODY x 0.3) + (OBJA x 0.3) + (OBJB x 0.3)	**18, 19, 21, 23, 24**
Not assigned to a domain	---	CASIVRS, CASIRGS2, RPNM	6b

Note: *See Appendix 6 for CASI variables and item numbers. CASI items (in bold) not completed with participants over the telephone because visual items could not be provided.

Even though the elderly participants final CASI score can be dependent on whether they completed the CASI exam in-person or over the telephone, both elderly men and women exhibited similar overall results. Therefore, elderly men and women were evaluated for this hypothesis.

The CASI final score for all the elderly participants in this study was 54.7, for elderly men was 55.1, and for elderly women was 50.2 (**Table 19**). Both elderly men (μ= 8.8) and women (μ= 8.0) had the highest mean value for the long-term memory domain. While the elderly men had the lowest mean value for the visuospatial domain (μ= 2.3), the elderly women have the lowest mean value for the short-term memory domain (μ= 3.3).

Table 19. Mean, Median, and Standard Deviation of CASI Domains and Final Score

	Men	**Women**	**Total**
CASI final score (100 points)	55.1 (54.0) ± 18.3 (17.0, 94.5)	50.2 (47.9) ± 20.9 (13.3, 92.5)	54.7 (52.9) ± 19.5 (17.0, 94.5)
CASI domains (total points)			
Long-term memory (10)	8.8 (10.0) ± 1.8 (3.0, 10.0)	8.0 (8.0) ± 2.1 (2.0, 10.0)	8.3 (8.0) ± 2.0 (2.0, 10.0)
Short-term memory (12)	4.6 (3.75) ± 3.2 (0.0, 12.0)	3.3 (2.2) ± 2.8 (0.0, 10.0)	3.9 (3.0) ± 3.0 (0.0, 12.0)
Attention (8)	6.2 (7.0) ± 1.9 (1.0, 8.0)	5.4 (6.0) ± 2.5 (0.0, 8.0)	5.8 (6.0) ± 2.2 (0.0, 8.0)
Mental manipulation/ concentration (10)	5.3 (5.0) ± 3.2 (0.0, 10.0)	3.9 (4.0) ± 3.0 (0.0, 10.0)	4.6 (5.0) ± 3.1 (0.0, 10.0)
Orientation (18)	12.2 (12.5) ± 5.0 (3.0, 18.0)	10.5 (11.0) ± 5.5 (1.0, 18.0)	11.3 (12.0) ± 5.3 (1.0, 18.0)
Visuospatial (10)	2.3 (0.0) ± 3.8 (0.0, 10.0)	4.7 (5.0) ± 4.7 (0.0, 10.0)	3.5 (0.0) ± 4.4 (0.0, 10.0)
Judgment/abstract thinking (12)	7.3 (7.0) ± 2.9 (0.0, 12.0)	5.5 (6.0) ± 3.5 (0.0, 10.0)	6.3 (7.0) ± 3.3 (0.0, 12.0)
Word fluency (10)	5.6 (6.0) ± 2.6 (0.0, 10.0)	4.2 (4.0) ± 2.6 (0.0, 10.0)	4.9 (4.0) ± 2.7 (0.0, 10.0)
Language (10)	3.1 (0.0) ± 4.3 (0.0, 10.0)	5.1 (7.0) ± 4.4 (0.0, 10.0)	4.1 (0.0) ± 4.4 (0.0, 10.0)

[a]Mean value (median value) ± standard deviation (min, max)

Continuous variables used for the multiple regression models were cognitive function (Cognitive Abilities Screening Instrument (CASI) score) (x_1) and age (x_2). Dummy variables created and used for the multiple regression model were gender, marital status, race/ethnicity, highest level of education, and stroke (excluding transient ischemic attack (TIA) or stroke) (**Table 20**). Female, widowed, Japanese, high school diploma or equivalent, and no history of stroke were used as reference groups for the multiple regression models for elderly men, elderly women, and both elderly men and women.

Table 20. Dummy Variables for Multiple Regression Model for Cognitive Abilities Screening Instrument to Predict Number of STFs Among Elderly Men and Women Living in the Hawaii AFCH System

Qualitative Variable	**Variable Name (variable)**
Gender	Female*
	Male (x_3)
Marital Status	Single (x_4)
	Married (x_5)
	Divorced (x_6)
	Separated (x_7)
	Widowed*
Race/Ethnicity	Caucasian (x_8)
	Chinese (x_9)
	Japanese*
	Multiethnic (x_{10})
Highest Level of Education	Less than high school (x_{11})
	High school diploma or equivalent*
	Some college, no degree (x_{12})
	Postsecondary non-degree award (x_{13})
	Associate's degree (x_{14})
	Bachelor's degree (x_{15})
	Master's degree (x_{16})
Stroke[a]	No*
	Yes, possible or probable (x_{17})

[a]Excluding Transient Ischemic Attack (TIA) or mini stroke
*Reference group
Note: Continuous variables used for multiple regression model in addition to dummy variables (x_1 = Cognitive Function (Cognitive Abilities Screening Instrument (CASI) score)); (x_2 = Age).

The multiple regression model for elderly men shows that cognitive function (CASI score) (x_1), age (x_2), single (x_4), married (x_5), divorced (x_6), Caucasian (x_8), multiethnic (x_{10}), less than high school (x_{11}), some college (no degree) (x_{12}), associate's degree (x_{14}), bachelor's degree (x_{15}), master's degree (x_{16}), and having a stroke (x_{17}) significantly predict the number of STFs for elderly men living in the Hawaii AFCH system (p=0.048) (**Table 21**). The "separated," "Chinese," and "post-secondary non-degree award" variables were deleted from the analysis since no elderly men were assigned to these categories. Overall, 21.3% of the variability of STFs can be explained by these variables.

The regression equation for this model is y = 7.400 – 0.026 x_1 – 0.047 x_2 – 0.205 x_4 – 0.835 x_5 + 0.941 x_6 + 1.736 x_8 – 1.397 x_{10} – 0.504 x_{11} + 0.159 x_{12} + 1.134 x_{14} – 1.502 x_{15} + 6.210 x_{16} + 0.187 x_{17} (**Table 21**). This means that the y-intercept (B_0) equals 7.400 and the slope for CASI score is 0.026. Therefore, for every unit decrease in cognitive function (CASI score) will result in a 0.026 unit increase in the number of STFs for both elderly men and women. This means there is an inverse relationship between cognitive function (CASI score) and the number of STFs for elderly men. The "master's degree" variable was the only variable that significantly contributed to the model (p=0.011).

Table 21. Summary of Cognitive Function Regression Analysis for Variables Predicting STFs Among Elderly Men Living in the Hawaii AFCH System

Model Men		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	7.400	5.990	1.235	0.225	0.213	2.021	0.048*	-4.749, 19.549
	Cognitive Function	-0.026	0.028	-0.937	0.355				-0.082, 0.030
	Age	-0.047	0.060	-0.788	0.436				-0.169, 0.075
	Single	-0.205	1.154	-0.177	0.860				-2.545, 2.135
	Married	-0.835	1.571	-0.531	0.599				-4.022, 2.352
	Divorced	0.941	1.432	0.657	0.515				-1.962, 3.845
	Caucasian	1.736	1.244	1.396	0.171				-0.787, 4.259
	Multiethnic	-1.397	1.062	-1.315	0.197				-3.551, 0.758
	Less than high school	-0.504	1.364	-0.369	0.714				-3.270, 2.263
	Some college, no degree	0.159	1.239	0.129	0.898				-2.354, 2.673
	Associate's degree	1.134	1.497	0.757	0.454				-1.902, 4.170
	Bachelor's degree	-1.502	1.162	-1.293	0.204				-3.859, 0.854
	Master's degree	6.210	2.311	2.687	0.011*				1.524, 10.896
	Stroke	0.187	0.937	0.200	0.843				-1.714, 2.088

Separated, Chinese, and post-secondary non-degree award were deleted from the analysis.
* p-value < 0.05

The multiple regression model for elderly women shows that cognitive function (CASI score) (x_1), age (x_2), single (x_4), married (x_5), divorced (x_6), separated (x_7), Caucasian (x_8), Chinese (x_9), multiethnic (x_{10}), less than high school (x_{11}), some college (no degree) (x_{12}), postsecondary non-degree award (x_{13}), associate's degree (x_{14}), bachelor's degree (x_{15}), and having a stroke (x_{17}) significantly predicts the number of STFs for elderly women living in the Hawaii AFCH system (p=0.005) (**Table 22**). The "master's degree" variable was deleted from the analysis since no elderly women were assigned to these categories. Overall, 33.0% of the variability of STFs can be explained by these variables.

The regression equation for this model is $y = 12.436 - 0.002x_1 - 0.122x_2 - 1.963x_4 - 1.951x_5 - 0.996x_6 + 8.780x_7 + 0.198x_8 + 0.327x_9 + 1.712x_{10} + 1.053x_{11} - 1.465x_{12} - 3.417x_{13} - 0.602x_{14} + 0.957x_{15} + 1.658x_{17}$ (**Table 22**). For every unit increase in cognitive function (CASI score) will result in a 0.002 increase in the number of STFs for elderly women. This means there is a direct relationship between cognitive function (CASI score) and the number of STFs for elderly women. The "age" and "separated" variables were the only variable that significantly contributed to the model (p=0.03 and 0.004, respectively).

Table 22. Summary of Cognitive Function Regression Analysis for Variables Predicting STFs Among Elderly Women Living in the Hawaii AFCH System

Model Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	12.436	5.257	2.365	0.023*	0.330	2.775	0.005*	1.802, 23.070
	Cognitive Function	0.002	0.023	0.077	0.939				-0.045, 0.049
	Age	-0.122	0.055	-2.213	0.033*				-0.233, -0.010
	Single	-1.963	1.130	-1.736	0.090				-4.249, 0.324
	Married	-1.951	1.954	-0.998	0.324				-5.905, 2.002
	Divorced	-0.996	1.188	-0.839	0.407				-3.339, 1.406
	Separated	8.780	2.870	3.059	0.004*				2.974, 14.585
	Caucasian	0.198	1.541	0.128	0.899				-2.920, 3.315
	Chinese	0.327	1.428	0.229	0.820				-2.561, 3.216
	Multiethnic	1.712	1.062	1.612	0.115				-0.437, 3.860
	Less than high school	1.053	1.058	0.995	0.326				-1.088, 3.193
	Some college, no degree	-1.465	1.463	-1.002	0.323				-4.424, 1.493
	Post-secondary non-degree award	-3.417	2.736	-1.249	0.219				-8.951, 2.118
	Associate's degree	-0.602	1.678	-0.359	0.721				-3.996, 2.791
	Bachelor's degree	0.957	1.099	0.870	0.389				-1.267, 3.181
	Stroke	1.658	0.991	1.673	0.102				-0.347, 3.664

Master's degree was deleted from the analysis.
* p-value < 0.05

The multiple regression model from both elderly men and women shows that cognitive function (CASI score) (x_1), age (x_2), male (x_3), single (x_4), married (x_5), divorced (x_6), separated (x_7), Caucasian (x_8), Chinese (x_9), multiethnic (x_{10}), less than high school (x_{11}), some college (no degree) (x_{12}), postsecondary non-degree award (x_{13}), associate's degree (x_{14}), bachelor's degree (x_{15}), master's degree (x_{16}), and having a stroke (x_{17}) significantly predicts the number of STFs for both elderly men and women

living in the Hawaii AFCH system (p=0.003) (**Table 23**). Overall, 19.8% of the variability of STFs can be explained by these variables.

The regression equation for this model is $y = 10.818 - 0.004x_1 - 0.096x_2 - 0.857x_3 - 1.393x_4 - 0.465x_5 - 0.0.694x_6 + 8.651x_7 + 0.831x_8 - 0.261x_9 - 0.028x_{10} + 0.402x_{11} - 0.593x_{12} - 2.861x_{13} + 0.330x_{14} + 0.189x_{15} + 7.058x_{16} + 0.844x_{17}$ (**Table 23**). For every unit decrease in cognitive function (CASI score) will result in a 0.004 increase in the number of STFs for both elderly men and women. This means there is an inverse relationship between cognitive function (CASI score) and the number of STFs for both elderly men and women. The "age," "separated," and "master's degree" variables were the only variable that significantly contributed to the model (p=0.019, 0.003, and 0.001, respectively).

Table 23. Summary of Cognitive Function Regression Analysis for Variables Predicting STFs Among Elderly Men and Women Living in the Hawaii AFCH System

Model Men & Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	10.818	3.897	2.776	0.007*	0.198	2.512	0.003*	3.072, 18.565
	Cognitive Function	-0.004	0.017	-0.026	0.814				-0.037, 0.029
	Age	-0.096	0.040	-2.384	0.019*				-0.175, -0.016
	Male	-0.857	0.614	-1.396	0.166				-2.078, 0.364
	Single	-1.393	0.763	-1.826	0.071				-2.910, 0.123
	Married	-0.465	1.157	-0.402	0.689				-2.764, 1.834
	Divorced	0.694	0.857	-0.809	0.421				-2.398, 1.010
	Separated	8.651	2.785	3.107	0.003*				3.116, 14.186
	Caucasian	0.831	0.886	0.938	0.351				-0.930, 2.591
	Chinese	-0.261	1.438	-0.182	0.856				-3.119, 2.597
	Multiethnic	-0.028	0.741	-0.038	0.970				-1.501, 1.445
	Less than high school	0.402	0.763	0.527	0.599				-1.114, 1.919
	Some college, no degree	-0.593	0.886	-0.670	0.505				-2.354, 1.167
	Postsecondary non-degree award	-2.861	2.810	-1.018	0.311				-8.446, 2.724
	Associate's degree	0.330	1.125	0.293	0.770				-1.906, 2.565
	Bachelor's degree	0.189	0.792	0.238	0.812				-1.385, 1.763
	Master's degree	7.058	2.077	3.398	0.001*				2.929, 11.187
	Stroke	0.844	0.656	1.288	0.201				-0.037, 2.147

* p-value < 0.05

Hypothesis 2: Number of Medications

A total of 104 elderly participants medications were inspected (i.e., medication name, physician name(s), expiration date), except for one participant. None of the elderly participants were taking expired medication. All caregivers were educated on the importance of having the elderly participant's physicians regularly assess their medications to reduce side effects and their risk of STFs. Eighty-five of elderly

participants had one physician prescribing their medications (80.9%), 13 had two physicians (12.4%), and 7 had three or more physicians (6.7%) (**Table 24**).

The number of medications prescribed to the elderly participants in this study ranged from 1 to 24 with the majority of them taking between 10 to 14 medications (n=35, 33.3%) (**Table 24**). Of the nine classes of medication, none of the elderly men and women participants reported taking sedative hypnotic medication. The top three classes of medication (from rank #1 to #3) that the elderly men and women participants have been prescribed are antihypertensives (77.1%), non-steroidal anti-inflammatory drugs (NSAIDs) (63.8%), and β-blockers (38.1%) and antidepressants (38.1%).

Both men and women participants were prescribed more than one type of medication from three classes of medication: (1) antihypertensives (i.e., alpha agnostics, ACE inhibitors, calcium channel blockers, alpha blockers), (2) antidepressants (i.e., tricyclic antidepressants, selective serotonin reuptake, MAO inhibitors, trazodone/nefazodone), and (3) NSAIDs (i.e., aspirin, cox 2 inhibitors, other NSAIDs) (**Table 24**). While the majority of elderly men and women participants were prescribed one type of antihypertensives (48.6%), some were prescribed up to two (21.9%) or three (6.7%) types of antihypertensives.

Both elderly men and women were taking at least one type of vitamin or supplement (n=78, 74.3%), Dementia (n=30, 28.6%), Parkinson's Disease (n=102 (97.1%), and other types of medication (n=100, 95.2%) (**Table 25**).

Table 24. Descriptive Statistics of Medications Among Elderly Men and Women Living in the Hawaii AFCH System

	Men (%)	Women (%)	Total (%)
Number of Physicians			
1	38 (74.0)	47 (85.5)	85 (80.9)
2	8 (16.0)	5 (9.1)	13 (12.4)
3 or more	4 (8.0)	3 (5.5)	7 (6.7)
Number of Medication			
0-4	6 (12.0)	5 (9.1)	11 (10.5)
5-9	12 (24.0)	20 (36.4)	32 (30.5)
10-14	20 (40.0)	15 (27.3)	35 (33.3)
15-19	8 (16.0)	12 (21.8)	20 (19.0)
20-24	4 (8.0)	3 (5.5)	7 (6.7)
Classes of Medication			
Antihypertensives			
No	12 (24.0)	12 (21.8)	24 (22.9)
Yes	38 (76.0)	43 (78.2)	81 (77.1)
1 types	23 (46.0)	28 (50.9)	51 (48.6)
2 types	10 (20.0)	13 (23.6)	23 (21.9)
3 types	5 (10.0)	2 (3.6)	7 (6.7)
Diuretics			
No	39 (78.0)	44 (80.0)	83 (79.1)
Yes	11 (22.0)	11 (20.0)	22 (21.0)
β-blockers			
No	31 (62.0)	34 (61.8)	65 (61.9)
Yes	19 (38.0)	21 (38.2)	40 (38.1)
Sedative hypnotics			
No	50 (100.0)	55 (100.0)	105 (100.0)
Yes	0 (0.0)	0 (0.0)	0 (0.0)
Neuroleptics (or antipychotics)			
No	44 (88.0)	46 (83.6)	90 (85.7)
Yes	6 (12.0)	9 (16.4)	15 (14.3)
Antidepressants			
No	32 (64.0)	33 (60.0)	65 (61.9)
Yes	18 (36.0)	22 (40.0)	40 (38.1)
1 types	15 (30.0)	18 (32.7)	33 (31.4)
2 types	3 (6.0)	4 (7.3)	7 (6.7)
Benzodiazepines			
No	47 (94.0)	44 (80.0)	91 (86.7)
Yes	3 (6.0)	11 (20.0)	14 (13.3)
Narcotic analgesics			
No	42 (84.0)	39 (70.9)	81 (77.1)
Yes	8 (16.0)	16 (29.1)	24 (21.9)
Non-steroidal anti-inflammatory drugs (NSAIDs)			
No	9 (18.0)	9 (16.4)	18 (16.2)
Yes	41 (82.0)	46 (83.6)	67 (63.8)
1	35 (70.0)	37 (67.3)	72 (68.6)
2	6 (12.0)	9 (16.4)	15 (14.3)

Table 25. Other Types of Medication (Vitamins and Supplements, Dementia, Parkinson's Disease, Other) Among Elderly Men and Women Living in the Hawaii AFCH System

	Men (%)	Women (%)	Total (%)
Vitamins and Supplements			
No	12 (24.0)	15 (27.3)	27 (25.7)
Yes	38 (76.0)	40 (72.7)	78 (74.3)
Dementia Medication			
No	43 (86.0)	32(58.2)	75 (71.4)
Yes	7 (14.0)	23 (41.8)	30 (28.6)
1	4 (8.0)	16 (29.1)	20 (19.0)
2	3 (6.0)	7 (12.7)	10 (9.5)
Parkinson's Disease			
No	48 (96.0)	54 (98.2)	102 (97.1)
Yes	2 (4.0)	1 (1.8)	3 (2.9)
Other			
No	3 (6.0)	2 (3.6)	5 (4.8)
Yes	47 (94.0)	53 (96.4)	100 (95.2)

The simple linear regression models for elderly men (p=0.116) and women (p=0.068) that participated in this study were not significant (**Table 26, 27**). However, the simple linear regression model for the elderly men and women combined was significant (p=0.015). Therefore, this model shows that the number of medication significantly predicts the number of STFs for both elderly men and women living in the Hawaii AFCH system. Overall, 4.7% of the variability of STFs can be explained by the number of medications both elderly men and women take (**Table 28**). The regression equation for this model is $y = 0.944 + 0.138x$ (**Table 28**). This means that the y-intercept (B_0) equals 0.944 and the slope for the number of medications is 0.138. Therefore, for every unit increase in the number of medications will result in a 0.138 unit increase in the number of STFs for both elderly men and women. This means there is a direct relationship between the number of medications and the number of STFs for both elderly men and women. In addition, the 95% confidence interval for the number of medications did not contain 0 and had a small amount of variability, which suggests that the number

of medications significantly and consistently predicts the number of STFs among both elderly men and women living in the Hawaii AFCH system.

Table 26. Simple Linear Regression Model for Medication Predicting Slips, Trips, and Falls Among Elderly Men Living in the Hawaii AFCH System

Model Men		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	0.881	1.036	0.850	0.399	0.031	2.555	0.116	-1.202, 2.963
	Medication	0.133	0.083	1.599	0.116				-0.034, 0.300

* p-value < 0.05

Table 27. Simple Linear Regression Model for Medication Predicting Slips, Trips, and Falls Among Elderly Women Living in the Hawaii AFCH System

Model Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	1.000	0.951	1.052	0.298	0.044	3.473	0.068	-0.907, 2.908
	Medication	0.143	0.077	1.864	0.068				-0.011, 0.296

* p-value < 0.05

Table 28. Simple Linear Regression Model for Medication Predicting Slips, Trips, and Falls Among Elderly Men and Women Living in the Hawaii AFCH System

Model Men & Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	0.944	0.694	1.359	0.177	0.047	6.109	0.015*	-0.433, 2.321
	Medication	0.138	0.056	2.472	0.015*				0.027, 0.249

* p-value < 0.05

Hypothesis 3: Home Safety Hazards

H_{A1}: The number of home safety hazards among the elderly men is less than those among elderly women within the Hawaii AFCH system.

