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THE EFFECT OF AN ENVIRONMENTAL MODIFICATION ON FEAR OF FALLING IN INSTITUTIONALIZED OLDER PERSONS

by

JoAnn L. Munski

A THESIS

Submitted to
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ABSTRACT

THE EFFECT OF AN ENVIRONMENTAL MODIFICATION ON FEAR OF FALLING IN INSTITUTIONALIZED OLDER PERSONS

By

JoAnn L. Munski

The purpose of this investigation was to examine the effect of an environmental modification on fear of falling in institutionalized older persons. A pretest-posttest experimental design was used to analyze data collected on 40 residents of a long term care facility. The subjects were randomly assigned to either experimental or control groups. Fear of falling was measured by Dayhoff, Baird, Bennett, & Backer's Falling Questionnaire (1994). The experimental group received an environmental modification, The Pull, in their living area for six weeks while the control group did not receive any intervention. T-test and analysis of covariance were used to test the hypotheses. Posttest fear of falling scores were significantly lower for the experimental group than the control group after adjusting for the influence of the pretest measure on the posttest measure ($p < .05$). Several implications for nursing practice and research were identified.

This is dedicated to the spirit of ageing.

Be ageless
Live in the here and now.
Do not restrict yourself to a chronological age.

Acknowledgments

I am grateful for the contributions of some very special people. First, to my thesis chairperson, Katherine Kim, who never let me give up on this project and whose thoroughness helped me complete a project I am proud of. I am also thankful for the direction provided by Phyllis Gendler and gordon Alderink, the other members of my thesis committee.

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CHAPTER ONE

INTRODUCTION

Accidents are the 6th leading cause of death in people aged 65 years and older in the U.S., while falls constitute two thirds of these accidental deaths (Rubenstein & Josephson, 1992). Falls are associated with high mortality, high morbidity, high utilization of resources, and premature nursing home placement (Rubenstein, Josephson, & Robbins, 1994; Walker & Howland, 1991). Incidences of falls and their severity increase with age and functional limitation (Costa, 1991; Rubenstein, Robbins, Josephson, Schulman, & Osterweil, 1990). When older individuals reach the age of 79, falls become the leading cause of death (Ross, 1991).

As early as 1954, Seiler and Ramsay identified that morbidity due to falls significantly affected the elderly population. In 1991, Ross reported that with advanced age, fall-related mortality rates increased, more than doubling with each decade of life. The exact number of falls which occur is difficult to determine because most falls do not result in serious physical injury, so go unreported. Unfortunately, society accepts falls by the elderly as an anticipated and unavoidable part of aging. There are predictable normal age-related changes which occur, but falling may not be one of them.

In the numerous epidemiological studies on falls, investigators have reported that approximately one third of older adults living at home will fall each year. The incidence within institutions escalates: two thirds of residents will fall at least once per year. The mean fall incidence of long term care elderly residents calculated from these studies was about three times the rate for community-living elderly persons. Probable explanations include the more frail nature of persons living in institutions and more accurate reporting of falls within institutions (Rubenstein et al., 1994). Within the community, females fall at a ratio of two to one compared to males, although within an institution the numbers remain equivalent (Rubenstein et al., 1994).

Mortality related to falls appears not to be a direct consequence of the fall, but rather a consequence of fall related complications, such as sepsis arising from immobility-induced pressure ulcers or urinary tract infections. The majority of deaths occur weeks to months after the fall (Morfitt, 1983). In a 1983 study, Rubenstein reported that 17-50% of older people suffering a fall-related injury requiring the attention of a hospital or emergency department died within one year of their fall.

Each year, about 1,800 fatal falls occur in nursing homes nationally. Among persons 85 years and older, one of five fatal falls occurs in a nursing home (Baker & Harvey, 1985). In 1991, the United States Department of Health and Human Services issued National Health Promotion and Disease Prevention objectives to reduce deaths from falls and fall- related injuries from 18 per 100,000 to 14.4 per 100,000 among those 45-84 years of age by the year 2000.

Although fall-related mortality rates increase with age, the majority of falls occurring to the elderly do not end in death. The physical injuries associated with falling include soft tissue changes, subdural hematoma, dehydration and pneumonia from a "long lie" and fractures. The incidence of injuries sustained as a result of a fall is reported to be between 6% and 20% (Nevitt, Cummings, & Hudes, 1991; Tinetti, Speechley, & Ginter, 1988). Common fracture sites include the wrist, humerus, pelvis, and hip. Only 1% of falls result in a hip fracture, but such fractures account for a large share of the disability, death, and medical costs associated with falls (Cummings & Nevitt, 1994). Nursing home residents also have a disproportionately high incidence of hip fractures and have been shown to have higher mortality rates after hip fracture than community-living persons (Rhymes & Jaeger, 1988). Furthermore, because of the high frequency of recurrent falls in nursing homes, the likelihood of sustaining an injurious fall is substantial.