The average dimensions of the living room, kitchen, bedroom, bathroom, and hallway for both the elderly men and women in this study were 224.3 ft^2, 124.0 ft^2, 127.4 ft^2, 68.5 ft^2, and 86.9 ft^2, respectively (**Table 29**). The staircase was a location in the Hawaii AFCH that was not included in this study due to the small ratio (2:105) of elderly participants that had access to a stairwell. The elderly men participants had a greater

bathroom (μ= 78.2 ft^2) and hallway (μ= 102.4 ft^2) size than the elderly women participants in this study. However, the elderly women participants had a greater living room (226.9 ft^2), kitchen (124.1 ft^2), and bedroom (128.1 ft^2) size than the elderly men in this study.

Table 29. Room Measurements for the Elderly Men and Women Living in the Hawaii AFCH System

Room	Men[a]	Women[a]	Total[a]
Living Room	221.5 ± 124.2 (88.8, 663.8)	226.9 ±162.3 (42.7, 882.0)	224.3 ± 144.8 (42.7, 882.0)
Kitchen	124.1 ± 71.4 (22.0, 499.6)	124.0 ± 88.1 (22.0, 499.6)	124.0 ± 80.2 (22.0, 499.6)
Bedroom	126.7 ± 41.5 (20.0, 272.0)	128.1 ± 34.6 (67.4, 208.0)	127.4 ± 37.9 (20.0, 272.0)
Bathroom	78.2 ± 62.0 (12.0, 296.0)	59.7 ± 22.4 (28.9, 163.5)	68.5 ± 46.5 (12.0, 296.0)
Hallway	102.4 ± 98.4 (13.1, 406.0)	72.8 ± 69.0 (10.3, 381.0)	86.9 ± 85.2 (10.3, 406.0)

[a]Mean value ± standard deviation (min, max) (in ft^2)

A total of 79 elderly participants (75.2%) had a safe bed height (20 inches ≤ x ≤ 23 inches). A total of 17 elderly participants had a bed height less than 20 inches (16.2%) and a total of 9 elderly participants had a bed height greater than 23 inches (8.6%). The mean bed height for the elderly men participants, elderly women participants, and both men and women participants in this study was 21.8 inches, 20.8 inches, and 21.3 inches, respectively (**Table 30**).

A total of 76 elderly participants (72.4%) had a safe toilet height (≥ 17 inches). A total of 29 elderly participants had a toilet height less than 17 inches (27.6%). The mean toilet height for the elderly men participants, elderly women participants, and both men and women participants in this study was 17.2 inches, 18.0 inches, and 17.6 inches, respectively (**Table 30**).

All caregivers were educated on the importance of having a safe bed and toilet height to reduce and prevent elderly from STFs.

Table 30. Bed and Toilet Heights Among the Elderly Men and Women Living in the Hawaii AFCH System

	Men[a]	**Women**[a]	**Total**[a]
Bed Height	21.8 ±2.5 (12.0, 18.0)	20.8 ± 2.9 (13.0, 25.0)	21.3 ± 7.2 (12, 28)
Toilet Height	17.2 ± 1.6 (14.0, 22.0)	18.0 ± 2.5 (14.0, 27.0)	17.6 ± 2.1 (14, 27)

[a]Mean value ± standard deviation (min, max) (in inches)

Automatic nightlights and non-slip tape were given to the elderly participants that needed them for their living room, kitchen, bedroom, bathroom, hallway, and staircase. Twelve elderly participants did not need automatic nightlights, and 70 elderly participants did not need non-slip tape. The top three rooms that needed automatic nightlights were the bedroom (n=89), kitchen (n=87) and hallway (n=87) (**Table 31**). The top three rooms that needed non-slip tape were the kitchen (n=18), bathroom (n=15), and living room (n=14). The top three most cluttered rooms in the Hawaii AFCHs were the bedroom (n=37), living room (n=24), and kitchen (n=20).

Table 31. Intervention Supplies and Education Provided After Visual Assessment of Hawaii AFCH

	LR	**K**	**Be**	**Ba**	**H**	**S**	**Total**
Intervention Supplies							
Automatic nightlights	82	87	89	84	87	2	431
Non-Slip Tape	14	18	3	15	5	1	56
Education							
Clutter	24	20	37	9	9	1	156
Items suggested							
Grab bar (Shower)	---	---	---	2	---	---	2
Grab Bar (Toilet)	---	---	---	20	---	---	20
Sturdy plastic toilet seat	---	---	---	1	---	---	1
Sturdy handrails	---	---	---	---	58	2	60

Living Room (LR), Kitchen (K), Bedroom (Be), Bathroom (Ba), Hallway (H), Staircase (S)

After performing either a chi-square test or fisher's exact test, all home safety hazards except for the lack of a sturdy handrail in the hallway was significantly different between the elderly men and women living within the Hawaii AFCH system (p=0.016) (**Table 32**). A total of 28 elderly men and 18 elderly women had sturdy handrails in their hallway. A total of 22 elderly men and 37 elderly women lacked sturdy handrails in their hallway. This suggests that the lack of sturdy handrails in the hallway among the elderly men is less than those of elderly women within the Hawaii AFCH system.

Table 32. Chi-Square Test and Fisher's Exact Test for Home Safety Hazards Among Elderly Men and Women Living in the Hawaii AFCH System

Description	**LR**		**K**		**Be**		**Ba**		**H**	
	No Haz	Haz	No Haz	Haz	No Haz	Haz	No Haz	Haz	No Haz	Haz
Dark or poor lighting (M/W)	49/55	1/0	49/53	1/2	49/55	1/0	49/53	1/2	49/54	1/1
	0.476		1.00		0.476		1.00		1.00	
Lack of night lights (M/W)	10/13	40/42	10/10	40/45	8/10	42/45	11/10	39/45	8/10	42/45
	0.653		0.813		0.767		0.625		0.767	
Exposed telephone/electrical cords (M/W)	44/48	6/7	47/50	3/5	44/49	6/6	50/55	0/0	49/55	1/0
	0.910		0.718		0.861		---		0.476	
Insufficient Height										
Bed (M/W)	--/--	--/--	--/--	--/--	43/42	7/13	--/--	--/--	--/--	--/--
	---		---		0.209		---		---	
Toilet (M/W)	--/--	--/--	--/--	--/--	--/--	--/--	33/42	17/13	--/--	--/--
	---		---		---		0.240		---	
Clutter (M/W)	39/42	11/13	39/46	11/9	37/31	13/24	45/51	5/4	45/51	5/4
	0.842		0.463		0.059		0.733		0.733	
Lack of non-slip rugs/carpet (M/W)	41/49	9/6	41/45	9/10	48/55	2/0	40/50	10/5	48/52	2/3
	0.300		0.981		0.224		0.111		1.00	
Lack grab bars										
Toilet (M/W)	--/--	--/--	--/--	--/--	--/--	--/--	41/44	9/11	--/--	--/--
	---		---		---		0.794		---	
Shower (M/W)	--/--	--/--	--/--	--/--	--/--	--/--	50/53	0/2	--/--	--/--
	---		---		---		0.496		---	
Uneven or slippery flooring (M/W)	49/55	1/0	49/55	1/0	50/55	0/0	50/55	0/0	49/55	1/0
	0.476		0.476		---		---		0.476	
Lack of sturdy plastic seat (M/W)	--/--	--/--	--/--	--/--	--/--	--/--	48/54	2/1	--/--	--/--
	---		---		---		0.604		---	
Lack of sturdy handrails (M/W)	--/--	--/--	--/--	--/--	--/--	--/--	--/--	--/--	28/18	22/37
	---		---		---		---		**0.016***	

Living Room (LR), Kitchen (K), Bedroom (Be), Bathroom (Ba), Hallway (H), Staircase (S), Men (M), Women (W)
Chi-square test was used if cells had greater than a sample size of 5
Fishers exact test was used if cells had less than a sample size of 5
* p-value < 0.05

Hypothesis 4: Caregiver Knowledge of STF Hazards

A total of 105 caregiver slip, trip, and fall knowledge tests were conducted (one for caregivers with one patient (n=56), two for caregivers with two patients (n=17), and three for caregivers with three patients (n=5)). A total of 87 caregiver tests had a perfect score of 15 out of 15, 8 caregiver tests scored 14, 9 caregiver tests scored 13, and one caregiver tests scored 7. The top two questions missed by the caregivers were "12. Having rugs and carpet with non-slip tape can prevent trips and falls" (n=9), and "8. Installing a raised toilet seat does not prevent falls" (n=6). All other questions missed by the caregivers are reported in **Table 33**.

Table 33. Missed Questions on the Caregiver Knowledge Test on STFs

Questions* True or False	**Incorrect Response N**
4. It is best for your patients' primary medical doctor to regularly assess his/her medication. (True)	1
5. Reducing clutter does not reduce trip or fall hazards in the home. (False)	3
6. Having your patient exercise everyday for at least 30 minutes reduces his/her risk of falling. (True)	1
7. Nightlights can prevent your patient from tripping or falling. (True)	1
8. Installing a raised toilet seat does not prevent falls. (False)	6
10. Handrails in the hallway and staircase are not necessary as long as the patient uses a walking aid, such as a cane. (False)	2
12. Having rugs and carpet with non-slip tape can prevent trips and falls. (True)	9
13. Exposed telephone and electrical cords may be a trip or fall hazard. (True)	3
14. If your patient falls and does not get hurt, it is not necessary to report the fall to your case management agency. (False)	5
15. Fall-related injuries are not common types of injuries among the elderly. (False)	3
Total	**34**

*Correct response in parentheses.

The simple linear regression model for elderly men participants (p=0.623) was not significant, therefore, caregiver's knowledge of STFs solely does not significantly predict the number of STFs for elderly men living in the Hawaii AFCH system (**Table 34**).

Multiple regression models consisting of caregiver's knowledge of STFs, caregiver's years of experience, age (caregiver), and age (elderly) were generated to determine if they predict the number of STFs for elderly men living in the Hawaii AFCH system (**Table 34**). The multiple regression model (Model 2) for elderly men participants was significant (p=0.040). Overall, 9.1% of the variability of STFs can be explained by the caregiver's knowledge of STFs and the caregiver's years of experience as a certified caregiver. The regression equation for this model is $y = -1.577 + 0.170_{knowledge} + 0.122_{experience}$. This means that the y-intercept (B_0) equals -1.577 and the slope for the caregiver's knowledge of STFs, and the caregiver's years of experience as a certified caregiver are 0.170 and 0.122, respectively. Therefore, for every unit increase in the caregiver's knowledge of STFs will result in a 0.170 unit increase in the number of STFs for elderly men. In addition, for every unit increase in the caregiver's years of experience will result in a 0.122 unit increase in the number of STFs for elderly men. This means there is a direct relationship between the caregiver's knowledge of STFs, and the caregiver's years of experience and the number of STFs for both elderly men and women. However, after examining the p-values for the variables in this model, the caregiver's years of experience as a certified caregiver was statistically significant (p=0.013), but the caregiver's knowledge of STFs was not statistically significant (p=0.790). This indicates that the caregiver's knowledge of STFs is not an important factor in predicting the number of STFs for elderly men living in the Hawaii AFCH system. Therefore, a simple linear regression model was generated to determine if the caregiver's years of experience as a certified caregiver predicts the number of STFs for elderly men.

Model 5 shows that the caregiver's years of experience significantly predicts the number of STFs for elderly men living in the Hawaii AFCH system. Overall, 10.9% of the variability of STFs can be explained by the caregiver's years of experience (**Table 34**). The regression equation for this model is $y = 0.905 + 0.123x$. This means that the y-intercept (B_0) equals 0.905 and the slope for the caregiver's years of experience is 0.123. Therefore, for every unit increase in the caregiver's years of experience as a certified caregiver will result in a 0.123 unit increase in the number of STFs for elderly men. This means that there is a direct relationship between the caregiver's years of experience and the number of STFs for elderly men living in the Hawaii AFCH system. In addition, the 95% confidence interval for the caregiver's years of experience did not contain 0 and had a small amount of variability, which suggests that the caregiver's years of experience significantly and consistently predicts the number of STFs among elderly men living in the Hawaii AFCH system.

Table 34. Summary of Caregiver Knowledge Regression Analysis for Variables Predicting STFs Among Elderly Men Living in the Hawaii AFCH System

Model Men		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	-2.438	9.793	-0.249	0.804	-0.016	0.245	0.623	-22.129, 17.252
	Knowledge	0.329	0.665	0.494	0.623				-1.008, 1.665
2	Constant	-1.577	9.270	-0.170	0.866	0.091	3.458	0.040*	-20.225, 17.072
	Knowledge	0.170	0.632	0.268	0.790				-1.101, 1.441
	Years of Experience	0.122	0.047	2.577	0.013				0.027, 0.217
3	Constant	-1.793	9.489	-0.189	0.851	0.068	2.166	0.105	-20.905, 17.320
	Knowledge	0.157	0.654	0.240	0.812				-1.160, 1.473
	Years of Experience	0.121	0.049	2.486	0.017*				0.023, 0.219
	Age (Caregiver)	0.009	0.035	0.245	0.808				-0.062, 0.079
4	Constant	2.023	10.035	0.202	0.841	0.074	1.959	0.118	-18.201, 22.247
	Knowledge	0.155	0.651	0.238	0.813				-1.158, 1.468
	Years of Experience	0.123	0.049	2.540	0.015*				0.025, 0.221
	Age (Caregiver)	0.008	0.035	0.237	0.813				-0.062, 0.078
	Age (Elderly)	-0.050	0.044	-0.158	0.261				-0.138, 0.038
5	Constant	0.905	0.690	1.311	0.196	0.109	6.979	0.011*	-0.483, 2.292
	Years of Experience	0.123	0.047	2.642	0.011*				0.029, 0.217

* p-value < 0.05

The simple and multiple linear regression models for elderly women participants was not significant (**Table 35**). Therefore, caregiver's knowledge of STFs, caregiver's years of experience, age (caregiver), and age (elderly) does not significantly predict the number of STFs for elderly women living in the Hawaii AFCH system.

Table 35. Summary of Caregiver Knowledge Regression Analysis for Variables Predicting STFs Among Elderly Women Living in the Hawaii AFCH System

Model Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	1.103	4.968	0.222	0.825	-0.017	0.094	0.761	-8.862, 11.067
	Knowledge	0.104	0.339	0.306	0.761				-0.576, 0.783
2	Constant	1.115	5.017	0.222	0.825	-0.036	0.049	0.952	-8.953, 11.183
	Knowledge	0.107	0.344	0.311	0.757				-0.584, 0.798
	Years of Experience	-0.006	0.072	-0.083	0.934				-0.151, 0.139
3	Constant	4.553	5.038	0.904	0.370	0.045	1.843	0.151	-5.561, 14.667
	Knowledge	0.149	0.331	0.452	0.653				-0.515, 0.814
	Years of Experience	0.055	0.074	0.745	0.460				-0.094, 0.204
	Age (Caregiver)	-0.097	0.042	-0.333	0.024*				-0.181, -0.013
4	Constant	13.775	7.171	1.921	0.060	0.083	2.226	0.079	-0.628, 28.178
	Knowledge	-0.032	0.340	-0.095	0.925				-0.715, 0.651
	Years of Experience	0.081	0.074	1.092	0.280				-0.068, 0.230
	Age (Caregiver)	-0.096	0.041	-2.347	0.023*				-0.178, -0.014
	Age (Elderly)	-0.082	0.046	-1.773	0.082				-0.174, 0.011
5	Constant	2.653	0.818	3.244	0.002*	-0.019	0.002	0.962	1.012, 4.293
	Years of Experience	-0.003	0.071	-0.048	0.962				-0.146, 0.140

* p-value < 0.05

The simple linear regression model for both elderly men and women participants (p=0.631) was not significant, therefore, caregiver's knowledge of STFs solely does not significantly predict the number of STFs for both elderly men and women living in the Hawaii AFCH system (**Table 36**).

Multiple regression models consisting of caregiver's knowledge of STFs, caregiver's years of experience, age (caregiver), and age (elderly) were generated to determine if they predict the number of STFs for both elderly men and women living in the Hawaii AFCH system (**Table 36**). The multiple regression model (Model 4) for both elderly men and women participants was significant (p=0.045). Overall, 5.6% of the

variability of STFs can be explained by the caregiver's knowledge of STFs, caregiver's years of experience, age (caregiver), and age (elderly). The regression equation for this model is $y = 6.952 + 0.041_{knowledge} + 0.115_{experience} - 0.050_{age\ (caregiver)} - 0.047_{age\ (elderly)}$.

After examining the p-values for the variables in this model, the caregiver's years of experience as a certified caregiver (p=0.044), age (caregiver) (p=0.029), and age (elderly) (p=0.029) were statistically significant, but the caregiver's knowledge of STFs was not statistically significant (p=0.297) (**Table 36**). This indicates that the caregiver's knowledge of STFs is not an important factor in predicting the number of STFs for both elderly men and women living in the Hawaii AFCH system. Therefore, a multiple regression model was generated to determine if the caregiver's years of experience as a certified caregiver, age (caregiver), and age (elderly) predicts the number of STFs for both elderly men and women. The multiple regression model (Model 5) for both elderly men and women participants was significant (p=0.021). Overall, 6.5% of the variability of STFs can be explained by the caregiver's years of experience, age (caregiver), and age (elderly). The regression equation for this model is $y = 6.952 + 0.041_{knowledge} + 0.115_{experience} - 0.050_{age\ (caregiver)} - 0.048_{age\ (elderly)}$. This means that there is a direct relationship between the caregiver's knowledge of STFs and the caregiver's years of experience and the number of STFs for both elderly men and women living in the Hawaii AFCH system. This also means that there is an inverse relationship between the caregiver's age and the elderly's age and the number of STFs for both elderly men and women living in the Hawaii AFCH system.

After examining the p-values for the variables in this model, the caregiver's years of experience was statistically significant (p=0.010), but age (caregiver) (p=0.087), and

age (elderly) (p=0.088) were not statistically significant (**Table 36**). This indicates that the ages of the caregiver and elderly were not important factors in predicting the number of STFs for both elderly men and women living in the Hawaii AFCH system. Therefore, a simple linear regression model was generated to determine if the caregiver's years of experience solely predicts the number of STFs for both elderly men and women.

Between Model 4 and Model 5, the best model is Model 5 because the variance is explained by the independent variables more than those in Model 4.

Model 6 shows that the caregiver's years of experience as a certified caregiver is approaching significance to predict the number of STFs for elderly men living in the Hawaii AFCH system (p=0.051) (**Table 36**). Overall, 2.7% of the variability of STFs can be explained by the caregiver's years of experience. The regression equation for this model is $y = 1.658 + 0.078x$. This means that there is a direct relationship between the caregiver's years of experience and the number of STFs for elderly men living in the Hawaii AFCH system.

Table 36. Summary of Caregiver Knowledge Regression Analysis for Variables Predicting STFs Among Elderly Men and Women Living in the Hawaii AFCH System

Model Men & Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	0.405	4.395	0.092	0.927	-0.007	0.231	0.631	-8.311, 9.120
	Knowledge	0.144	0.299	0.481	0.631				-0.449, 0.737
2	Constant	0.414	4.338	0.095	0.924	0.018	1.980	0.143	-8.190, 9.018
	Knowledge	0.086	0.297	0.289	0.773				-0.503, 0.674
	Years of Experience	0.076	0.040	1.929	0.056				-0.002, 0.155
3	Constant	1.944	4.377	0.444	0.658	0.039	2.411	0.071	-6.738, 10.627
	Knowledge	0.128	0.294	0.436	0.664				-0.456, 0.713
	Years of Experience	0.114	0.045	2.565	0.012*				0.026, 0.203
	Age (Caregiver)	-0.053	0.029	-1.785	0.077				-0.111, 0.006
4	Constant	6.952	5.282	1.316	0.191	0.056	2.530	0.045*	-3.528, 17.433
	Knowledge	0.041	0.297	0.137	0.892				-0.548, 0.629
	Years of Experience	0.115	0.044	2.595	0.011*				0.027, 0.202
	Age (Caregiver)	-0.050	0.029	-1.723	0.088				-0.108, 0.008
	Age (Elderly)	-0.047	0.029	-1.662	0.100				-0.104, 0.009
5	Constant	7.583	2.563	2.958	0.004*	0.065	3.401	0.021*	2.498, 12.668
	Years of Experience	0.115	0.044	2.618	0.010*				0.028, 0.202
	Age (Caregiver)	-0.050	0.029	-1.726	0.087				-0.107, 0.007
	Age (Elderly)	-0.048	0.028	-1.722	0.088				-0.104, 0.007
6	Constant	1.658	0.517	3.208	0.002*	0.027	3.911	0.051	0.633, 2.684
	Years of Experience	0.078	0.039	1.978	0.051				0.000, 0.155

* p-value < 0.05

Hypothesis 5: Pre- and Post-Intervention Physical Activity

Majority of the elderly men and women that participated in this study used a walker as a walking aid (n=46, 43.8%) (**Table 37**). The elderly men and women also reported having difficulty walking one-half mile (n=72, 68.6%) and walking up a flight

of stairs (n= 83.0, 79.0%), but did not have difficulty getting out of bed or chair (n=68, 64.8%). While a total of 53 elderly men and women did not have difficulty walking around in the house (50.5%), a total of 50 had difficulty walking around in the house (47.6%). The majority of elderly men and women reported not having difficulty using the telephone (n=81, 77.1%), feeding themselves (n=94, 89.5%), dressing themselves (n=71, 67.6%), using the toilet (n=66, 62.9%), and reaching out or above you head with arms (n=91, 86.7%) (**Table 38**). Elderly men and women reported having difficulty lifting or carrying something as heavy as 10 pounds (n=66, 62.9%). Nearly half of the elderly men and women had difficulty bathing or taking a shower (n=46, 43.8%), the other half did not (n=44, 41.9%).

Table 37. Elderly Men and Women's Use of Walking Aid and Difficulty Walking

	Responses	**Men (%)**	**Women (%)**	**Total (%)**
Do you use any walking aids?	No	12 (23.5)	9 (16.4)	21 (20.0)
	Yes, WC	7 (13.7)	14 (25.5)	21 (20.0)
	Yes, W	22 (43.1)	24 (43.6)	46 (43.8)
	Yes, QC	2 (3.9)	2 (3.6)	4 (3.8)
	Yes, OC	2 (3.9)	4 (7.3)	6 (5.7)
	Other WC & W	3 (5.9)	2 (3.6)	5 (4.8)
	Other W & OC	2 (3.9)	0 (0.0)	2 (1.9)
Do you have any difficulty:				
Walking one-half mile? (about 5-6 blocks)	No	15 (29.4)	17 (30.9)	32 (30.5)
	Yes	34 (66.7)	38 (69.1)	72 (68.6)
	Could do it*	1 (2.0)	0 (0.0)	1 (1.0)
Walking around in the house?	No	23 (45.1)	30 (54.5)	53 (50.5)
	Yes	26 (51.0)	24 (43.6)	50 (47.6)
	Could do it*	1 (2.0)	1 (1.8)	2 (1.9)
Getting out of bed or chair?	No	32 (62.7)	36 (65.5)	68 (64.8)
	Yes	18 (35.3)	19 (34.5)	37 (35.2)
	Could do it*	0 (0.0)	0 (0.0)	0 (0.0)
Walking up a flight of stairs? (about 10 steps)	No	13 (25.5)	6 (10.9)	19 (18.1)
	Yes	35 (68.6)	48 (87.3)	83 (79.0)
	Could do it*	2 (3.9)	1 (1.8)	3 (2.9)

Wheelchair (WC), Walker (W), Quad Cane (QC), Other Cane (OC)
* Could do it, but don't for other reason

Table 38. Daily Functioning Among Elderly Men and Women Living in the Hawaii AFCH System

	Responses	Men (%)	Women (%)	Total (%)
Because of health or physical problems, do you have difficulty with:				
Using the telephone?	No	37 (72.5)	44 (80.0)	81 (77.1)
	Yes	8 (15.7)	8 (14.5)	16 (15.2)
	Could do it*	5 (9.8)	3 (5.5)	8 (7.6)
Feeding yourself?	No	43 (84.3)	51 (92.7)	94 (89.5)
	Yes	5 (9.8)	3 (5.5)	8 (7.6)
	Could do it*	2 (3.9)	1 (1.8)	3 (2.9)
Dressing yourself?	No	35 (68.6)	36 (65.5)	71 (67.6)
	Yes	12 (23.5)	18 (32.7)	30 (28.6)
	Could do it*	3 (5.9)	1 (1.8)	4 (3.8)
Bathing or taking a shower?	No	27 (52.9)	17 (30.9)	44 (41.9)
	Yes	15 (29.4)	31 (56.4)	46 (43.8)
	Could do it*	8 (15.7)	7 (12.7)	15 (14.3)
Getting to or using the toilet?	No	34 (66.7)	32 (58.2)	66 (62.9)
	Yes	13 (25.5)	20 (36.4)	33 (31.4)
	Could do it*	3 (5.9)	3 (5.5)	6 (5.7)
Do you have difficulty:				
Lifting or carrying something as heavy as 10 pounds? (such as a bag of groceries)	No	24 (47.1)	14 (25.5)	38 (36.2)
	Yes	26 (51.0)	40 (72.7)	66 (62.9)
	Could do it*	0 (0.0)	1 (1.8)	1 (1.0)
Reaching out and above your head with your arms?	No	42 (82.4)	49 (89.1)	91 (86.7)
	Yes	8 (15.7)	5 (9.1)	13 (12.4)
	Could do it*	0 (0.0)	1 (1.8)	1 (1.0)

* Could do it, but don't for other reason

At pre-intervention, both elderly men and women spent an average of 8.70 hours of no activity per day, zero hours of heavy activity, 0.01 hours of moderate activity, 1.17 hours of slight activity, and 14.12 hours of sedentary activity (**Table 39**). While elderly men did not participate in heavy activity, elderly women did not participate in heavy or moderate activity. On a typical day, elderly men spent more time participating in moderate activity, slight activity, and sedentary activity than elderly women. On a typical day, elderly women spent more time participating in no activity than elderly men.

At post-intervention, both elderly men and women spent an average of 9.40 hours of no activity per day, zero hours of heavy activity, 0.02 hours of moderate activity, 1.30 hours of slight activity, and 13.28 hours of sedentary activity (**Table 39**). On a typical

day, elderly men spent more time participating in moderate activity and sedentary activity than elderly women. On a typical day, elderly women spent more time participating in no activity and slight activity than elderly men.

Table 39. Physical Activity of Elderly Men and Women Living in the Hawaii AFCH System

Type of Activity	Men[a]	Women[a]	Total[a]
Pre-Intervention			
No activity	8.40 ± 2.373 (3, 13)	8.96 ± 2.457 (5, 14)	8.70 ± 2.422 (3, 14)
Heavy activity	---	---	---
Moderate activity	0.02 ± 0.141 (0, 1)	---	0.01 ± 0.098 (0, 1)
Slight activity	1.22 ± 0.840 (0, 6)	1.13 ± 0.336 (1, 2)	1.17 ± 0.627 (0, 6)
Sedentary activity	14.36 ± 2.319 (10, 20)	13.91 ± 2.406 (9, 18)	14.12 ± 2.364 (9, 20)
Post-Intervention			
No activity	9.28 ± 2.110 (3, 15)	9.51 ± 2.202 (6, 15)	9.40 ± 2.151 (3, 15)
Heavy activity	---	---	---
Moderate activity	0.04 ± 0.198 (0, 1)	---	0.02 ± 0.137 (0, 1)
Slight activity	1.24 ± 0.625 (0, 3)	1.36 ± 1.007 (1, 6)	1.30 ± 0.845 (0, 6)
Sedentary activity	13.44 ± 2.392 (7, 20)	13.13 ± 2.126 (8, 17)	13.28 ± 2.251 (7, 20)

[a]Mean value ± standard deviation (min, max) (in hrs)

At pre-intervention, both elderly men and women would participate in one type of routine exercise (48.6%) on a typical day (**Table 40**). The top three types of routine exercises (#1 to #3) among both elderly men and women were endurance exercises (37.1%), endurance and stretching exercises (19.0%), and endurance and strengthening exercises (8.6%). The top three types of routine exercises among elderly men were endurance exercises (40.0%), endurance and stretching exercises (20.0%), and endurance and strengthening exercises (12.0%). The top three routine exercises among elderly

women were endurance exercises (34.5%), endurance and stretching exercises (18.2%), and stretching exercises (9.1%).

At post-intervention, both elderly men and women would participate in one type of routine exercise (45.7%) on a typical day (**Table 40**). The top three types of routine exercises (#1 to #3) among both elderly men and women were the Stay Safe Stay Active Exercise DVD Program (21.0%), endurance exercises (17.1%), and endurance, strengthening, stretching, balance and the Stay Safe Stay Active Exercise DVD Program (12.4%). The top three types of routine exercises among elderly men were the Stay Safe Stay Active Exercise DVD Program (26.0%), endurance exercises (24.0%), and endurance, strengthening, stretching, balance and the Stay Safe Stay Active Exercise DVD Program (12.0%). The top three routine exercises among elderly women the Stay Safe Stay Active Exercise DVD Program (16.4%), endurance, strengthening, stretching, balance and the Stay Safe Stay Active Exercise DVD Program (12.7%), and endurance exercises (10.9%).

Of the 105 participants, a total of 104 participants received the Stay Safe Stay Active Exercise DVD Program. While a total of 65 elderly participants used the Stay Safe Stay Active Exercise DVD Program, a total of 39 elderly participants did not. The main reason why the elderly participants did not use the exercise DVD program was because they preferred to walk as their form of exercise.

Table 40. Types of Routine Exercises Among Elderly Men and Women Living in the Hawaii AFCH System

	Men (%)		Women (%)		Total (%)	
	Pre-	**Post-**	**Pre-**	**Post-**	**Pre-**	**Post-**
No routine exercise(s)						
Total	**4 (8.0)**	**1 (2.0)**	**3 (5.5)**	**0 (0.0)**	**7 (6.7)**	**1 (1.0)**
One type						
Endurance (E)	20 (40.0)	12 (24.0)	19 (34.5)	6 (10.9)	39 (37.1)	18 (17.1)
Strengthening (G)	1 (2.0)	0 (0.0)	2 (3.6)	0 (0.0)	3 (2.9)	0 (0.0)
Stretching (C)	3 (6.0)	3 (6.0)	5 (9.1)	5 (9.1)	8 (7.6)	8 (7.6)
Balance (B)	0 (0.0)	0 (0.0)	1 (1.8)	0 (0.0)	1 (1.0)	0 (0.0)
Stay Safe Stay Active Exercise DVD Program (D)	---	13 (26.0)	---	9 (16.4)	---	22 (21.0)
Total	**24 (48.0)**	**28 (56.0)**	**27 (49.1)**	**20 (36.4)**	**51 (48.6)**	**48 (45.7)**
Two types						
E + G	6 (12.0)	1 (2.0)	3 (5.5)	0 (0.0)	9 (8.6)	1 (1.0)
E + C	10 (20.0)	2 (4.0)	10 (18.2)	5 (9.1)	20 (19.0)	7 (6.7)
E + B	0 (0.0)	0 (0.0)	1 (1.8)	0 (0.0)	1 (1.0)	0 (0.0)
E + D	---	1 (2.0)	---	3 (5.5)	---	4 (3.8)
G + C	3 (6.0)	2 (4.0)	2 (3.6)	5 (9.1)	5 (4.8)	7 (6.7)
G + D	---	1 (2.0)	---	2 (3.6)	---	3 (2.9)
C + D	---	1 (2.0)	---	1 (1.8)	---	2 (1.9)
Total	**19 (38.0)**	**8 (16.0)**	**16 (29.1)**	**16 (29.1)**	**35 (33.3)**	**24 (22.9)**
Three types						
E + G + C	1 (2.0)	0 (0.0)	4 (7.3)	0 (0.0)	5 (4.8)	0 (0.0)
E + G + B	1 (2.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.0)	0 (0.0)
E + G + D	---	0 (0.0)	---	1 (1.8)	--	1 (1.0)
E + C + B	0 (0.0)	0 (0.0)	1 (1.8)	1 (1.8)	1 (1.0)	1 (1.0)
E + C + D	---	3 (6.0)	---	4 (7.3)	---	7 (6.7)
G + C + B	0 (0.0)	0 (0.0)	2 (3.6)	0 (0.0)	2 (1.9)	0 (0.0)
Total	**2 (4.0)**	**3 (6.0)**	**7 (12.7)**	**6 (10.9)**	**9 (8.6)**	**9 (8.6)**
Four types						
E + G + C + B	1 (2.0)	0 (0.0)	2 (3.6)	0 (0.0)	3 (2.9)	0 (0.0)
E + G + C + D	---	3 (6.0)	---	5 (9.1)	---	8 (7.6)
E + C + B + D	---	0 (0.0)	---	1 (1.8)	---	1 (1.0)
G + C + B + D	---	1 (2.0)	---	0 (0.0)	---	1 (1.0)
Total	**1 (2.0)**	**4 (8.0)**	**2 (3.6)**	**6 (10.9)**	**3 (2.9)**	**10 (9.5)**
All Five types						
Total	**---**	**6 (12.0)**	**---**	**7 (12.7)**	**---**	**13 (12.4)**

Abbreviations: Endurance (E); Strengthening (G); Stretching (C); Balance (B); Stay Safe Stay Active Exercise DVD Program (D)

At pre- and post-intervention, elderly men and women were asked "What is the average number of hours you spend per day in no activity, heavy activity, moderate

activity, slight activity, and sedentary activity?" No activity represented the hours the elderly spent sleeping or lying down. Heavy activity represented the hours the elderly spent doing activities that include shoveling, digging, tennis, swimming laps, running, aerobics, and basketball. Moderate activity represented the hours the elderly spent doing activities that concludes around the onset of sweating, such as gardening, carpentry, ballroom dancing, yoga, and aerobic dancing. Slight activity represented the hours the elderly spent doing activities that does not induce sweating, such as walking on level ground, window-shopping, and golf. Sedentary activity represented the hours the elderly spent doing activities sitting down, such as reading, eating, and watching television.

The Spearman's correlation suggests that there was a strong, positive correlation between pre- and post-intervention of moderate physical activity among elderly men living in the Hawaii AFCH system (r_s=0.700, p=0.000) (**Table 41**). Therefore, elderly men's moderate physical activity changed from pre- to post-intervention due to the Stay Safe Stay Active Exercise DVD Program that was provided to the elderly men at the home visit. There was no correlation between pre- and post-intervention of no activity, slight activity, sedentary activity, and the number of STFs.

Table 41. Spearman's Correlation for Physical Activity and Number of Slip, Trips, and Falls at Pre- and Post-Intervention Among Elderly Men Living in the Hawaii AFCH System

		Post-Intervention					
		No Activity	Heavy Activity	Moderate Activity	Slight Activity	Sedentary Activity	Number of Slips, Trips, & Falls
Pre-Intervention	No Activity						
	r_s	0.197	---	---	---	---	---
	p	0.170	---	---	---	---	---
	Heavy Activity						
	r_s	---	---	---	---	---	---
	p	---	---	---	---	---	---
	Moderate Activity						
	r_s	---	---	0.700	---	---	---
	p	---	---	0.000*	---	---	---
	Slight Activity						
	r_s	---	---	---	0.017	---	---
	p	---	---	---	0.908	---	---
	Sedentary Activity						
	r_s	---	---	---	---	0.205	---
	p	---	---	---	---	0.152	---
	Number of Slips, Trips, & Falls						
	r_s	---	---	---	---	---	0.070
	p	---	---	---	---	---	0.627

* p-value < 0.05

The Spearman's correlation suggests that there was a strong, positive correlation between pre- and post-intervention of slight physical activity among elderly women living in the Hawaii AFCH system (r_s=0.440, p=0.001) (**Table 42**). Therefore, elderly women's slight physical activity changed from pre- to post-intervention due to the Stay Safe Stay Active Exercise DVD Program that was provided to the elderly women at the home visit. There was no correlation between pre- and post-intervention of no activity, sedentary activity, and the number of STFs.

Table 42. Spearman's Correlation for Physical Activity and Number of Slip, Trips, and Falls at Pre- and Post-Intervention Among Elderly Women Living in the Hawaii AFCH System

		Post-Intervention					
		No Activity	Heavy Activity	Moderate Activity	Slight Activity	Sedentary Activity	Number of Slips, Trips, & Falls
Pre-Intervention	No Activity						
	r_s	0.251	---	---	---	---	---
	p	0.065	---	---	---	---	---
	Heavy Activity						
	r_s	---	---	---	---	---	---
	p	---	---	---	---	---	---
	Moderate Activity						
	r_s	---	---	---	---	---	---
	p	---	---	---	---	---	---
	Slight Activity						
	r_s	---	---	---	0.440	---	---
	p	---	---	---	0.001*	---	---
	Sedentary Activity						
	r_s	---	---	---	---	0.195	---
	p	---	---	---	---	0.155	---
	Number of Slips, Trips, & Falls						
	r_s	---	---	---	---	---	-0.125
	p	---	---	---	---	---	0.362

* p-value < 0.05

The Spearman's correlation suggests that there was a strong, positive correlation between pre- and post-intervention of no activity (r_s=0.219, p=0.025), moderate activity (r_s=0.704, p=0.000), slight activity (r_s=0.223, p=0.022), and sedentary activity (r_s=0.195, p=0.046) among both elderly men and women living in the Hawaii AFCH system (**Table 43**). Therefore, both elderly men and women's no activity, moderate activity, slight activity, and sedentary physical activity changed from pre- to post-intervention due to the Stay Safe Stay Active Exercise DVD Program that was provided to both elderly men and women at the home visit. There was no correlation between pre- and post-intervention for the number of STFs.

Table 43. Spearman's Correlation for Physical Activity and Number of Slip, Trips, and Falls at Pre- and Post-Intervention Among Elderly Men and Women Living in the Hawaii AFCH System

		Post-Intervention					
		No Activity	Heavy Activity	Moderate Activity	Slight Activity	Sedentary Activity	Number of Slips, Trips, & Falls
Pre-Intervention	No Activity						
	r_s	0.219	---	---	---	---	---
	p	0.025*	---	---	---	---	---
	Heavy Activity						
	r_s	---	---	---	---	---	---
	p	---	---	---	---	---	---
	Moderate Activity						
	r_s	---	---	0.704	---	---	---
	p	---	---	0.000*	---	---	---
	Slight Activity						
	r_s	---	---	---	0.223	---	---
	p	---	---	---	0.022*	---	---
	Sedentary Activity						
	r_s	---	---	---	---	0.195	---
	p	---	---	---	---	0.046*	---
	Number of Slips, Trips, & Falls						
	r_s	---	---	---	---	---	-0.028
	p	---	---	---	---	---	0.781

* p-value < 0.05

After performing Spearman's correlation models for elderly men, elderly women, and both elderly men and women, multiple regression models were used to compare pre- and post-intervention physical activity of the elderly living in the Hawaii AFCH system. Elderly women were used as the reference group.

The multiple regression models for elderly men at pre-intervention (p=0.916), elderly women at pre-intervention (p=0.746), elderly women at post-intervention (p=0.665), both elderly men and women at pre-intervention (p=0.978), and both elderly men and women at post-intervention (p=0.788) were not significant (**Table 44, 46-49)**. However, the simple linear regression model for the elderly men at post-intervention was significant (p=0.030) (**Table 45**). Therefore, this model shows that physical activity

significantly predicted the number of STFs among elderly men at post-intervention. Overall, 12.1% of the variability of STFs can be explained by physical activity among elderly men at post-intervention. The regression equation for this model is $y = -0.010 - 0.054_{moderate\ activity} + 0.083_{slight\ activity} - 0.005_{sedentary\ activity}$. This means that the y-intercept (B_0) equals -0.010 and the slope for moderate activity, slight activity, and sedentary activity are -0.054, 0.083, and -0.005, respectively. This means that there is an inverse relationship between moderate and sedentary activity and the number of STFs, and a direct relationship between slight activity and the number of STFs for elderly men at post-intervention.

Table 44. Multiple Regression Model for Physical Activity Predicting Slips, Trips, and Falls Among Elderly Men Living in the Hawaii AFCH System at Pre-Intervention

Model Men		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	3.956	2.903	1.363	0.180	-0.054	0.170	0.916	-1.887, 9.800
	Moderate Activity	-1.302	3.081	-0.423	0.675				-7.505, 4.900
	Slight Activity	0.142	0.521	-0.273	0.786				-1.190, 0.906
	Sedentary Activity	-0.095	0.190	-0.499	0.620				-0.476, 0.287

Heavy activity was deleted from the analysis.
* p-value < 0.05

Table 45. Multiple Regression Model for Physical Activity Predicting Slips, Trips, and Falls Among Elderly Men Living in the Hawaii AFCH System at Post-Intervention

Model Men		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	-0.010	0.155	-0.066	0.948	0.121	3.254	0.030*	-0.323, 0.302
	Moderate Activity	-0.054	0.097	-0.556	0.581				-0.249, 0.141
	Slight Activity	0.083	0.036	2.334	0.024*				0.011, 0.155
	Sedentary Activity	-0.005	0.009	-0.559	0.579				-0.024, 0.014

Heavy activity was deleted from the analysis.
* p-value < 0.05

Table 46. Multiple Regression Model for Physical Activity Predicting Slips, Trips, and Falls Among Elderly Women Living in the Hawaii AFCH System at Pre-Intervention

Model Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	1.584	2.656	0.596	0.554	-0.027	0.295	0.746	-3.745, 6.912
	Slight Activity	0.929	1.212	0.766	0.447				-1.504, 3.362
	Sedentary Activity	-0.001	0.170	-0.005	0.996				-0.341, 0.339

Heavy activity and moderate activity were deleted from the analysis.
* p-value < 0.05

Table 47. Multiple Regression Model for Physical Activity Predicting STFs Among Elderly Women Living in the Hawaii AFCH System at Post-Intervention

Model Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	-0.073	0.124	-0.586	0.560	-0.022	0.411	0.665	-0.322, 0.176
	Slight Activity	-0.004	0.019	-0.222	0.825				-0.042, 0.033
	Sedentary Activity	0.007	0.009	0.832	0.409				-0.010, 0.025

Heavy activity and moderate activity were deleted from the analysis.
* p-value < 0.05

Table 48. Multiple Regression Model for Physical Activity Predicting STFs Among Elderly Men and Women Living in the Hawaii AFCH System at Pre-Intervention

Model Men & Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	3.043	1.892	1.608	0.111	-0.035	0.112	0.978	-0.711, 6.796
	Male	-0.179	0.592	-0.303	0.762				-1.353, 0.995
	Moderate Activity	-1.363	3.029	-0.450	0.654				-7.373, 4.647
	Slight Activity	0.041	0.470	0.087	0.931				-0.892, 0.973
	Sedentary Activity	-0.034	0.125	-0.270	0.787				-0.282, 0.214

Heavy activity was deleted from the analysis.
* p-value < 0.05

Table 49. Multiple Regression Model for Physical Activity Predicting STFs Among Elderly Men and Women Living in the Hawaii AFCH System at Post-Intervention

Model Men & Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	0.039	0.095	0.416	0.679	-0.022	0.429	0.788	-0.149, 0.228
	Male	0.006	0.028	0.225	0.823				-0.049, 0.061
	Moderate Activity	-0.032	0.101	-0.317	0.752				-0.232, 0.168
	Slight Activity	0.017	0.017	0.981	0.329				-0.017, 0.050
	Sedentary Activity	-0.003	0.006	-0.523	0.602				-0.016, 0.009

Heavy activity was deleted from the analysis.
* p-value < 0.05

Hypothesis 6: Pre- and Post-Intervention Assessment of the Care Home Caregiver

Wilcoxon signed rank test was used to analyze the elderly men and women's assessment of their Hawaii AFCH caregiver during the pre- and post-intervention home visit. Elderly men and women were asked, on a 5-point Likert scale ("0=Poor" to "5=excellent"), how the current care home caregiver is at "helping you exercise at least 30 minutes per day," "helping you adhere to your medication regimen," and "reducing slip, trip, and fall hazards in the care home."

The Wilcoxon signed rank test shows that the difference between pre- and post-intervention exercise among elderly men is significant (p=0.001), adhering to their medication regimen is not significant (p=0.705), and reducing STF hazards in the care home is significant (p=0.020) (**Table 50**). With regards to exercise, a total of 9 elderly men were more satisfied with their caregiver at pre-intervention, 28 were more satisfied with their caregiver at post-intervention, and 13 were equally satisfied with their caregiver at pre- and post-intervention. With regards to reducing STF hazards in the care home, a total of 1 elderly man was more satisfied with their caregiver at pre-intervention,

11 were more satisfied at post-intervention, and 38 were equally satisfied with their caregiver at pre- and post-intervention.

Table 50. Elderly Men's Pre- and Post-Intervention Assessment of the Care Home Caregiver

	N	Mean Rank	Sum of Ranks	Z	p (2-tailed)
Helping the elderly participant exercise at least 30 minutes per day					
Negative Ranks	9	14.61	131.50	-3.374	0.001*
Positive Ranks	28	20.41	571.50		
Ties	13				
Total	50				
Helping the elderly participant adhere to his/her medication regimen					
Negative Ranks	1	4.00	4.00	-0.378	0.705
Positive Ranks	3	2.00	6.00		
Ties	46				
Total	50				
Reducing slip, trip, and fall hazards in the care home					
Negative Ranks	1	10.50	10.50	-2.321	0.020*
Positive Ranks	11	6.14	67.50		
Ties	38				
Total	50				

A "negative ranks" mean that the elderly men were more satisfied with their caregiver pre-intervention than post-intervention. A "positive ranks" mean that the elderly men were more satisfied with their caregiver post-intervention than pre-intervention. A "ties" mean that the elderly men were equally satisfied with their caregiver at pre- and post-intervention.

* p-value < 0.05

The Wilcoxon signed rank test shows that the difference between pre- and post-intervention exercise among elderly women is significant (p=0.001), adhering to their medication regimen is not significant (p=0.564), and reducing STF hazards in the care home is not significant (p=0.414) (**Table 51**). With regards to exercise, a total of 9 elderly women were more satisfied with their caregiver at pre-intervention, 32 were more satisfied with their caregiver at post-intervention, and 14 were equally satisfied with their caregiver at pre- and post-intervention.

Table 51. Elderly Women's Pre- and Post-Intervention Assessment of the Care Home Caregiver

	N	Mean Rank	Sum of Ranks	Z	p (2-tailed)
Helping the elderly participant exercise at least 30 minutes per day					
Negative Ranks	9	19.83	178.50	-3.337	0.001*
Positive Ranks	32	21.33	682.50		
Ties	14				
Total	55				
Helping the elderly participant adhere to his/her medication regimen					
Negative Ranks	1	2.00	2.00	-0.577	0.564
Positive Ranks	2	2.00	4.00		
Ties	52				
Total	55				
Reducing slip, trip, and fall hazards in the care home					
Negative Ranks	1	1.50	1.50	-0.816	0.414
Positive Ranks	2	2.25	4.50		
Ties	52				
Total	55				

A "negative ranks" mean that the elderly women were more satisfied with their caregiver pre-intervention than post-intervention. A "positive ranks" mean that the elderly women were more satisfied with their caregiver post-intervention than pre-intervention. A "ties" mean that the elderly women were equally satisfied with their caregiver at pre- and post-intervention.

* p-value < 0.05

The Wilcoxon signed rank test shows that the difference between pre- and post-intervention exercise among both elderly men and women is significant (p=0.000), adhering to their medication regimen is not significant (p=0.527), and reducing STF hazards in the care home is significant (p=0.014) (**Table 52**). With regards to exercise, a total of 18 elderly men and women were more satisfied with their caregiver at pre-intervention, 60 were more satisfied with their caregiver at post-intervention, and 27 were equally satisfied with their caregiver at pre- and post-intervention. With regards to reducing STF hazards in the care home, a total of 2 elderly men and women were more satisfied with their caregiver at pre-intervention, 13 were more satisfied at post-

intervention, and 90 were equally satisfied with their caregiver at pre- and post-intervention.

Table 52. Elderly Men and Women's Pre- and Post-Intervention Assessment of the Care Home Caregiver

	N	Mean Rank	Sum of Ranks	Z	p (2-tailed)
Helping the elderly participant exercise at least 30 minutes per day					
Negative Ranks	18	33.58	604.50	-4.750	0.000*
Positive Ranks	60	41.28	2476.50		
Ties	27				
Total	105				
Helping the elderly participant adhere to his/her medication regimen					
Negative Ranks	2	5.25	10.50	-0.632	0.527
Positive Ranks	5	3.50	17.50		
Ties	98				
Total	105				
Reducing slip, trip, and fall hazards in the care home					
Negative Ranks	2	9.25	18.50	-2.450	0.014*
Positive Ranks	13	7.81	101.50		
Ties	90				
Total	105				

A "negative ranks" mean that both elderly men and women were more satisfied with their caregiver pre-intervention than post-intervention. A "positive ranks" mean that both elderly men and women were more satisfied with their caregiver post-intervention than pre-intervention. A "ties" mean that both elderly men and women were equally satisfied with their caregiver at pre- and post-intervention.
* p-value < 0.05

Hypothesis 7: Overall STF Risk

To determine the elderly men, elderly women, and both elderly men and women's overall STF risk, several risk factors (i.e., cognitive function (CASI score), the number of medication, the caregiver's knowledge of STF-related hazards, and physical activity) were analyzed in a multiple regression model. An average of pre- and post-intervention physical activity was calculated and used in the multiple regression models. The number of STFs were combined from pre- and post-intervention to give the total number of STFs used in the multiple regression models. Covariates for the multiple regression models were age of the elderly participant, gender, marital status, race/ethnicity, highest level of

education attained, history of stroke, caregiver's years of experience, and the age of the caregiver. Dummy variables were created for marital status, race/ethnicity, highest level of education attained, and history of stroke. Female, widowed, Japanese, high school diploma or equivalent, and no history of stroke were used as reference groups for the multiple regression models for elderly men, elderly women, and both elderly men and women **(Table 53)**. Continuous variables used for the multiple regression models are x_1 = cognitive function; x_2 = age; x_{18} = number of medication; x_{19} = caregiver's knowledge of STF-related hazards; x_{20} = caregiver's years of experience; x_{21} = age of the caregiver; x_{22} = moderate activity; x_{23} = slight activity; x_{24} = sedentary activity.

Table 53. Dummy Variables for Multiple Regression Model for Overall STF Risk Predicting STFs Among Elderly Men and Women Living in the Hawaii AFCH System

Qualitative Variable	**Variable Name (variable)**
Gender	Female*
	Male (x_3)
Marital Status	Single (x_4)
	Married (x_5)
	Divorced (x_6)
	Separated (x_7)
	Widowed*
Race/Ethnicity	Caucasian (x_8)
	Chinese (x_9)
	Japanese*
	Multiethnic (x_{10})
Highest Level of Education	Less than high school (x_{11})
	High school diploma or equivalent*
	Some college, no degree (x_{12})
	Postsecondary non-degree award (x_{13})
	Associate's degree (x_{14})
	Bachelor's degree (x_{15})
	Master's degree (x_{16})
Stroke[a]	No*
	Yes, possible or probable (x_{17})

[a]Excluding Transient Ischemic Attack (TIA) or mini stroke
*Reference group
Note: Continuous variables used for multiple regression model in addition to dummy variables (x_1 = Cognitive Function (Cognitive Abilities Screening Instrument (CASI) score)); (x_2 = Age).

The multiple regression model for elderly men shows that cognitive function (CASI score) (x_1), age (x_2), single (x_4), married (x_5), divorced (x_6), Caucasian (x_8), multiethnic (x_{10}), less than high school (x_{11}), some college (no degree) (x_{12}), associate's degree (x_{14}), bachelor's degree (x_{15}), master's degree (x_{16}), having a stroke (x_{17}), number of medication (x_{18}), caregiver's knowledge of STF-related hazards (x_{19}), caregiver's years of experience (x_{20}), age of the caregiver (x_{21}), moderate activity (x_{22}), slight activity (x_{23}), and sedentary activity (x_{24}) predicts the number of STFs for elderly men living in the Hawaii AFCH system (p=0.026) (**Table 54).** The "separated," "post-secondary non-degree award," and "heavy activity" variables were deleted from the analysis since no elderly men were assigned to these categories. Overall, 33.6% of the variability of STFs can be explained by these variables.

The regression equation for this model is $y = -1.794 - 0.029x_1 - 0.043x_2 - 0.385x_4 - 2.734x_5 + 1.422x_6 + 1.158x_8 - 1.440x_{10} - 1.578x_{11} - 0.446x_{12} + 3.041x_{14} - 1.170x_{15} + 5.269x_{16} - 0.424x_{17} + 0.080x_{18} + 0.621x_{19} + 0.122x_{20} + 0.069x_{21} - 1.613x_{22} - 1.394x_{23} - 0.264x_{24}$ (**Table 53).** For every unit increase in cognitive function (CASI score), number of medication, caregiver's knowledge of STF-related hazards, slight activity, and sedentary activity results in a 0.029 decrease, 0.080 increase, 0.621 increase, 1.394 decrease, and 0.264 decrease in the number of STFs for elderly men, respectively. This means there is a direct relationship (medication and caregiver's knowledge of STF-related hazards) and an inverse relationship (cognitive function, moderate activity, slight activity, and sedentary activity) between overall STF risk and the number of STFs among elderly men in the Hawaii AFCH system. The "master's degree" variable was the only variable that significantly contributed to the model (p=0.048).

Table 54. Multiple Regression Model for Overall STF Risk Predicting STFs Among Elderly Men Living in the Hawaii AFCH System

Model Men		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	-1.794	13.226	-0.136	0.893	0.336	2.212	0.026*	-28.886, 25.297
	Cognitive Function	-0.029	0.029	-0.969	0.341				-0.089, 0.032
	Age	-0.043	0.064	-0.676	0.505				-0.174, 0.088
	Single	-0.385	1.171	-0.329	0.745				-2.784, 2.014
	Married	-2.734	1.618	-1.690	0.102				-6.048, 0.579
	Divorced	1.422	1.659	0.857	0.399				-1.976, 4.820
	Caucasian	1.158	1.251	0.926	0.362				-1.404, 3.721
	Multiethnic	-1.440	1.080	-1.333	0.193				-3.652, 0.773
	Less than high school	-1.578	1.548	-1.019	0.317				-4.748, 1.593
	Some college, no degree	-0.446	1.331	-0.335	0.740				-3.173, 2.281
	Associate's degree	3.041	1.713	1.775	0.087				-0.468, 6.551
	Bachelor's degree	-1.170	1.292	-0.906	0.373				-3.816, 1.475
	Master's degree	5.269	2.549	2.068	0.048*				0.049, 10.490
	Stroke	-0.424	1.032	-0.411	0.684				-2.538, 1.690
	Medication	0.080	0.103	0.778	0.443				-0.130, 0.290
	Knowledge	0.621	0.653	0.952	0.349				-0.716, 1.958
	Years of Experience	0.122	0.053	2.300	0.029				0.013, 0.232
	Age (Caregiver)	0.069	0.041	1.696	0.101				-0.014, 0.152
	Moderate Activity	-1.613	2.829	-0.570	0.573				-7.409, 4.183
	Slight Activity	-1.394	1.073	-1.299	0.204				-3.592, 0.804
	Sedentary Activity	-0.264	0.299	-0.883	0.385				-0.877, 0.349

Separated, Chinese, post-secondary non-degree award, and heavy activity were deleted from the analysis.
* p-value < 0.05

The multiple regression model for elderly women shows that cognitive function (CASI score) (x_1), age (x_2), single (x_4), married (x_5), divorced (x_6), separated (x_7), Caucasian (x_8), Chinese (x_9), multiethnic (x_{10}), less than high school (x_{11}), some college

(no degree) (x_{12}), postsecondary non-degree award (x_{13}), associate's degree (x_{14}), bachelor's degree (x_{15}), having a stroke (x_{17}), number of medication (x_{18}), caregiver's knowledge of STF-related hazards (x_{19}), caregiver's years of experience (x_{20}), age of the caregiver (x_{21}), slight activity (x_{23}), and sedentary activity (x_{24}) predicts the number of STFs for elderly women living in the Hawaii AFCH system (p=0.012) (**Table 55).** The "master's degree," "heavy activity," and "moderate activity" variables were deleted from the analysis since no elderly women were assigned to these categories. Overall, 35.0% of the variability of STFs can be explained by these variables.

The regression equation for this model is $y = 15.024 - 0.001x_1 - 0.125x_2 - 1.853x_4 - 3.504x_5 - 1.162x_6 + 10.902x_7 - 0.200x_8 + 0.578x_9 + 2.181x_{10} + 1.459x_{11} - 0.971x_{12} - 4.589x_{13} + 0.016x_{14} + 0.689x_{15} + 1.661x_{17} + 0.135x_{18} - 0.251x_{19} + 0.135x_{20} - 0.019x_{21} - 0.505x_{23} + 0.001x_{24}$ (**Table 55).** For every unit increase in cognitive function (CASI score), number of medication, caregiver's knowledge of STF-related hazards, slight activity, and sedentary activity results in a 0.001 unit decrease, 0.135 unit increase, 0.251 unit decrease, 0.505 unit decrease, and 0.001 unit increase in the number of STFs for elderly women, respectively. This means there is a direct relationship (medication and sedentary activity) and an inverse relationship (cognitive function, caregiver's knowledge of STF-related hazards, and slight activity) between overall STF risk and the number of STFs among elderly women in the Hawaii AFCH system. The "age" and "separated" variables were the only variable that significantly contributed to the model (p=0.046 and 0.006, respectively).

Table 55. Multiple Regression Model for Overall STF Risk Predicting STFs Among Elderly Women Living in the Hawaii AFCH System

Model Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	15.024	10.384	1.447	0.157	0.352	2.397	0.012*	-6.102, 36.121
	Cognitive Function	-0.001	0.026	-0.021	0.983				-0.053, 0.052
	Age	-0.125	0.060	-2.072	0.046*				-0.248, -0.002
	Single	-1.853	1.216	-1.525	0.137				-4.326, 0.620
	Married	-3.504	2.095	-1.673	0.104				-7.766, 0.757
	Divorced	-1.162	1.208	-0.962	0.343				-3.618, 1.295
	Separated	10.902	3.712	2.937	0.006*				3.349, 18.455
	Caucasian	-0.200	1.666	-0.120	0.905				-3.589, 3.189
	Chinese	0.578	1.475	0.392	0.698				-2.423, 3.579
	Multiethnic	2.181	1.153	1.891	0.067				-0.166, 4.528
	Less than high school	1.459	1.166	1.251	0.220				-0.914, 3.832
	Some college, no degree	-0.971	1.504	-0.646	0.523				-4.032, 2.089
	Post-secondary non-degree award	-4.589	2.769	-1.657	0.107				-10.223, 1.044
	Associate's degree	0.016	2.026	0.008	0.994				-4.106, 4.138
	Bachelor's degree	0.689	1.148	0.600	0.553				-1.647, 3.025
	Stroke	1.661	1.012	1.641	0.110				-0.398, 3.719
	Medication	0.135	0.097	1.383	0.176				-0.064, 0.333
	Knowledge	-0.251	0.332	-0.756	0.455				-0.925, 0.424
	Years of Experience	0.135	0.082	1.640	0.111				-0.033, 0.303
	Age (Caregiver)	-0.019	0.056	-0.338	0.737				-0.133, 0.095
	Slight Activity	-0.505	0.782	-0.645	0.523				-2.096, 1.087
	Sedentary Activity	0.001	0.219	0.003	0.998				-0.445, 0.447

Master's degree, heavy activity, and moderate activity were deleted from the analysis.
* p-value < 0.05

The multiple regression model for both elderly men and women shows that cognitive function (CASI score) (x_1), age (x_2), male (x_3), single (x_4), married (x_5), divorced (x_6), separated (x_7), Caucasian (x_8), Chinese (x_9), multiethnic (x_{10}), less than

high school (x_{11}), some college (no degree) (x_{12}), postsecondary non-degree award (x_{13}), associate's degree (x_{14}), bachelor's degree (x_{15}), master's degree (x_{16}), having a stroke (x_{17}), number of medication (x_{18}), caregiver's knowledge of STF-related hazards (x_{19}), caregiver's years of experience (x_{20}), age of the caregiver (x_{21}), moderate activity (x_{22}), slight activity (x_{23}), and sedentary activity (x_{24}) predicts the number of STFs for both elderly men and women living in the Hawaii AFCH system (p=0.002) (**Table 56).** The "heavy activity" variable was deleted from the analysis since no elderly men and women were assigned to these categories. Overall, 24.2% of the variability of STFs can be explained by these variables.

The regression equation for this model is $y = 14.642 - 0.011x_1 - 0.102x_2 - 0.910x_3 - 1.393x_4 - 1.025x_5 - 0.622x_6 + 9.615x_7 + 0.554x_8 - 0.144x_9 - 0.205x_{10} + 0.521x_{11} - 0.522x_{12} - 4.552x_{13} + 1.0.46x_{14} + 0.226x_{15} + 6.046x_{16} + 0.829x_{17} + 0.095x_{18} - 0.071x_{19} + 0.113x_{20} - 0.042x_{21} + 0.548x_{22} - 0.381x_{23} - 0.119x_{24}$ (**Table 55).** For every unit increase in cognitive function (CASI score), number of medication, caregiver's knowledge of STF-related hazards, moderate activity, slight activity, and sedentary activity results in a 0.011 decrease, 0.095 increase, 0.071 decrease, 0.548 increase, 0.381 decrease, and 0.119 decrease in the number of STFs for both elderly men and women, respectively. This means there is a direct relationship (medication and moderate activity) and an inverse relationship (cognitive function, caregiver's knowledge of STF-related hazards, slight activity, and sedentary activity) between overall STF risk and the number of STFs among both elderly men and women in the Hawaii AFCH system. The "age," "separated," "master's degree," and "caregiver's years of experience" variables were the

only variable that significantly contributed to the model ($p=0.016$, 0.003, 0.005, 0.019, respectively).

Table 56. Multiple Regression Model for Overall STF Risk Predicting STFs Among Elderly Men and Women Living in the Hawaii AFCH System

Model Men & Women		Unstandardized Coefficients		t	p	adj. R^2	F	p	95% CI
		B	SE						
1	Constant	14.642	7.376	1.985	0.051	0.242	2.385	0.002*	-0.036, 29.319
	Cognitive Function	-0.011	0.018	-0.627	0.533				-0.047, 0.025
	Age	-0.102	0.041	-2.463	0.016*				-0.184, -0.020
	Male	-0.910	0.609	-1.493	0.139				-2.123, 0.303
	Single	-1.393	0.763	-1.826	0.072				-2.911, 0.125
	Married	-1.025	1.159	-0.885	0.379				-3.332, 1.281
	Divorced	-0.622	0.874	-0.712	0.479				-2.360, 1.117
	Separated	9.615	3.120	3.082	0.003*				3.406, 15.825
	Caucasian	0.554	0.899	0.616	0.540				-1.236, 2.343
	Chinese	-0.144	1.430	-0.101	0.920				-2.990, 2.702
	Multiethnic	-0.205	0.753	-0.272	0.786				-1.704, 1.294
	Less than high school	0.521	0.762	0.683	0.496				-0.996, 2.037
	Some college, no degree	-0.522	0.887	-0.588	0.558				-2.287, 1.244
	Post-secondary non-degree award	-4.552	2.782	-1.636	0.106				-10.088, 0.985
	Associate's degree	1.046	1.215	0.861	0.392				-1.372, 3.463
	Bachelor's degree	0.226	0.813	0.278	0.781				-1.392, 1.845
	Master's degree	6.046	2.115	2.858	0.005*				1.836, 10.255
	Stroke	0.829	0.661	1.253	0.214				-0.487, 2.145
	Medication	0.095	0.061	1.542	0.127				-0.027, 0.217
	Knowledge	-0.071	0.286	-0.248	0.805				-0.640, 0.498
	Years of Experience	0.113	0.047	2.395	0.019*				0.019, 0.207
	Age (Caregiver)	-0.042	0.029	-1.419	0.160				-0.100, 0.017
	Moderate Activity	0.548	2.528	0.217	0.829				-4.482, 5.578
	Slight Activity	-0.381	0.562	-0.679	0.499				-1.499, 0.736
	Sedentary Activity	-0.119	0.170	-0.702	0.485				-0.457, 0.219

Heavy activity was deleted from analysis.
* p-value < 0.05

Summary of the statistical findings (Hypothesis 1 through 7) for this study can be found in **Table 57.**

CHAPTER 5

DISCUSSIONS, CONCLUSIONS, RECOMMENDATIONS

Discussion of Results

Cognitive Function

After performing multiple regression models for cognitive function for elderly men, elderly women, and both elderly men and women, all models were statistically significant, but only partially supported. While there was an inverse relationship between cognitive function and the number of STFs for elderly men and both elderly men and women, there was a direct relationship between cognitive function and the number of STFs for elderly women.

Results suggest that there is a gender difference between cognitive function and the number of STFs experienced by elderly living in the Hawaii AFCH system. An inverse relationship between cognitive function and the number of STFs for elderly men suggests that higher cognitive function (CASI scores) results in a lower number of STFs. An inverse relationship between cognitive function and the number of STFs for elderly men was strongly represented in the multiple regression model for both elderly men and women.

A direct relationship between cognitive function and the number of STFs for elderly women for elderly women suggests that higher cognitive function (CASI scores) results in a higher number of STFs. Even though there is a direct relationship between cognitive function and number of STFs, it is a very weak relationship. Therefore, for every unit increase in cognitive function results in a slight increase in the number of STFs for elderly women.

While there is extensive research on gender differences for cognitive function, to my knowledge, this current study is one of the first studies evaluating the gender differences of cognitive function and its relationship to STFs. There are conflicting research studies that have found that men outperformed women on visuospatial tasks, and others that found that women outperformed men on visuospatial tasks (Association for Psychological Science, 2008; Murre et al, 2013). In this current study, women outperformed men on visuospatial and language tasks and men outperformed women on long-term memory, short-term memory, attention, mental manipulation/concentration, orientation, judgment/abstract thinking, and word fluency tasks.

Medication

After performing simple linear regression models for medication for elderly men, elderly women, and both elderly men and women, this hypothesis was only partially supported. While the simple linear regression models for elderly men and elderly women were not statistically significant, the simple linear regression model for both elderly men and women was statistically significant. There was a direct relationship between the number of medications and the number of STFs for both elderly men and women.

Results suggest that there are no gender differences between the number of medications and the number of STFs experienced by elderly living in the Hawaii AFCH system. Therefore, the amount of medications that elderly are taking can affect the number of STFs they will experience in the AFCH.

Results from the current study support results from previous studies. If elderly individuals are taking medication from multiple medication classes, they are potentially at an increased risk of experiencing STF-related injuries. Not only are prescribed

medication from these nine medication classes related to an increased risk of STF-related injuries among the elderly, so are over-the-counter medications, vitamins, and supplements (Social Work Today, 2012).

In this current study, majority of the participants were prescribed antihypertensives, NSAIDs, β-blockers, and antidepressants. These types of medications have been found to cause dizziness, thus increasing the elderly's risk of STFs (Drug Guide, 2012). Therefore, it is imperative to reduce the prescription of these types of medication, especially in combination with each other.

Home Safety Hazards

After performing a chi-square test on various home safety hazards, only the lack of a sturdy handrail in the hallway was statistically significant. The chi-square test revealed that the lack of sturdy handrails in the hallway among the elderly men is less than those of elderly women within the Hawaii AFCH system.

It is possible that elderly women were less likely to have sturdy handrails in the hallway than elderly men because of their willingness to ask for the caregiver's assistance through the hallway. In addition, elderly men may not ask for the caregiver's assistance in efforts to preserve their masculinity and independence. Regardless of the elderly's willingness to obtain assistance from the caregiver, the Hawaii AFCH system should require all care homes to have two sturdy handrails in the hallways to be a certified care home.

While there is extensive research on what types of home safety hazards that should be reduced in elderly homes, to my knowledge, this current study is one of the

first studies to assess gender differences of home safety hazards (Gillespie et al, 2012, Moyer, 2012).

Caregiver Knowledge of STF Hazards

After performing multiple regression models for caregiver's knowledge of STF hazards for elderly men, elderly women, and both elderly men and women, this hypothesis was only partially supported. While the multiple regression models for elderly women were not statistically significant, the multiple regression models for elderly men and both elderly men and women was statistically significant. For elderly men and both elderly men and women, there was a direct relationship between caregiver's knowledge of STF hazards and the number of STF-related injuries.

To my knowledge, this current study is one of the first studies to assess gender differences for caregiver's knowledge of STF hazards and its relationship to STFs. Results from the multiple regression model for elderly men were strongly represented in the model for both elderly men and women. This suggests that the caregiver's knowledge of STF hazards directly impacted the number of STF-related injuries among elderly men living in the Hawaii AFCH system. It is possible that knowledgeable caregiver's were given elderly men with a history of STF-related injuries because they could provide a higher level of care for them. Care for elderly men with a history of STF-related injuries may be more demanding, thus require more experienced caregiver's.

Pre- and Post-Intervention Physical Activity

After performing multiple regression models for elderly men, elderly women, and both elderly men and women for physical activity at pre- and post-intervention, this hypothesis was only partially supported. While the elderly men at pre-intervention,

elderly women at pre- and post-intervention, and both elderly men and women at pre- and post-intervention were not statistically significant, elderly men at post-intervention was statistically significant. For elderly men at post-intervention, there was an inverse relationship for moderate and sedentary activity to the number of STFs, and a direct relationship for slight activity to the number of STFs.

The post-intervention multiple regression model for elderly men suggests that it was more beneficial for elderly men to partake in moderate and sedentary activity than slight activity in order to reduce their risk of STFs. It is possible that the elderly men greatly benefited from using the Stay Safe Stay Active Exercise DVD Program (i.e., moderate activity) to reduce their risk of STFs.

According to the American College of Sports Medicine and the American Heart Association, it is recommended that elderly perform either moderate intensity aerobic activity for a minimum of 5 days per week for at least 30 minutes per day or vigorous intensity aerobic activity for a minimum of 3 days per week for at least 20 minutes per day (Haskell et al, 2007). While this recommendation is generalized for all elderly men and women, the current study found that it was more beneficial for elderly men to partake in moderate and sedentary activity than slight activity in order to reduce their risk of STFs.

Pre- and Post-Intervention Assessment of the Care Home Caregiver

After performing a Wilcoxon signed rank test, this hypothesis was only partially supported. Elderly men, elderly women, and both elderly men and women's assessment of the Hawaii AFCH caregiver helping the elderly participant exercise at least 30 minutes per day was statistically significant. Results from elderly men and elderly men were

equally represented in the Wilcoxon signed rank test for both elderly men and women. This suggests that both elderly men and women's assessment of the Hawaii AFCH caregiver helping the elderly participant exercise at least 30 minutes per day increased from pre- to post-intervention. This increased evaluation of the Hawaii AFCH caregiver may be due to the caregiver's increased knowledge on the importance of the elderly exercising or the elderly participant's use of the Stay Safe Stay Active Exercise DVD Program.

To my knowledge, this current study is one of the first studies where elderly assess the AFCH caregiver's helping the elderly exercise at least 30 minutes per day, helping the elderly adhere to their medication regimen, and reducing STF hazards in the care home.

Elderly men, and both elderly men and women's assessment of the Hawaii AFCH caregiver at reducing STF hazards were statistically significant. Results from elderly men were strongly represented in the Wilcoxon signed rank test for both elderly men and women. This suggests that elderly men's assessment of the Hawaii AFCH caregiver reducing STF hazards in the care home increased from pre- to post-intervention. This increased evaluation of the Hawaii AFCH caregiver may be due to the caregiver's increase knowledge on how to reduce hazards in the home or the caregiver installing the current studies intervention supplies (i.e., automatic nightlights, non-slip tape for loose rugs).

The Hawaii AFCH caregiver helping the elderly participant adhere to their medication regimen was not significant. Overall, both elderly men and women were equally satisfied with their caregivers helping them adhere to their medication regimen at

pre- and post-intervention. This suggests that the elderly participant's trusted their caregiver assisting them take the correct medication on any given day.

Overall STFs Risk

After performing multiple regression models for elderly men, elderly women, and both elderly men and women, this hypothesis was only partially supported. Multiple regression models for elderly men, elderly women, and both elderly men and women were statistically significant.

To my knowledge, this current study is one of the first studies evaluating the gender differences of overall STF risk and its relationship to STFs. Results suggest that there are no gender differences between (1) cognitive function, (2) the number of medication, (3) slight activity and the number of STFs experienced by elderly men, elderly women, and both elderly men and women living in the Hawaii AFCH system. Overall, there was a direct relationship (number of medication) and an inverse relationship (cognitive function and slight activity) between overall STF risk and the number of STFs. On the other hand, there are gender differences between (1) the caregiver's knowledge of STF hazards, (2) moderate activity, and (3) sedentary activity and the number of STFs experienced by elderly men, elderly women, and both elderly men and women living in the Hawaii AFCH system.

Cognitive Function

Results suggest that there are no gender differences between cognitive function and the number of STFs experienced by elderly living in the Hawaii AFCH system. Therefore, if elderly have a higher cognitive function, they will experience less STFs.

Medication

Results suggest that there are no gender differences between the number of medications and the number of STFs experienced by elderly living in the Hawaii AFCH system. Therefore, the amount of medications that elderly are taking can affect the number of STFs they will experience in the AFCH.

Caregiver's Knowledge of STF-Related Hazards

It is possible that knowledgeable caregiver's were given elderly men with a history of STF-related injuries because they could provide a higher level of care for them. Care for elderly men with a history of STF-related injuries may be more demanding, thus require more experienced caregiver's. For elderly women, it is possible that knowledgeable caregiver's were able to prevent STF-related injuries for elderly women. It is also possible that elderly women had less STF-related injuries than elderly men, but could have been more severe types of injuries that still required high level of care.

Physical Activity

While it was more beneficial for elderly men to partake in moderate, slight, and sedentary activity in order to reduce their risk of STF-related injuries, it was more beneficial for elderly women to partake in slight activity.

Conclusions

A major public health concern affecting the elderly population is unintentional injuries, particularly slips, trips, and falls (STFs). While there is extensive research on STFs among the elderly living in the community and long-term health care facilities, little to no research is found on STFs among the elderly living in community-based health care facilities. To my knowledge, this study is one of the first studies to determine the STF

risk among elderly men and women, particularly for those living in the Hawaii AFCH system.

Study Limitations

One limitation to the current study was that about half of the participants completed the CASI memory test in-person and the other half completed the CASI memory test over the telephone. It is possible that the participants that completed the CASI over the telephone could have a final CASI score that is ≤ 22.5 points less than those that completed the CASI in-person. Scores for CASI domains (short-term memory, visuospatial, and language) may not be accurate representations for elderly men and women that participated in the study.

Another limitation to the current study was the self-reporting of elderly STFs. It is possible that the elderly participants could have experienced more STFs than what was actually reported. It is possible that the elderly may not remember all the STFs that they have experienced or are fearful of reporting STFs that didn't result in serious injuries because they do not want to become institutionalized in facilities such as nursing homes.

Another limitation to the current study was the use of a STF knowledge test that is not considered a validated tool. The research team was not able to find a validated STF knowledge test, therefore, one was created for the current study.

Recommendations

The most effective injury prevention programs are those that incorporate all 7 E's of injury prevention (ElderSafety, 2011). Therefore, the 7 E's of injury prevention can be used to reduce STFs among elderly living in the Hawaii AFCH system.

By applying the 7 E's of injury prevention to elderly's cognitive function can reduce their risk of STFs. Education is a very important part of injury prevention. Caregivers, physicians, case management agencies and other health care professionals should be reminded that cognitive function is a major risk factor for STFs among the elderly. In addition, when a caregiver is getting certified or re-certified as a licensed caregiver for the Hawaii AFCH system, they should be trained on how to administer a memory test for their patients at the time of admission and every six to twelve months post-admission. In doing so, the caregiver can determine if the elderly's cognitive function is changing and if additional precautions are needed to reduce the elderly's risk of STFs. Enforcement is also a very important part of injury prevention. The Hawaii DOH should make it a requirement for all healthcare professionals in the State of Hawaii to attend STF prevention trainings and workshops that teaches them how to administer a memory test and how a decrease in cognitive function can increase an elderly's risk of STFs. Evaluation is also a very important part of injury prevention. If physicians, case management agencies, and caregivers track changes to elderly patient's cognitive function overtime, they are able to determine the elderly's risk of STFs and take the necessary precautions to reduce their risk of STFs in the AFCH. Empowerment is also a very important part of injury prevention. By teaching caregivers, physicians, case management agencies, and other health care professionals how to administer memory tests for their elderly patients, they can provide better healthcare for the elderly. Engineering, economics, and ergonomics are not applicable types of injury prevention for cognitive function and reducing STFs among elderly living in the Hawaii AFCH system.

By applying the 7 E's of injury prevention to medication can reduce elderly's risk of STFs. Education is a very important part of injury prevention. Caregivers, physicians, case management agencies and other health care professionals should be reminded that the number of medications that elderly are prescribed is a major risk factor for STFs. All healthcare professional caring for AFCH elderly patients should be trained on the side effect of medication, particularly the side effects of antihypertensives, NSAIDs, β-blockers, and antidepressants. In addition, healthcare professional should also monitor the elderly's response to the medication and start them off with the least amount and lowest dosage of medication. Enforcement is also a very important part of injury prevention. The Hawaii DOH should make it a requirement for physicians to review the medications of elderly living in AFCHs on a regular basis and reduce the number and dosage of medication prescribed to them. Economics is also a very important part of injury prevention. By reducing the number and dosage of medications that are prescribed to elderly living in the AFCH system, it is possible that the financial burden on the healthcare system can also decrease. Evaluation is also a very important part of injury prevention. All healthcare professionals involved in the care of the AFCH elderly should track the number and dosage of medications that the elderly are taking and physicians should also update the elderly's medication regimen on a regular basis. Empowerment is also a very important part of injury prevention. All healthcare professionals and AFCH elderly should be empowered to reduce the number and dosage of medication that is prescribed to the elderly. Ways to empower people can be accomplished through education. Engineering and ergonomics are not applicable types of injury prevention for medications and reducing STFs among elderly living in the Hawaii AFCH system.

By applying the 7 E's of injury prevention to home safety hazards can reduce elderly's risk of STFs. Education is an important part of injury prevention. Caregivers, physicians, case management agencies and other healthcare professionals should be trained on the various home safety hazards that can increase elderly's risk of STFs in the AFCH and what preventive measures must be taken to reduce their risk of STFs. Enforcement is also an important part of injury prevention. The Hawaii DOH should required all healthcare professionals to attend STF prevention training and should have more stringent environmental requirements for caregiver's homes to be certified AFCHs in Hawaii. The Hawaii DOH should consider having certified Healthy Homes Specialist conduct visual assessments of the Hawaii AFCHs during caregiver certification and re-certification home visits. Engineering is also an important part of injury prevention. The Hawaii DOH should ensure that certified or licensed contractors make environmental modifications to the AFCHs. Evaluation is also an important part of injury prevention. The Hawaii DOH and case management agencies should track the types of home safety hazards that are identified during caregiver certification and re-certification home visits and require that environmental modifications be made in order for caregivers to have certified or re-certified AFCHs. Empowerment is also an important part of injury prevention. All caregivers, case management agencies and other healthcare professionals should be empowered to work together to reduce home safety hazards in the AFCH system. In doing so, they are able to provide better care for the elderly living in the AFCH system. Economics and ergonomics are not applicable types of injury prevention for home safety hazards and reducing STFs among elderly living in the Hawaii AFCH system.

By applying the 7 E's of injury prevention to the caregiver's knowledge of STFs can reduce elderly's risk of STFs. Education is an important part of injury prevention. During the caregiver's initial 6-week certified nursing assistant training course, they should be trained on STF risk and prevention. Currently, the 6-week caregiver course does not have a module on STF risk and prevention. In addition, case management agencies can provide in-service training on STF risk and prevention on a bi-annual or annual basis. Enforcement is also an important part of injury prevention. The Hawaii DOH should make it a requirement for all 6-week certified nursing assistant courses and case management agency in-service trainings have a STF risk and prevention module for caregivers to be certified caregivers. Evaluation is also an important part of injury prevention. During the 6-week certified nursing assistant course, it is required that attendees take a standardized exam. This standardized exam should include STF risk and prevention questions to test their knowledge on the topic. Empowerment is also an important part of injury prevention. Caregivers can be empowered to be knowledgeable on STF risk and prevention through education. Engineering, economics, and ergonomics are not applicable types of injury prevention for caregiver's knowledge of STFs and reducing STFs among elderly living in the Hawaii AFCH system.

By applying the 7 E's of injury prevention to physical activity can reduce elderly's risk of STFs. Education is an important part of injury prevention. Elderly, their family members, caregivers, physicians, case management agencies, and other healthcare professionals should be educated on the importance of elderly exercising at least 30 minutes per day. Enforcement is also an important part of injury prevention. The Hawaii DOH should require all healthcare professionals caring for elderly in AFCHs to attend an

STF prevention training. In doing so, they can learn the importance of elderly being physical active to reduce their risk of STF and STF-related injuries. The Hawaii DOH can also promote the use of the Stay Safe Stay Active Exercise Program along with the exercise DVD program that utilized in the current study. Evaluation is also an important part of injury prevention. The caregivers and/or case management agencies should track the elderly's physical activity regimen (consisting of aerobic activity, muscle-strengthening activity, flexibility activity, and balance exercises) on a daily basis. Ergonomics is also an important part of injury prevention. The caregivers and case management agencies should partner with fitness professionals and kinesiologists to develop a personalized fitness program for the AFCH elderly. Or the caregivers and case management agencies can monitor the elderly using the Stay Safe Stay Active Exercise DVD Program. Empowerment is also an important part of injury prevention. The elderly patients must be empowered to stay physically active. As the elderly progress through their exercise regimen, they can be evaluated on a quarterly or bi-annual basis to determine what their physical abilities are. If the elderly can see improvements overtime, they will be empowered to continue their physical activity regimen, thus reduce their risk of STFs and STF-related injuries. Engineering and economics are not applicable types of injury prevention for physical activity and reducing STFs among elderly living in the Hawaii AFCH system.

Several implications can be made based on the findings of this current study. Firstly, a validated tool should be created to test individual's knowledge on STF risk and prevention. The caregiver STF knowledge test used in this current study was not a validated tool since there are no existing validated STF knowledge tests readily available

in the field of science and research. However, the validity of the STF knowledge test used in the current study will be tested in a future study. If validated, it is highly recommended that the STF risk and prevention knowledge test be used in community-based healthcare facility training courses, such as the 6-week certified nursing assistant course in Hawaii or case management in-service trainings.

This current study found invaluable information about STF risk among elderly men and women living in the Hawaii AFCH system. Regardless of gender, it is important for community-based healthcare facilities, such as the Hawaii AFCH system, to have stringent policies in order to reduce STFs and STF-related injuries among the elderly living in the Hawaii AFCH system. In order to prevent the long-term consequences of elderly falls in Hawaii, the House Bill 2053 and the Senate Bill 2531 (passed and in effect on July 3, 2014) established a Fall Prevention and Early Detection Coordinator within the DOH Emergency Medical Services and Injury Prevention System Branch. To reduce STF and STF-related injuries among the elderly living in Hawaii, specifically in the Hawaii AFCH system, it is highly recommended that the Fall Prevention and Early Detection Coordinator develop and implement the following policies:

(1) Require case management agencies and/or caregivers to administer memory tests to elderly at the time of admission, bi-annually or annually, and following an STF or STF-related injury

(2) Require physicians, case management agencies, caregivers, and other healthcare professionals to review elderly's medication regimen on a regular basis and reduce the number and dosage of medication prescribed to the elderly

(3) Require a Hawaii DOH employee or contractor, ideally a certified Healthy Homes Specialist, to conduct visual inspections of care homes prior to certification and re-certification of the care home

(4) Require the 6-week certified nursing assistant course to have a STF risk and prevention module with questions on the final exam in the course

(5) Require caregiver's to monitor and report that their elderly patients are performing their physical activity regimen (consisting of aerobic activity, muscle-strengthening activity, flexibility activity, and balance exercises) for at least 30 minutes per day

(6) Recommend the Hawaii DOH or case management agencies to administer annual patient satisfaction surveys to find ways to improve the AFCH system for the elderly

By developing and implementing the policies mentioned above, elderly will have a better quality of life and a reduction in STF and STF-related injuries while living in the AFCH system.

Overall, the current study was able to determine the STF risk among the elderly men and women living in the Hawaii AFCH system. Since this study is one of the first studies to evaluate various STF risk factors for elderly living in the AFCH system, more research is needed to evaluate STF risk factors for elderly living in community-based healthcare facilities in other states with large elderly populations, such as Nevada, Oregon, Florida, and Washington.

APPENDIX 1. Institutional Review Board Approval Form

UNLV

Biomedical IRB – Expedited Review
Modification Approved

NOTICE TO ALL RESEARCHERS:
Please be aware that a protocol violation (e.g., failure to submit a modification for any change) of an IRB approved protocol may result in mandatory remedial education, additional audits, re-consenting subjects, researcher probation, suspension of any research protocol at issue, suspension of additional existing research protocols, invalidation of all research conducted under the research protocol at issue, and further appropriate consequences as determined by the IRB and the Institutional Officer.

DATE: November 18, 2014

TO: **Dr. Sheniz Moonie**, School of Community Sciences

FROM: Office of Research Integrity – Human Subjects

RE: Notification of IRB Action
Protocol Title: **Trip and Fall Hazard Reduction in Nevada Homes for Individual Residential Care and Hawaii Adult Foster Care Homes**
Protocol #: 1302-4368
Expiration Date: June 18, 2015

The modification of the protocol named above has been reviewed and approved.

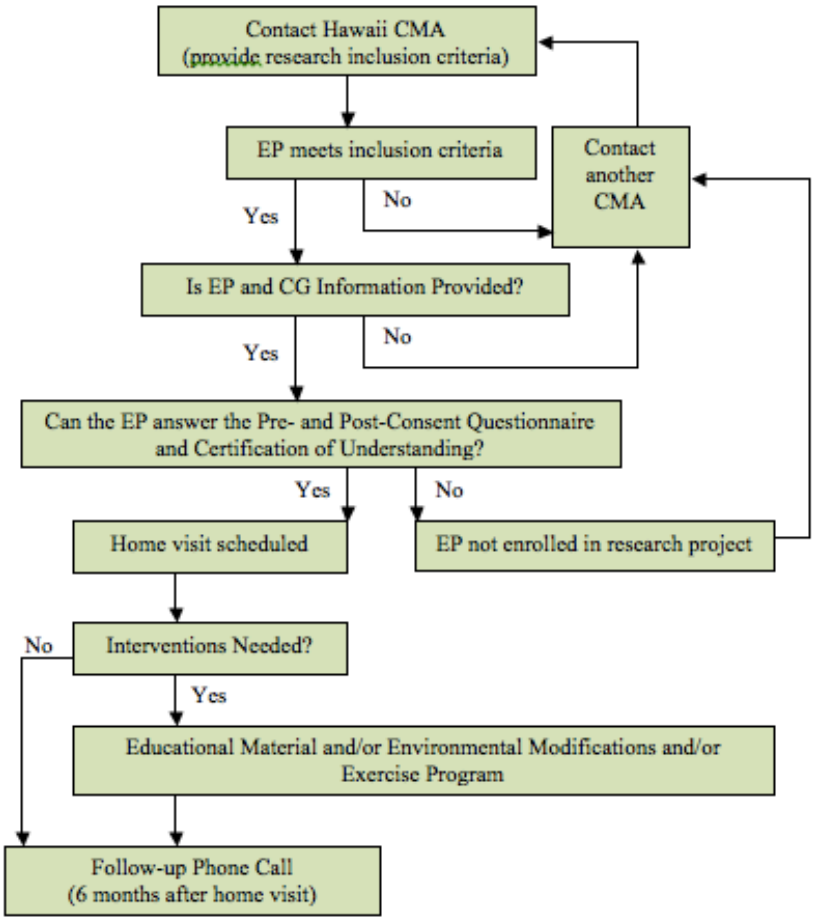
This IRB action will not reset your expiration date for this protocol. The current expiration date for this protocol is June 18, 2015.

PLEASE NOTE:
Upon approval, the research team is responsible for conducting the research as stated in the protocol most recently reviewed and approved by the IRB, which shall include using the most recently submitted Informed Consent/Assent forms and recruitment materials. The official versions of these forms are indicated by footer which contains approval and expiration dates.

Should there be *any* change to the protocol, it will be necessary to submit a **Modification Form** through ORI - Human Subjects. No changes may be made to the existing protocol until modifications have been approved by the IRB. Modified versions of protocol materials must be used upon review and approval. Unanticipated problems, deviations to protocols, and adverse events must be reported to the ORI – HS within 10 days of occurrence.

Should the use of human subjects described in this protocol continue beyond June 18, 2015, it would be necessary to submit a **Continuing Review Request Form** *30 days* before the expiration date. If you have questions or require any assistance, please contact the Office of Research Integrity - Human Subjects at IRB@unlv.edu or call 702-895-2794.

APPENDIX 2. Flow Chart of Research Project



Key of Abbreviations
CMA- Case Management Agency
EP- Elderly Participant
CG-Caregiver

APPENDIX 3. Pre- and Post-Consent Questionnaire and Certification for Elderly Participation

N. Pre- and Post-Consent Questionnaire and Certification for Elderly Participation

Pre-Consent Questionnaire

1. What is your name? _____
2. What State and City are we in? _____
3. What time is it? _____
4. What is today's date (year, month, date)? _____

Post-Consent Questionnaire

1. What are some activities that we will do today? _____
2. What is a benefit of participating in this study? _____
3. What is a risk of participating in this study? _____
4. Is your participation in this study voluntary? _____Yes_____No_____
5. Can you withdraw from the study at anytime? _____Yes_____No_____
6. Are there any penalties or loss of benefits if you refuse to participate in this study? _____Yes_____No_____

Certification for Elderly Participation

Based on the pre- and post-consent questionnaire above,

_____
(Researcher's Name)

has determined on _____that
(Month, Date, Year)

_____
(Subject's Name)

is capable of understanding the purpose, nature, risks, benefits, and alternatives (including nonparticipation) of the research, making a decision about participation, and understanding that the decision about participation in the research will involve no penalty or loss of benefits to which the subject is otherwise entitled.

_____
(Researcher's Signature)

APPENDIX 4. The Care Home Resident Consent Form

UNLV

Elderly Consent Form

TITLE OF STUDY: Trip and Fall Hazard Risk Among the Elderly Men and Women in the Hawaii Care Home System

INVESTIGATOR(S): Sheniz Moonie, PhD, Shawn Gerstenberger, PhD, Michelle Chino, PhD, or Michelle Ching MPH 702-895-5422 (office) or 808-383-2197 (cell).

Name of Participant: _____

Case Number: _____

Purpose

This research project was designed to identify and reduce trip and fall hazards in Hawaii care homes through education and environmental modifications. Researcher(s) will assess the overall safety of the care home by identifying trip and fall hazards in the home. Identifying these areas through a home assessment will allow us to provide you with information on improving the safety of your home and health in order to reduce trip and falls hazards in the care home.

Procedures

You are being asked to participate in the study because you live in a care home. If you choose to participate, this study should take about 3 hours of your time, over a period of 3 months. UNLV researcher(s), each specially trained and certified, will visit your home on one occasion and follow-up with you over the telephone 3 months after the home visit. An overview of the process is provided to you.

An assessment may include the following services at *no cost*:

Home visit: During the home visit, you will complete forms necesssary for enrollment. The forms include this consent form, an authorization to use and share health information for research purposes form, medication list, and questionnaires about your physical activity, and trips and falls in the care home. These forms need to be completed by each participate and caregiver. After all the forms are complete your home will be checked for trip and fall hazards through a Healthy Homes Trip and Fall Visual Assessment. A list of the activities at your home visit include:

- Checking for trip and fall hazards in the living room, kitchen, bedroom, bathroom, hallway, staircase
    - The home will be assessed for the presence or absence of things such as good lighting, clutter, grab bars, and handrails.
- Administer a memory test that will take 15-20 minutes
    - You will be asked questions that will assess your attention, concentration, orientation, short-term memory, long-term memory, language abilities, visual construction, list-generating fluency, abstraction, and judgment.
- Obtain a medication/vitamin list
    - You will be asked to provide researchers with all the medications (all prescription, non-prescription, and herbal medicines) that you have taken in the past 2 weeks.
- Obtain information on physical functioning (e.g., physical ability and injury)
    - You will be asked questions regarding your physical ability, physical activity, and any trip or fall-related injuries that have occurred in the home.
- Obtain medical information (e.g., type of fall-related injuries within the past 3 months and medical costs of fall-related injuries)
    - You will be asked to provide your medical history of trip or fall-related injuries that have occurred in the care home.

Researcher(s) will provide you with educational material, nightlights, non-slip grip tape, and/or exercise DVD. Participants will be given an exercise DVD if their current exercise plan doesn't consist of endurance activities,

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strengthening, stretching, and balancing exercises. (Note: Elderly residents will not be performing any physical tasks in this study.)

Follow-up phone call: You will be contacted over the telephone 3 months after the home visit in order to reassess your physical activity, determine if you experienced any injuries since the home visit, and provide an assessment of the care home you live in and the Stay Safe Stay Active Daily Exercise DVD program that was provided to you by the research project.

Benefits

The benefits for participating in this study include personalized educational materials that can help make the care home a safer place for the participant and increase the participants daily physical activity. In addition, you may qualify to receive free nightlights, non-slip grip tape, and the Stay Safe Stay Active Daily Exercise DVD program. Note: The Stay Safe Stay Active Daily Exercise DVD program may be provided to participants of this study to serve as a recommended, not a required exercise program.

Risks

Risks of participating in this study are minimal. There may be some level of discomfort that may come with home visits and answering questions about your care home and health. If you are uncomfortable answering any of the questions in this study, you are free to skip those questions or discontinue participation. Participation is voluntary and you can withdraw at anytime. There is no penalty or loss of benefits from this study for those who choose not to participate. When using the Stay Safe Stay Active Daily Exercise DVD program, elderly participants should perform exercises at their own discretion.

Other important things to know:

All information gathered in this study will be kept completely confidential, unless researchers become aware of any abuse that has been inflicted on the elderly individual and will report such concerns to the appropriate authorities. Data will be evaluated using case numbers instead of personal names, therefore no reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at the University of Nevada, Las Vegas (UNLV) for five years after completion of the study or until publication. After the storage time the information gathered will be destroyed. Only researcher(s) for this research project will have access to the study data. You can ask questions about this study at anytime.

Questions

If you do have questions about the research, your rights as a participant, or would like more information please contact Dr. Sheniz Moonie, Dr. Shawn Gerstenberger, Dr. Michelle Chino, or Michelle Ching, MPH at (702)895-5422 or (808) 383-2197. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794 or toll free at 877-895-2794 or via email at IRB@unlv.edu.**

Please inital one box below. Signing your name below indicates that you agree to be in this study.

_____ The initial indicates that I have read the above consent.

or

_____ The initial indicates that the above consent was read to me by the research team member

Signature of participant **Date**

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TITLE OF STUDY: Trip and Fall Hazard Risk Among the Elderly Men and Women in the Hawaii Care Home System

Printed name of participant	**Date**
Signature of person obtaining consent	**Date**
Printed name of person obtaining consent	**Date**

Approved by the UNLV IRB. Protocol #1302-4368
Received: 11-07-14 Approved: 11-18-14 Expiration: 06-18-15

APPENDIX 5. The Caregiver Consent Form

UNLV

Caregiver Consent Form

TITLE OF STUDY: Trip and Fall Hazard Risk Among the Elderly Men and Women in the Hawaii Care Home System

INVESTIGATOR(S): Sheniz Moonie, PhD, Shawn Gerstenberger, PhD, Michelle Chino, PhD, or Michelle Ching MPH 702-895-5422 (office) or 808-383-2197 (cell).

Name of Participant: _____

Case Number: _____

Purpose

This research project was designed to identify and reduce trip and fall hazards in Hawaii care homes through education and environmental modifications. Researcher(s) will assess the overall safety of the care home by identifying trip and fall hazards in the home. Identifying these areas through a home assessment will allow us to provide you with information on improving the safety of your home and health in order to reduce trip and falls hazards in the care home.

Procedures

You are being asked to participate in this research project because you own or are in charge of a care home. If you choose to participate, this study should take about two hours of your time, over a period of 3 months. Research team members, each specially trained and certified, will visit your home on one occasion and follow-up with you over the telephone 3 months after the home visit. An overview of the process is provided to you.

An assessment may include the following services at *no cost*:

Home visit: During the home visit, you will complete forms necesssary for enrollment. The forms include this consent form and a questionnaire evaluating the caregivers knowledge on trip and fall hazards. After all the forms are complete your home will be checked for trip and fall hazards in the living room, kitchen, bedroom of the resident(s), bathroom, hallway, and staircase through a Healthy Homes Trip and Fall Visual Assessment. The home will be assessed for the presence or absence of things such as good lighting, clutter, grab bars, and handrails.

Researcher(s) will also provide you with educational material on how to make the care home a safer place for the resident(s).

Follow-up phone call: You will be contacted over the telephone 3 months after the home visit in order to determine if any of your resident(s) that participated in the study experienced any trip or falls in the home.

Benefits

The benefits for participating in this study include personalized educational materials that can help make the care home a safer place for your resident(s).

Approved by the UNLV IRB. Protocol #1302-4368
Received: 11-07-14 Approved: 11-18-14 Expiration: 06-18-15

TITLE OF STUDY: Trip and Fall Hazard Risk Among the Elderly Men and Women in the Hawaii Care Home System

Risks

Risks of participating in this study are minimal. There may be some level of discomfort that may come with home visits and answering questions about your care home. If you are uncomfortable answering any of the questions in this study, you are free to skip those questions or discontinue participation. Participation is voluntary and you can withdraw at anytime. There is no penalty or loss of benefits from this study for those who choose not to participate.

Other important things to know:

All information gathered in this study will be kept completely confidential. Data will be evaluated using case numbers instead of personal names, therefore no reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at the University of Nevada, Las Vegas (UNLV) for five years after completion of the study or until publication. After the storage time the information gathered will be destroyed. Only researcher(s) for this research project will have access to the study data. You can ask questions about this study at anytime.

Questions

If you do have questions about the research, your rights as a participant, or would like more information please contact Dr. Sheniz Moonie, Dr. Shawn Gerstenberger, Dr. Michelle Chino, or Michelle Ching, MPH at (702)895-5422 or (808) 383-2197. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794 or toll free at 877-895-2794 or via email at IRB@unlv.edu.**

Please check box below for Authorization to Conduct Research at Facility

☐ The Facility acknowledges that it has reviewed the protocol presented by the researcher, as well as the associated risks to the Facility. The Facility accepts the protocol and the associated risks to the Facility, and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board. If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity – Human Subjects.

Please inital one box below. Signing your name below indicates that you agree to be in this study.

_____ The initial indicates that I have read the above consent.

or

_____ The initial indicates that the above consent was read to me by the research team member

Signature of participant **Date**

Printed name of participant **Date**

Approved by the UNLV IRB. Protocol #1302-4368
Received: 11-07-14 Approved: 11-18-14 Expiration: 06-18-15

TITLE OF STUDY: Trip and Fall Hazard Risk Among the Elderly Men and Women in the Hawaii Care Home System

Signature of person obtaining consent	**Date**
Printed name of person obtaining consent	**Date**

APPENDIX 6. The Authorization to Use and Share Health Information for Research Purposes Forms

UNIVERSITY OF NEVADA, LAS VEGAS

AUTHORIZATION TO USE AND SHARE HEALTH INFORMATION FOR RESEARCH PURPOSES

Researcher(s):

Sheniz Moonie, PhD, Shawn Gerstenberger, PhD, Michelle Chino, PhD, Michelle Ching, MPH (808) 383-2197

Title of Study:

Trip and Fall Hazard Risk Among the Elderly Men and Women in the Hawaii Care Home System

By law, researchers must protect the privacy of health information about you. In this form the word "you" means both the person who takes part in the research and the person who gives permission for another person to be in the research. Researchers may use, create, or share your health information for research **only if you let them**. This form describes what researchers will do with your health information. Please read it carefully. If you agree with it, please sign your name at the bottom. You will get a copy of this form after you have signed it.

If you sign this form, information will be shared with the people who conduct the research. In this form, all these people together are called "researchers." Their names will also appear on the research consent form that you sign.

The researchers will use the health information only for the purposes named in this form.

1. My health information that may be used, created, or shared includes:

Name, age, sex, address, and information related to claims, payment, and medical costs related to trip and fall injuries.

2. My health information will be used for:

Determining the trip and fall injury costs.

3.What the researchers may do with my health information:

The researchers may use and share health information about you for the study.

4. Removing your name from health information

The researchers may remove your name (and other information that could identify you) from your health information. No one would know the information was yours.

If your name is removed, the information may be used by the researchers as the law allows. (This includes other research purposes.) This form would no longer limit the way the researchers uses and shares the information.

5. How the researchers protect health information

The researchers will follow the limits in this form. If they publish the research, they will not identify you unless you allow it in writing. These limitations continue even if you take back this permission.

6. After the researchers learn health information

The limits in this form come from a federal law called the Health Insurance Portability and Accountability Act (HIPAA). This law applies to your doctors and other health care providers.

Once the researchers get your health information, this law may no longer apply. But other privacy protections will still apply.

1

7. Storing your health information

Your health information may be added to a database or data repository. This permission will end when the database or data repository is destroyed.

8. You do not have to sign this permission (authorization) form. If I decide not to sign the authorization form:

- It will not affect your treatment, payment or enrollment in any health plans or affect your eligibility for benefits.
- You may not be allowed to participate in the research study.

9. After signing the authorization form, you can change your mind and:

- Not let the researcher disclose or use your protected health information (revoke the authorization).
- If you revoke the authorization, you will send a written letter to: *Michelle Ching, MPH 4505 South Maryland Parkway Box 3063 Las Vegas, Nevada 89154* to inform her of your decision.
- If you revoke this Authorization, researchers may only use and disclose the protected health information **already** collected for this research study.
- If you revoke this Authorization your protected health information may still be used and disclosed should you have an adverse event (a bad effect).
- If you change your mind and withdraw the authorization, you may not be allowed to continue to participate in the study.

10. Please note

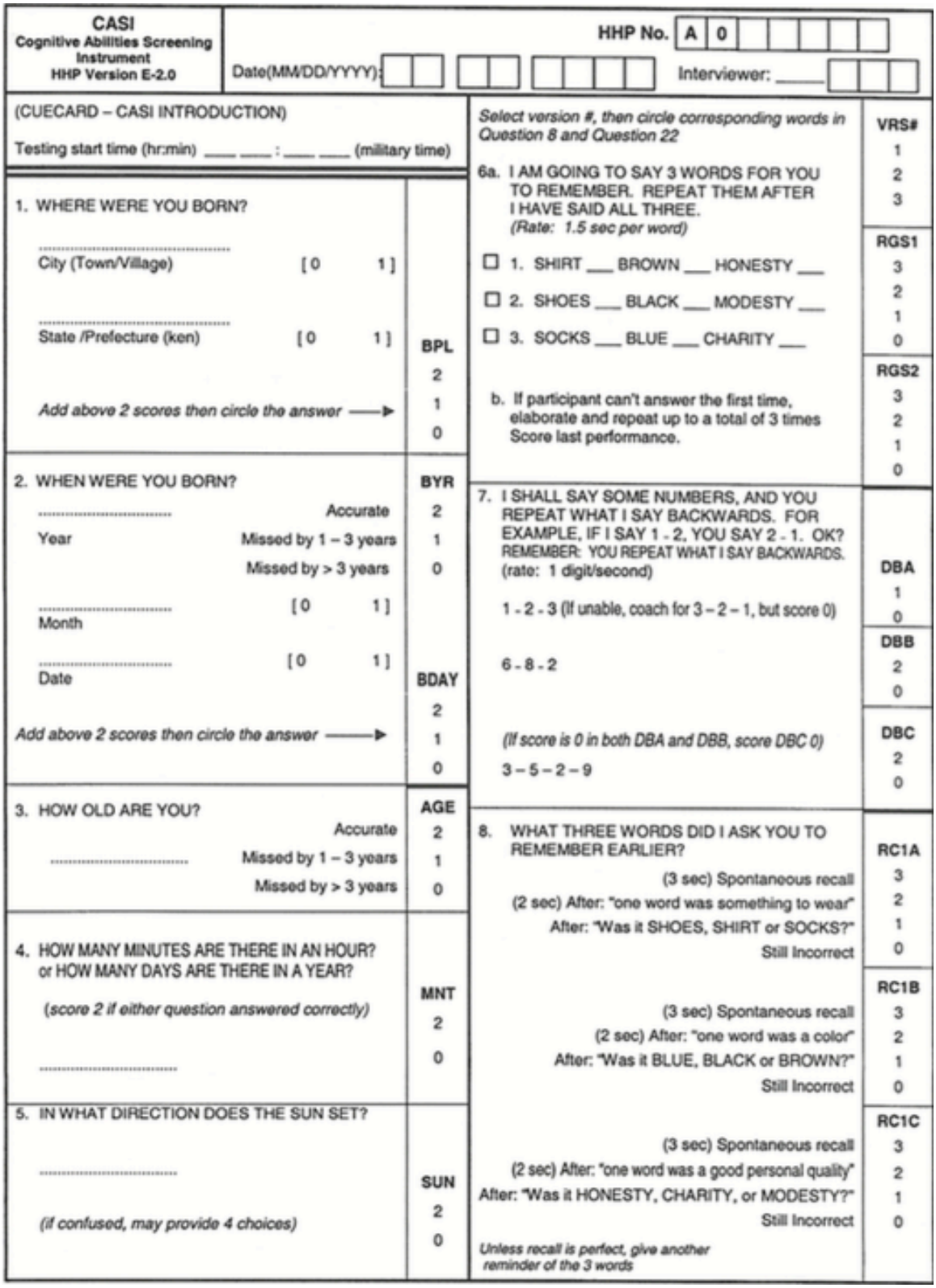
Unless you take back your permission (authorization), this form does not have an ending date.

11. Your signature

I agree to the use and sharing of my health information for purposes of this research study

_____	_____
Signature of research subject	Date
_____	_____
Printed name of research subject	Date

APPENDIX 7. Memory Test (Cognitive Abilities Screening Instrument)



CASI
Cognitive Abilities Screening Instrument
HHP Version E-2.0

HHP No. A 0 _____

Date(MM/DD/YYYY): ____ ____ ____ ____

Interviewer: _____

(CUECARD – CASI INTRODUCTION)

Testing start time (hr:min) ____ ____ : ____ ____ (military time)

1. WHERE WERE YOU BORN?

City (Town/Village) [0 1]

State /Prefecture (ken) [0 1]

Add above 2 scores then circle the answer → **BPL** 2 1 0

2. WHEN WERE YOU BORN?

Year — Accurate / Missed by 1 – 3 years / Missed by > 3 years **BYR** 2 1 0

Month [0 1]

Date [0 1] **BDAY** 2 1 0

Add above 2 scores then circle the answer →

3. HOW OLD ARE YOU?

_____ — Accurate / Missed by 1 – 3 years / Missed by > 3 years **AGE** 2 1 0

4. HOW MANY MINUTES ARE THERE IN AN HOUR? or HOW MANY DAYS ARE THERE IN A YEAR?

(score 2 if either question answered correctly)

MNT 2 0

5. IN WHAT DIRECTION DOES THE SUN SET?

(if confused, may provide 4 choices)

SUN 2 0

Select version #, then circle corresponding words in Question 8 and Question 22

VRS# 1 2 3

6a. I AM GOING TO SAY 3 WORDS FOR YOU TO REMEMBER. REPEAT THEM AFTER I HAVE SAID ALL THREE.
(Rate: 1.5 sec per word)

☐ 1. SHIRT ___ BROWN ___ HONESTY ___

☐ 2. SHOES ___ BLACK ___ MODESTY ___

☐ 3. SOCKS ___ BLUE ___ CHARITY ___

RGS1 3 2 1 0

b. If participant can't answer the first time, elaborate and repeat up to a total of 3 times Score last performance.

RGS2 3 2 1 0

7. I SHALL SAY SOME NUMBERS, AND YOU REPEAT WHAT I SAY BACKWARDS. FOR EXAMPLE, IF I SAY 1 - 2, YOU SAY 2 - 1. OK? REMEMBER: YOU REPEAT WHAT I SAY BACKWARDS. (rate: 1 digit/second)

1 - 2 - 3 (If unable, coach for 3 – 2 – 1, but score 0) **DBA** 1 0

6 - 8 - 2 **DBB** 2 0

(If score is 0 in both DBA and DBB, score DBC 0)

3 – 5 – 2 – 9 **DBC** 2 0

8. WHAT THREE WORDS DID I ASK YOU TO REMEMBER EARLIER?

(3 sec) Spontaneous recall
(2 sec) After: "one word was something to wear"
After: "Was it SHOES, SHIRT or SOCKS?"
Still Incorrect **RC1A** 3 2 1 0

(3 sec) Spontaneous recall
(2 sec) After: "one word was a color"
After: "Was it BLUE, BLACK or BROWN?"
Still Incorrect **RC1B** 3 2 1 0

(3 sec) Spontaneous recall
(2 sec) After: "one word was a good personal quality"
After: "Was it HONESTY, CHARITY, or MODESTY?"
Still Incorrect **RC1C** 3 2 1 0

Unless recall is perfect, give another reminder of the 3 words

CASI – Cognitive Abilities Screening Instrument *HHP Version E-2.0 Record Form page 2 of 4*

(For the first error only: score 0, but provide the correct answer. If subject asks examiner to repeat answer from previous step, provide the answer but score 0 at that step.)

9a. FROM 100, TAKE AWAY 3, = HOW MANY? (97)

b. AND TAKE AWAY 3 FROM THAT EQUALS? (94)

(If a. and b. are both scored 0, score part c. 0)

c. Repeat "AND TAKE AWAY 3 AGAIN EQUALS?" three more times. 1 point each.

(91 88 85)

SUB3A
1
0

SUB3B
1
0

SUB3C
3
2
1
0

10. WHAT IS TODAY'S DATE? .....

[YEAR]
Accurate 4
Missed by 1 year 2
Missed by 2 – 5 yars 1
Missed >= 6 years 0

YR

[MONTH]
Accurate or within 5 days 2
Missed by 1 month 1
Missed >= 2 months 0

MO

[DATE]
(of the month) Accurate 3
Missed by 1 or 2 days 2
Missed 3-5 days 1
Missed >= 6 days 0

DATE

11. WHAT DAY OF THE WEEK IS TODAY?

.....
Accurate 1
Inaccurate 0

DAY

12. WHAT SEASON ARE WE IN?

Accurate within 1 month 1
Missed by > 1 month 0

(May provide 4 choices if necessary)

SSN

13a. WHAT _____ ARE WE IN?

State [0 2]
City/Town/Village [0 2]

add above 2 scores then circle the answer ——►

SPA
4
2
0

b. IS THIS PLACE A HOSPITAL (CLINIC), A STORE ( ), OR HOME?

SPB
1
0

14. WHAT ANIMALS HAVE 4 LEGS? TELL ME AS MANY AS YOU CAN. (30 sec.)

Number of correct answers: 0 1 2 3 4 5 6 7 8 9 10

ANML

(CUE CARD – INTRODUCTION TO SIMILARITIES)

15. AN ORANGE AND A BANANA ARE BOTH FRUIT.
(pause for 2 sec., then ask:)
(coach for correct answer if needed for "a." only)

a. AN ARM AND A LEG ARE BOTH ....?
Body parts, limbs, extremities 2
Long, bend, muscles, bones, etc. 1
Incorrect; DK; tells difference 0

b. LAUGHING AND CRYING ARE BOTH ....?
Expressions of feelings/emotions 2
Other correct answer 1
Incorrect; DK; tells difference 0

c. EATING AND SLEEPING ARE BOTH .....?
Necessary bodily functions 2
Other correct answer 1
Incorrect; DK; tells difference 0

add above 3 scores then circle the answer

SIM
6
5
4
3
2
1
0

16a. WHAT ACTIONS WOULD YOU TAKE IF YOU SAW YOUR NEIGHBOR'S HOUSE CATCHING FIRE?
(prompt "WHAT ELSE MIGHT YOU DO?" once only, if necessary)

1 point for each category of actions: 0 1 2

b. WHAT ACTIONS WOULD YOU TAKE IF YOU LOST A BORROWED UMBRELLA?

1 point for each category of actions:
* Inform/Apologize
* Replace/Compensate 0 1 2

c. WHAT WOULD YOU DO IF YOU FOUND AN ENVELOPE THAT WAS SEALED, ADDRESSED AND HAD A NEW STAMP?
Mail 2
Try to locate the owner 1
Inappropriate action 0

add above 3 scores then circle the answer ——►

JGMT
6
5
4
3
2
1
0

17a. REPEAT EXACTLY WHAT I SAY: "HE WOULD LIKE TO GO HOME." (2 sec)
Correct 2
1 or 2 missed or wrong words 1
>= 3 missed or wrong words 0

RPTA

(for each part of 17b, score 1 only if repeated exactly as given)

b. NOW REPEAT ..... (3 sec)
"THIS YELLOW CIRCLE [0 1]
IS HEAVIER THAN [0 1]
BLUE SQUARE" [0 1]

Add above 3 scores then circle the answer ——►

RPTB
3
2
1
0

CASI – Cognitive Abilities Screening Instrument *HHP Version E-2.0 Record Form page 3 of 4*

18. PLEASE DO THIS:
(Point to statement "RAISE YOUR HAND")
(allow up to 5 sec for each stage)

READ

Raises hand without prompting	3
Raises hand after prompting	2
Reads correctly, but does not raise hand	1
Neither reads nor obeys	0

19. LET ME HAVE A SAMPLE OF YOUR HANDWRITING.
PLEASE WRITE:
(HE) WOULD LIKE TO GO HOME. (1 min.)
(may dictate 1 word at a time if necessary)

WRITE

0 1 2 3 4 5

20. PLEASE COPY THIS:
(show pentagons – 1 minute)

DRAW

	Left Pentagon	Right Pentagon
5 approx. equal sides	4	4
5 but un-equal (>2:1) sides	3	3
Any other enclosed figure	2	2
>= 2 lines but without closure	1	1
Less than 2 lines	0	0

Intersection:	
4-cornered	2
Not 4-cornered	1
No enclosure	0

Add above 3 scores then circle the answer ——▶

10 9 8 7 6 5 4 3 2 1 0

(note: for question 21, do not repeat any part of the command)
(use non-preferred hand) (6 sec)
21. TAKE THIS PAPER WITH YOUR

CMD

L (R) HAND	[0	1]
FOLD IT IN HALF, AND	[0	1]
HAND IT BACK TO ME.	[0	1]

Add above 3 scores then circle the answer ——▶

3 2 1 0

22. WHAT THREE WORDS DID I ASK YOU TO REMEMBER EARLIER?

RC2A

(3 sec) Spontaneous recall	3
(2 sec) After: "one word was something to wear"	2
After: "Was it SHOES, SHIRT or SOCKS?"	1
Still Incorrect	0

RC2B

(3 sec) Spontaneous recall	3
(2 sec) After: "one word was a color"	2
After: "Was it BLUE, BLACK or BROWN?"	1
Still Incorrect	0

RC2C

(3 sec) Spontaneous recall	3
(2 sec) After: "one word was a good personal quality"	2
After: "Was it HONESTY, CHARITY or MODESTY?"	1
Still Incorrect	0

23. WHAT DO WE CALL THIS PART OF THE FACE/BODY?
(2 sec each)

BODY

BROW / FOREHEAD	[0	1]	5
JAW / CHIN	[0	1]	4
SHOULDER	[0	1]	3
ELBOW	[0	1]	2
WRIST	[0	1]	1

Add above 5 scores then circle the answer ——▶ 0

24. WHAT IS THIS? *(show one at a time, any order OK)*
(Show item: 2 sec for answer; if unable, place in hand: 4 sec for answer)

OBJA

SPOON	[0	1]	2
COIN	[0	1]	1

Add above 2 scores then circle the answer ——▶ 0

OBJB

TOOTHBRUSH	[0	1]	3
KEY	[0	1]	2
COMB	[0	1]	1

Add above 3 scores then circle the answer ——▶ 0

(Total number of objects either named spontaneously or repeated correctly after coaching.) **RPNM**

0 1 2 3 4 5

25. REMEMBER THESE 5 OBJECTS!
(Wait for 5 sec.; cover, then ask:)
WHAT 5 OBJECTS DID I JUST SHOW YOU?
(Any order is OK, circle the correct ones.)

SPOON COIN TOOTHBRUSH KEY COMB
(If > 5 sec pause, stop testing)

RCOBJ

Number of correct answers ——▶ 5 4 3 2 1 0

Finish time (hr:min) ___ : ___ Duration (minutes) ☐☐

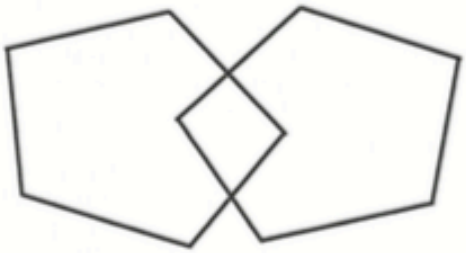
VALIDITY OF SCORE (best reason only)

Valid	1
Probably invalid: poor hearing	2
Probably invalid: poor eyesight	3
Probably invalid: impaired motor control	4
Probably invalid: language barrier	5
Probably invalid: impaired alertness or attentiveness	6
Probably invalid: significant physical or mental discomfort	7
Probably invalid: other reason, specify: (include coma, aphasia, PVS, etc)	8

CASI EXAM STATUS

All items completed	1
Partial (i.e. all items not done)	2
Unable to test (severe dementia/agitation)	3
Unable to test (severe deafness)	4
Unable to test (non-verbal)	5
Unable to test – other (specify):	6

RAISE YOUR HAND



APPENDIX 8. Assessment of Elderly Physical Functioning Questionnaire

ASSESSMENT OF ELDERLY PHYSICAL FUNCTIONING	**PPT ID No.**	**H**	**I**			
		N	**V**			

Scheduled Home Visit	**Follow-up Phone Interview**
Date (MM/DD/YYYY):	Date (MM/DD/YYYY):
Time (hr:min):	

I. CARE HOME INFORMATION (Completed with caregiver or CMA PRIOR to Home Visit)

A. Name of Caregiver (Last, First):

B. Total Number of Years Certified as a Caregiver or Care Home Operator: ☐☐ years

C. Address of Care Home (Street Name, City, State, Zip)

D. Phone Number:

E. Caregiver Demographic Information

a. Race/Ethnicity	1. White	9. Other Asian (Hmong, Laotian, Thai, etc)
	2. Black or African American	10. Native American, American Indian, Alaskan Native
	3. Asian Indian	11. Guamanian or Chamorro
	4. Chinese	12. Samoan
	5. Filipino	13. Other Pacific Islander (Fijian, Tongan, etc)
	6. Japanese	
	7. Korean	14. Other race
	8. Vietnamese	
b. Age (in years)	☐☐ years old	
c. Marital Status	1. Single / 2. Married / 3. Divorced / 4. Separated / 5. Widowed	
d. Highest level of education attained	1. Less than high school	4. Postsecondary non-degree award / 7. Master's degree
	2. High school diploma or equivalent	5. Associate's degree / 8. Doctoral or professional degree
	3. Some college, no degree	6. Bachelor's degree

II. PATIENT INFORMATION (Completed with caregiver or CMA PRIOR to Home Visit)

A. Name of Participant (Last, First):

B. Gender	0. Male	1. Female
C. Date of Birth (MM/DD/YYYY)	☐☐/☐☐/☐☐☐☐	
D. Age (in years) (must be ≥ 65 years to participate)	☐☐ years old	

E. Place of Birth (City, State)

F. Date of Admission to Care Home (MM/DD/YYYY)	☐☐/☐☐/☐☐☐☐

G. Have you ever experienced a slip, trip, or fall in the past? (Must answer **Yes** to participate)			0. No	1. Yes	
1. If yes, when was your most recent slip, trip or fall? (MM/YYYY)			☐☐/☐☐☐☐		
H. Insurance Status	1. Medicaid	2. Medicare	3. Private	4. Other: _____	
I. Race/Ethnicity	1. White		9. Other Asian (Hmong, Laotian, Thai, etc) _____		
	2. Black or African American		10. Native American, American Indian, Alaskan Native		
	3. Asian Indian		11. Guamanian or Chamorro		
	4. Chinese		12. Samoan		
	5. Filipino		13. Other Pacific Islander (Fijian, Tongan, etc) _____		
	6. Japanese				
	7. Korean		14. Other race _____		
	8. Vietnamese				
J. Marital Status	1. Single	2. Married	3. Divorced	4. Separated	5. Widowed
K. Highest level of education attained	1. Less than high school		4. Postsecondary non-degree award	7. Master's degree	
	2. High school diploma or equivalent		5. Associate's degree	8. Doctoral or professional degree	
	3. Some college, no degree		6. Bachelor's degree		

III. PHYSICAL ABILITY (Completed with caregiver or participant at home visit)

A. Do you use any walking aids?	(0) No aid			
	(1) Yes, wheelchair (as walking aid)			
	(2) Yes, walker			
	(3) Yes, quad cane			
	(4) Yes, other cane			
	(5) Other: _____			
B. Do you have any difficulty:	**No**	**Yes**	**Could do it, but don't for other reason**	**Unknown**
1. Walking one-half mile? (about 5-6 blocks)	0 (skip to 4)	1	2	9
2. Walking around in the house?	0	1	2	9
3. Getting out of bed or chair?	0	1	2	9
4. Walking up a flight of stairs? (about 10 steps)	0	1	2	9
C. Because of health or physical problems, do you have any difficulty with:				
1. Using the telephone?	0	1	2	9
2. Feeding yourself?	0	1	2	9
3. Dressing yourself?	0	1	2	9
4. Bathing or taking a shower?	0	1	2	9
5. Getting to or using the toilet?	0	1	2	9
D. Do you have any difficulty:				
1. Lifting or carrying something as heavy as 10 pounds? (such as a bag of groceries)	0	1	2	9
2. Reaching out and above your head with your arms?	0	1	2	9

IV. PHYSICAL ACTIVITY (Completed with caregiver or participant at home visit)	
A. What is the average number of hours you spend per day in:	
1. **No activity** - Sleeping or lying down	☐☐
2. **Heavy activity** - Activity that includes shoveling, digging, tennis, swimming laps, running, aerobics, lawn mowing, boxing, soccer, football, basketball, volleyball, mountain-climbing with weights.	☐☐
3. **Moderate activity** - Activity that concludes around the onset of sweating such as gardening, carpentry, painting, ballroom dancing, baseball, judo, yoga, aerobic dancing, ice-skating, croquet, mountain climbing without weights.	☐☐
4. **Slight activity** - Activity that does not induce sweating such as walking on level ground, window shopping, weeding, building light-weight fences (bamboo), badminton, golf, Frisbee, feeding livestock, window-washing, mopping floors, heavy cleaning, motor cycling.	☐☐
5. **Sedentary activity** - Sitting down such as sitting or standing, reading, eating, listening to music or watching TV.	☐☐
TOTAL (Total hours must equal 24)	☐☐
B. What kind of exercises is part of your daily (or weekly) routine? _____	(1) Endurance activity (eg., walking) (2) Strengthening exercises (3) Stretching exercises (4) Balance exercises
V. ELDERLY INJURY (Completed with caregiver or participant at home visit)	
A. Have you ever experienced a slip, trip, or fall?	(0) No (skip to **Elderly Assessment of Care Home**) (1) Yes
1. How many times have you experienced a slip, trip or fall?	Slip ☐☐ Trip ☐☐ Fall ☐☐
2. What room(s) did you experience this (these) slip(s), trip(s) or fall(s)? (Circle all that apply)	(1) Living room (2) Kitchen (3) Bedroom (4) Bathroom (5) Hallway (6) Staircase (7) Other: _____
B. Did you experience any fall-related injuries?	(0) No (skip to **Elderly Assessment of Care Home**) (1) Yes
1. What type of injuries? (Circle all that apply)	(1) Bruise(s) (2) Cut(s) (3) Fracture(s) (4) Broken bone(s)
C. Did you ever seek medical assistance for your fall-related injury?	(0) No (1) Yes (obtain medical information for C1-C5)

MEDICAL INFORMATION TO BE COMPLETED WITH OR OBTAINED FROM THE CAREGIVER OR CASE MANAGEMENT AGENCY	
1. How many times did the participant have a fall-related injury that required medical assistance?	☐☐ times
2. Of the __(C.1.)___ times the participant obtained medical assistance, how many times was the participant admitted to the hospital for fall-related injuries?	☐☐ times
3. In total, how many nights did the participant spend in the hospital for ALL fall-related injuries?	☐☐ nights
4. In total, what was the direct (non-Medicaid) medical cost for the fall-related injuries?	$☐☐☐,☐☐☐ Non-Medicaid costs
5. In total, what was direct (Medicaid) medical cost for the fall-related injuries?	$☐☐☐,☐☐☐ Medicaid costs

VI. MEDICAL HISTORY (Completed with caregiver or participant at home visit)

A. In the last 5 years, has a doctor told you that you had the following:

1. Heart attack or coronary
2. Coronary bypass surgery
3. Treatment of your coronary vessels with balloon angioplasty or stent
4. Congestive heart failure
5. Angina
6. Arrhythmia (skipped beats, fibrillation)
7. Other heart disease, specify _____
8. Serious head injuries with more than momentary loss of consciousness
9. Stroke (i.e., have you ever been weak or numb on one side of the body lasting over 24 hrs)
   a. Present (active or within 1 month)
      0. No 1. Yes, probable 2. Yes, possible
   b. Past (resolved or more than 1 month)
      0. No 1. Yes, probable 2. Yes, possible
   c. Total number of strokes _____
10. TIA (Transient Ischemic Attack or mini-stroke)
    (i.e., have you ever been weak or numb on one side of the body lasting less than 24 hrs)
   a. Present (active or within 1 month)
      0. No 1. Yes, probable 2. Yes, possible
   b. Past (resolved or more than 1 month)
      0. No 1. Yes, probable 2. Yes, possible
   c. Total number of TIAs _____

B. Have you ever been hospitalized for, or has a doctor ever told you that you have any of the following conditions

1. Memory problems
   0. No
   1. Yes (Current, under medical care)
   2. Yes (Current, not under medical care)
   3. Yes (Present only in the past)
2. Depression
   0. No
   1. Yes (Current, under medical care)
   2. Yes (Current, not under medical care)
   3. Yes (Present only in the past)
3. Other psychiatric illness or nervous breakdown, specify: _____
   0. No
   1. Yes (Current, under medical care)
   2. Yes (Current, not under medical care)
   3. Yes (Present only in the past)
4. Parkinson's Disease
   0. No
   1. Yes (Current, under medical care)
   2. Yes (Current, not under medical care)
   3. Yes (Present only in the past)
5. Diabetes Mellitus or high blood sugar
   0. No
   1. Yes (Current, under medical care)
   2. Yes (Current, not under medical care)
   3. Yes (Present only in the past)

VII. ELDERLY ASSESSMENT OF THE CARE HOME (MUST BE COMPLETED with elderly participant at home visit)

A. On a scale of 1 to 5, how is this current care home at,…	Poor	Fair	Average	Good	Excellent
1. Helping you exercise at least 30 minutes per day?	1	2	3	4	5
2. Helping you adhere to your medication regimen?	1	2	3	4	5
3. Reducing trip or fall hazards in the care home?	1	2	3	4	5

VIII. POST EXAM COMMENTS BY STUDENT INVESTIGATOR	
A. Did the participant have an impairment of hearing that interfered with the examination? (If hearing aid is worn, assess level of impairment with use of aid)	0. No 1. Mild 2. Moderate 3. Severe
B. Did participant need to use an assistive device for hearing?	0. Did not need 1. Participant's own hearing aid used 2. Voice amplifier used 3. Poor hearing bt refused to try voice amplifier
C. Did the participant have an impairment of vision that interfered with the examination? (If glasses or contact lenses are worn assess level of impairment with use of aid)	0. No 1. Mild 2. Moderate 3. Severe
D. Did the participant have an impairment of speech that interfered with his/her ability to answer questions?	0. No 1. Yes 2. Mixed/Uncertain
E. Did the participant seem awake and alert?	0. No 1. Yes 2. Mixed/Uncertain
F. Did the participant seem oriented, and did he/she seem to understand the questions and instructions?	0. No 1. Yes 2. Mixed/Uncertain
G. Was the participant's affect and behavior generally appropriate and normal?	1. Yes 2. Appeared depressed 3. Appeared agitated 4. Other unusual/inappropriate affect: _____
H. In your judgment, did the participant try to answer questions and carry out instructions to the best of his/her ability?	0. No 1. Yes 2. Mixed/Uncertain
I. Source of information If "Other" or "Mixed", specify _____	1. Self 2. Spouse 3. Other 4. Mixed
J. How much of the interview was provided by the caregiver?	0. None 1. Some 2. Most 3. All
K. If any answer other than "None" is given to question J what was the main reason for information being given by the caregiver?	1. Participant had a problem with speech such as stroke or mechanical problem with mouth or throat 2. Participant confused or unable to remember information 3. Participant had other mental problem 4. Other:
L. Was the examination completed?	0. No 1. Yes
M. If examination was not completed, what was the main reason?	1. Physical or sensory problems 2. Mental or cogn tive problems 3. Emotional problems, like irritation, anger, agitation, anxiety 4. Fatigue 5. Illness 6. Scheduling conflict 7. Reasons unrelated to participant (i.e., equipment failure) 8. Other:

APPENDIX 9. Medications and Vitamins List

MEDICATIONS and VITAMINS **(Completed with caregiver or participant)**	**PPT ID No.**	**H**	**I**			
		N	**V**			

In the past 2 weeks, have you taken any medicines on a regular basis at least once daily or once every other day (including all prescription, non-prescription, and herbal medicines).

A. Name of Medication	**Name of Physician**	**Daily**	**Every other day**	**At least once a week**	**Expired? Y(1)/N(0)**	
1)		1	2	3	Y	N
2)		1	2	3	Y	N
3)		1	2	3	Y	N
4)		1	2	3	Y	N
5)		1	2	3	Y	N
6)		1	2	3	Y	N
7)		1	2	3	Y	N
8)		1	2	3	Y	N
9)		1	2	3	Y	N
10)		1	2	3	Y	N
11)		1	2	3	Y	N
12)		1	2	3	Y	N
13)		1	2	3	Y	N
14)		1	2	3	Y	N
15)		1	2	3	Y	N
16)		1	2	3	Y	N
17)		1	2	3	Y	N
18)		1	2	3	Y	N
19)		1	2	3	Y	N
20)		1	2	3	Y	N

B. Total # of medications ☐☐	**C. Medications available for inspection**	
	No	0
	Yes, some	1
	Yes, all	2

D. Is the ppt taking any of the following classes of meds? **[TO BE COMPLETED BY CMA RN]**

		No	**Yes**	**Unk**			**No**	**Yes**	**Unk**
1	Benzodiazepines	0	1	9	**10**	Anticonvulsants (dilantin, etc)	0	1	9
2	Other sedative hypnotics (barbiturates, etc)	0	1	9	**11**	Opiates (percodan, etc)	0	1	9
3	Ambien	0	1	9	**12**	HI antihistamines (benedryl, etc)	0	1	9
4	Chloral Hydrate	0	1	9	**13**	Beta Blockers (inderal, etc)	0	1	9
5	Neuroleptics (thorazine, etc)	0	1	9	**14**	Diuretics	0	1	9
6	Tricyclic antidepressants (elavil, etc)	0	1	9	**15**	Alpha agnostics (clonidine, etc)	0	1	9
7	Selective serotonin reuptake inhibitors (paxil, etc)	0	1	9	**16**	ACE inhibitors (prinivil, etc)	0	1	9
8	Other antidepressants (MAO inhibitors, etc)	0	1	9	**17**	Cardiac glycosides (digoxin, etc)	0	1	9
9	Trazodone/Nefazodone	0	1	9	**18**	Other antihypertensives (calcium channel blockers)	0	1	9

		No	Yes	Unk			No	Yes	Unk
19	Statins	0	1	9	**35**	Dopamine agonists for PD -Pramipexole/Mirapex -Ropinirole/Requip -Perfolide/Permax -Entacapone/Comtan -Bromocriptine/Parlodel	0	1	9
20	Alpha blockers (Flomax, Hytrin, Cardura)	0	1	9			0	1	9
21	Proscar	0	1	9			0	1	9
22	Methylxanthines (theophylline, etc)	0	1	9			0	1	9
23	Oral sympathomimetics	0	1	9	**36**	Other PD meds -Symmetral, Amantadine, etc	0	1	9
24	Inhaled sympathomimetics (albuterol MDI, etc)	0	1	9	**37**	Cholinesterase Inhibitors -Tacrine/Cognex -Donepezil/Aricept -Rivastigmine/Exelon -Galantamine/Reminyl	0	1	9
25	Other inhaled asthma medications (inhaled steroids, atrovent)	0	1	9					
26	Systemic Corticosteroids (prednisone, etc)	0	1	9	**38**	Ginkgo biloba	0	1	9
27	Diabetes Pills	0	1	9	**39**	Other herbal meds	0	1	9
28	Insulin (any type)	0	1	9	**40**	Vitamin E	0	1	9
29	H2 blockers	0	1	9	**41**	Other anti-platelet agents -Ticlid/Ticlopidine, Plavix/Clopidogrel, Aggrenox, Persantine	0	1	9
30	Aspirin	0	1	9					
31	Cox 2 inhibitors	0	1	9					
32	Other NSAIDs	0	1	9					
33	Sinemet	0	1	9	**42**	Coumadin/Warfarin	0	1	9
34	Selegiline	0	1	9	**43**	Namenda/Memantine	0	1	9

Were MEDICATIONS and VITAMINS list completed?	0	No	If "No", specify reason(s):
	1	Yes	

APPENDIX 10. Trip and Fall Visual Assessment

TRIP & FALL VISUAL ASSESSMENT			**PPT ID No.**	**H**	**I**			
				N	**V**			
(Note: 0- absent, 1- present, 99- not applicable)	**Living Room**	**Kitchen**	**Bedroom**	**Bathroom**	**Hallway**	**Staircase**
1. Room Measurement (ft x ft)						
2. Dark or poor lighting						
3. Lack of night lights						
4. Exposed telephone/electrical cords						
5. Insufficient Height (inches)						
a. Bed not between $20 \geq x \geq 23$ inches						
b. Toilet not above $x \geq 17$ inches]						
6. Clutter (1-Low, 2-Med, 3-High)						
7. Lack of non-slip rugs/carpet						
8. Lack grab bars (T-Toilet, S-Shower)						
9. Uneven or slippery flooring						
10. Lack of sturdy plastic seat						
11. Lack of sturdy handrails (1-one side handrails, 2-no handrails)						
Were TRIPS & FALLS VISUAL ASSESSMENT completed?	0	No	If "No", specify reason(s):			
	1	Yes				

APPENDIX 11. Caregiver Trip and Fall Test

CAREGIVER TRIP AND FALL TEST	PPT ID No.	H I N V			
		True		False	
1. It is important to know the side effects of all the medication that your patient is taking.		**1**		0	
2. It is important to talk to your patients' primary medical doctor about ways to reduce trips and falls due to medication.		**1**		0	
3. It is ok to give your patient expired medication because it is still somewhat effective.		1		**0**	
4. It is best for your patients' primary medical doctor to regularly assess his/her medication.		**1**		0	
5. Reducing clutter does not reduce trip or fall hazards in the home.		1		**0**	
6. Having your patient exercise everyday for at least 30 minutes reduces his/her risk of falling.		**1**		0	
7. Nightlights can prevent your patient from tripping or falling.		**1**		0	
8. Installing a raised toilet seat does not prevent falls.		1		**0**	
9. Installing grab bars on walls around the tub and beside the toilet should be strong enough to support your patients' weight.		**1**		0	
10. Handrails in the hallway and staircase are not necessary as long as the patient uses a walking aid, such as a cane.		1		**0**	
11. Adjusting the height of your patients' bed can help your patient get in and out of bed easily.		**1**		0	
12. Having rugs and carpets with non-slip tape can prevent trips and falls.		**1**		0	
13. Exposed telephone and electrical cords may be a trip or fall hazard.		**1**		0	
14. If your patient falls and does not get hurt, it is not necessary to report the fall to your case management agency.		1		**0**	
15. Fall-related injuries are not common types of injuries among the elderly.		1		**0**	
Total Correct		_____ / 15			

APPENDIX 12. Injury Prevention Checklist

INJURY PREVENTION CHECKLIST	**PPT ID No.**	**H**	**I**			
		N	**V**			

1. The following rooms given automatic nightlights and non-slip grip tape…

	A. Automatic Nightlights	**B. Non-slip Grip Tape**
a. Living Room	Yes / No	Yes / No
b. Kitchen	Yes / No	Yes / No
c. Bedroom	Yes / No	Yes / No
d. Bathroom	Yes / No	Yes / No
e. Hallway	Yes / No	Yes / No
f. Staircase	Yes / No	Yes / No

3. ☐ Barnett Stay Safe Stay Active Daily Exercise Program (Stage 1 & 2) exercise DVD
-Please have elderly participant exercise everyday for 30 minutes

4. Reduce clutter in the following rooms…
- ☐ Living Room
- ☐ Kitchen
- ☐ Bedroom
- ☐ Bathroom
- ☐ Hallway
- ☐ Staircase

5. Medication:
- ☐ Know side effects of medication
- ☐ Discard expired medication
- ☐ Speak to elderly participants Primary Medical Doctor about ways to reduce trip and falls due to medication
- ☐ Have Primary Medical Doctor regularly assess elderly participants medication

6. Suggested safe height for the…
- ☐ Bed [Between 20 and 23 inches]
- ☐ Toilet [Greater than 17 inches]

7. Suggested to install the following…
- ☐ Grab bars in Shower / Toilet
- ☐ Sturdy plastic seat in shower
- ☐ Sturdy handrails in Hallway / Staircase

APPENDIX 13. Barnett Stay Safe Stay Active Daily Exercise Program

Stage 1 home program - Stay Safe Stay Active: Falls prevention in Primary Care 2001, SWSAHS.

Stay Safe Stay Active
Daily Exercise Program

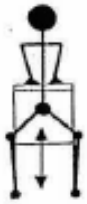
1. Warm up

2. Shoulder rolls (Flexibility)

3. March on spot (mobility)

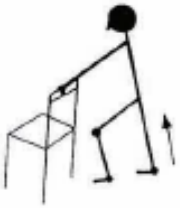
4. Ankle (strength)

5. Knee bend (strength)

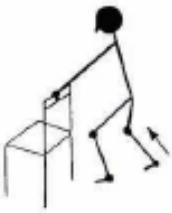


6. Sit to Stand (strength)

7. Calf (stretch)



8 Calf (stretch)



Thank you Sally Castell for your diagrams

Stay Safe Stay Active
Daily Exercise Program (Stage 2)

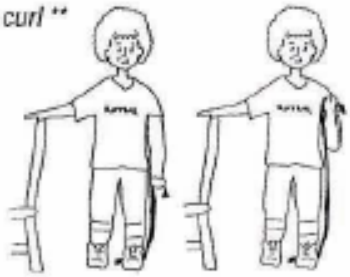
1. *Hip to the side* *

2. *Foot Circles* *

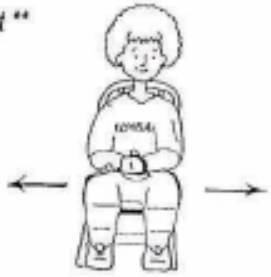
3. *Lift leg backwards* *

4. *Shoulder blade exercises* **

5. *Arm curl* **

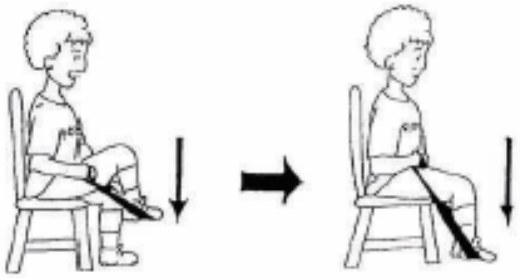


6. *Knees in and out* **



7. *Ankle Pumps* **

8. *Hip extension* **



Thank you to Stay on Your Feet* and Roybal - Boston University** for allowing us to use your diagrams

APPENDIX 14. Follow-up Phone Interview

FOLLOW-UP PHONE INTERVIEW (To complete 3 months after home visit)	**PPT ID No.**	**H** **I** **N** **V**				

IV. PHYSICAL ACTIVITY (Completed with caregiver or participant)	
A. Since our last visit, what is the average number of hours you spend per day in:	
1. **No activity** - Sleeping or lying down	☐☐
2. **Heavy activity** - Activity that includes shoveling, digging, tennis, swimming laps, running, aerobics, lawn mowing, boxing, soccer, football, basketball, volleyball, mountain-climbing with weights.	☐☐
3. **Moderate activity** - Activity that concludes around the onset of sweating such as gardening, carpentry, painting, ballroom dancing, baseball, judo, yoga, aerobic dancing, ice-skating, croquet, mountain climbing without weights.	☐☐
4. **Slight activity** - Activity that does not induce sweating such as walking on level ground, window shopping, weeding, building light-weight fences (bamboo), badminton, golf, Frisbee, feeding livestock, window-washing, mopping floors, heavy cleaning, motor cycling.	☐☐
5. **Sedentary activity** - Sitting down such as sitting or standing, reading, eating, listening to music or watching TV.	☐☐
TOTAL (Total hours must equal 24)	☐☐
B. Since our last visit, what kind of exercises is part of your daily (or weekly) routine? _____	(1) Endurance activity (eg., walking) (2) Strengthening exercises (3) Stretching exercises (4) Balance exercises (5) Stay Safe Stay Active Daily Exercise Program

V. ELDERLY INJURY (Completed with caregiver or participant)	
A. Since our last visit, have you experienced a slip, trip, or fall?	(0) No (skip to **Elderly Assessment of Care Home & Exercise Program**) (1) Yes
1. Since our last visit, how many times did you experience a slip, trip, or fall?	Slip ☐☐ Trip ☐☐ Fall ☐☐
2. What room(s) did you experience this (these) slip(s), trip(s) or fall(s)? (Circle all that apply)	(1) Living room (2) Kitchen (3) Bedroom (4) Bathroom (5) Hallway (6) Staircase (7) Other:
B. Did you experience any fall-related injuries since our last visit?	(0) No (skip to **Elderly Assessment of Care Home & Exercise Program**) (1) Yes
1. What type of injuries? (Circle all that apply)	(1) Bruise(s) (2) Cut(s) (3) Fracture(s) (4) Broken bone(s)
C. Since our last visit, did you seek medical assistance for your fall-related injury?	(0) No (1) Yes (obtain medical information for C1-C5)

MEDICAL INFORMATION TO BE COMPLETED WITH OR OBTAINED FROM THE CAREGIVER OR CASE MANAGEMENT AGENCY	
1. Since our last visit, how many times did the participant have a fall-related injury that required medical assistance?	☐☐ times
2. Of the __(C.1.)___ times the participant obtained medical assistance, how many times was the participant admitted to the hospital since our last visit for fall-related injuries?	☐☐ times
3. In total, how many nights did the participant spend in the hospital for ALL fall-related injuries since our last visit?	☐☐ nights
4. In total, what was the direct (non-Medicaid) medical cost for the fall-related injuries since our last visit?	$☐☐☐,☐☐☐ Non-Medicaid costs
5. In total, what was direct (Medicaid) medical cost for the fall-related injuries since our last visit?	$☐☐☐,☐☐☐ Medicaid costs

VII. ELDERLY ASSESSMENT OF THE CARE HOME & EXERCISE PROGRAM (MUST BE COMPLETED with elderly participant)

A. Since our last visit, on a scale of 1 to 5, how is this current care home at….	Poor	Fair	Average	Good	Excellent
1. Helping you exercise at least 30 minutes per day?	1	2	3	4	5
2. Helping you adhere to your medication regimen?	1	2	3	4	5
3. Reducing trip or fall hazards in the care home?	1	2	3	4	5

B. Have you been using the Stay Safe Stay Active Daily Exercise Program?	(0) No (STOP) (1) Yes, Stage 1 only (2) Yes, Stage 1 and 2
1. How often do you use the Stay Safe Stay Active Daily Exercise Program?	(1) Everyday (2) Every other day (3) 1-2 times per WEEK (4) 1-2 times per MONTH or less
2. What do you like and/or dislike about the Stay Safe Stay Active Daily Exercise Program? _____	
C. In your opinion, has the Stay Safe Stay Active Daily Exercise Program help you trip and fall less or less often than before?	(0) No (1) Somewhat (2) Yes (99) I don't know

APPENDIX 15.

Table 57. Summary of Results (Hypothesis 1-7) for Elderly Men and Women Living in the Hawaii AFCH System

Hypothesis No. (Type) *Statistical Test*	**Elderly Men, Elderly Women**	**Both Elderly Men & Women**
Hypothesis 1 (Cognitive Function) *Multiple Regression*	MEN There is an **inverse relationship** between cognitive function and the number of STFs.*	There is a **inverse relationship** between cognitive function and the number of STFs.***
	WOMEN There is an **direct relationship** between cognitive function and the number of STFs.**	
Hypothesis 2 (Number of Medication) *Simple Linear Regression*	MEN There is **no relationship** between the number of medication and the number of STFs.	There is a **direct relationship** between the number of medication and the number of STFs.
	WOMEN There is **no relationship** between the number of medication and the number of STFs.	
Hypothesis 3 (Home Safety Hazards) *Chi-Square Test*	MEN & WOMEN The **lack of sturdy handrails** in the hallway among **elderly men is less than those of elderly women**.	Not applicable
Hypothesis 4 (Caregiver's Knowledge of Trip & Fall-Related Hazards) *Multiple Regression*	MEN There is a **direct relationship** between the caregiver's knowledge of STF-related hazards and the number of STFs.^	There is a **direct relationship** between the caregiver's knowledge of STF-related hazards and the number of STFs.^^
	WOMEN There is **no relationship** between the caregiver's knowledge of STF-related hazards and the number of STFs.	
Hypothesis 5 (Pre- and Post-Intervention Physical Activity) *Multiple Regression*	MEN PRE: There is **no relationship** between pre-intervention physical activity and the number of STFs. POST: There was an **inverse relationship** (moderate activity & sedentary activity) and a **direct relationship** (slight activity) between post-intervention physical activity and the number of STFs.	There is **no relationship** between pre-intervention physical activity and the number of STFs.
	WOMEN PRE: There is **no relationship** between pre-intervention physical activity and the number of STFs. POST: There is **no relationship** between post-intervention physical activity and the number of STFs.	There is **no relationship** between post-intervention physical activity and the number of STFs.
Hypothesis 6 (Pre- and Post-Intervention Assessment of the Care Home Caregiver) *Wilcoxon signed rank test*	MEN PRE: Assessment of the caregiver **helping the elderly participant exercise at least 30 mins/day increased** from pre- to post-intervention. POST: Assessment of the caregiver **reducing slip, trip, and fall hazards increased** from pre- to post-intervention.	Assessment of the caregiver **helping the elderly participant exercise at least 30 mins/day increased** from pre- to post-intervention.
	WOMEN PRE & POST: Assessment of the caregiver **helping the elderly participant exercise at least 30 mins/day increased** from pre- to post-intervention.	Assessment of the caregiver **reducing slip, trip, and fall hazards increased** from pre- to post-intervention.
Hypothesis 7 (Overall STF Risk) *Multiple Regression*	MEN There was an **inverse relationship** (cognitive function, moderate activity, slight activity, and sedentary activity) and a **direct relationship** (medication, caregiver knowledge) between overall STF risk and the number of STFs.~	There was an **inverse relationship** (cognitive function, caregiver knowledge, slight activity, sedentary activity) and a **direct relationship** (medication, moderate activity) between overall STF risk and the number of STFs.~~~
	WOMEN There was an **inverse relationship** (cognitive function, caregiver knowledge, slight activity) and a **direct relationship** (medication, sedentary activity) between overall STF risk and the number of STFs.~~	

* Model adjusted for age, single, married, divorced, Caucasian, Multiethnic, less than high school, some college (no degree), Associate's degree, Bachelor's degree, Master's degree, and stroke; ** Model adjusted for age, single, married, divorced, separated, Caucasian, Chinese, Multiethnic, less than high school, some college (no degree), post-secondary non-degree award, Associate's degree, Bachelor's degree, and stroke; *** Model adjusted for age, male, single, married, divorced, separated, Caucasian, Chinese, Multiethnic, less than high school, some college (no degree), post-secondary non-degree award, Associate's degree, Bachelor's degree, Master's degree, and stroke; ^ Model adjusted for the caregiver's years of experience as a certified caregiver; ^^ Model adjusted for the caregiver's years of experience, the age of the caregiver, and the age of the elderly participant; ~ Model was adjusted for age of the elderly participant, single, married, divorced, Caucasian, Multiethnic, less than high school, some college (no degree), Associate's degree, Bachelor's degree, Master's degree, stroke, caregiver's years of experience, and age of the caregiver; ~~ Model adjusted for age of the elderly participant, single, married, divorced, separated, Caucasian, Chinese, Multiethnic, less than high school, some college (no degree), post-secondary non-degree award, Associate's degree, Bachelor's degree, stroke, caregiver's years of experience, and the age of the caregiver; ~~~ Model adjusted for age of the elderly participant, male, single, married, divorced, separated, Caucasian, Chinese, Multiethnic, less than high school, some college (no degree), post-secondary non-degree award, Associate's degree, Bachelor's degree, Master's degree, stroke, caregiver's years of experience, and the age of the caregiver.

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