Urton (1991) reported the actual costs of 200,000 hip fractures within a year to be $2 billion for institutional care alone. In the U.S., the indirect and direct costs of falls each year has been estimated from $75 billion to $100 billion. In addition to physical injuries, falls can have serious consequences on physical functioning and quality of life. One factor that has gained importance in the current literature is the fear of falling (Walker & Howland, 1991). The fear of falling can further complicate and contribute to risk factors for falls (Walker & Howland, 1991). The fear of falling may lead to a debilitating spiral, marked by a loss of confidence, reduced activity, deconditioning, weakness of muscle, bone resorption, and weakening resulting, ultimately, in a loss of independence (Outslander, Osterweil, & Morley, 1991; Rubenstein et al., 1990). Almost 50% of those

who had experienced a fall reported having a fear of falling and 25% avoided certain activities because of this fear (Ceder, Svenson, & Thorngren, 1980). A discrepancy between the subjective performance measures of functional status and the actual ability to carry out activities in daily life is frequently observed in elderly patients residing in nursing homes (Franzoni, Rossini, Boffelli, Frisoni, & Trabucchi, 1994).

Falls arise from the complex interplay between an individual, his or her physical state, and the created or natural environment. This interaction is determined by age, disease, activity level, and the presence of hazards in the environment. Falls are experienced with increasing frequency as an individual ages. Environmental interventions, and medical management and modification decrease the number of falls, increase mobility, and the ability to perform activities of daily living (ADLs) (Tinetti et al., 1994). The most familiar environmental modifications include grab bars in bathrooms, reflective tape or paint on step edges, and non-skid surfaces on ramps. There is limited research on the effects of environmental modification alone on falls and the fear of falling.

The purpose of this study was to evaluate the impact of a specific environmental intervention on an elderly person's fear of falling, and the number of falls experienced. The interventional device is The Pull (Appendix A). The Pull is a platform, large enough to set a chair on, with a cane handle attached. The platform may be placed under a chair, bed or commode, at arm's length from the handle. The cane handle is adjusted to the user's hip height. The individual is able to sit in the chair, grab the handle and, using his or her legs and arms, come to a standing position with the weight of transfer divided between the upper body and legs. Standing in front of the chair on the platform while holding on

to the stationary cane handle provides the stability to transfer from a sitting to a standing position while allowing three point fixation for balance.

The ease with which individuals are able to pull themselves up from a sitting position as well as the support The Pull provides upon standing has the potential to increase ability to stand from a seated position. The increased ability experienced upon transferring may reduce the individual's fear of falling thus decreasing the threat to mobility and limitation of activities.

Purpose

The purpose of this study was to answer the following questions:

1. What effect does an environmental intervention (The Pull) have on fear of falling in residents living in a long term care institution?
2. What is the relationship between transfer ability and fear of falling?
3. What is the relationship between specific demographic variables and fear of falling in the elderly?

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Conceptual Framework

The value in organizing nursing interventions according to a conceptual framework has been supported in the literature. Lazarus (1984) developed a model of stress and coping which provides the framework for this study, linking the concepts of stress, coping and appraisal of the environment. Dayhoff, Baird, Bennett, and Backer (1994) utilized Lazarus' theoretical model in the development of the Falling Questionnaire (FQ) used in this study. The Falling Questionnaire was developed to measure a person's fear of falling upon an appraisal of his or her environment (Appendix B).

The relationship between a person and his/her environment is the foundation of Lazarus' theory of cognitive appraisal of stressful events (Lazarus & Folkman, 1984). Fear, as it relates to fear of falling, is a core relational theme described in Lazarus' Cognitive Motivation Relational Theory (1991). Theoretically, Lazarus would support an environmental intervention in preventing falls, thus decreasing the fear of falling.

According to Lazarus (1984), "psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 21). The two

critical processes that mediate the person-environment relationship are cognitive appraisal and coping. Lazarus defined cognitive appraisal as, "an evaluative process that determines why and to what extent a particular transaction or series of transactions between the person and the environment is stressful (p. 19)". Coping is the process through which the individual manages the demands of the person-environment relationship that are appraised as stressful and the emotions they generate.

Within this theory, appraisals of the person-environment relationship is defined as a core relational theme in which specific emotions are associated. The emotion of fear or harm is attached to the core relational theme of "concrete and sudden danger of imminent physical harm" in Lazarus' theory (1991, p.235). The theme of harm arises from individual appraisal of an event in terms of the significance in relationship to personal goals and perceived coping potential. This includes the appraisal of personal and external resources that could be used to avoid or escape the danger. Goal incongruence such as a threat to bodily integrity by a sudden concrete harm can cause a negative emotion (fear) (Appendix C).

Variation in intensity of emotions among people reflects differences in their appraisal, both in content and in the strength with which a person makes an appraisal. According to Lazarus (1991), appraisals always precede emotions; therefore, when fear is described, it can be assumed that a specific appraisal has been made.

It is believed that fear of falling and variations in fear are a result of the appraisal of what harm might occur as a result of a fall, the perceived coping potential to control or prevent harm, the seriousness of the harm, and the emotion of fear. A series of negative

encounters with the environment can provoke acute emotions that over time contribute to longer lasting moods. An individual who has difficulty rising from a chair and experiences stumbling or initial loss of balance upon rising repeatedly feel acute negative emotions. The individual may fear "sudden, concrete harm" as a result of a potential fall.

Lazarus' theory (1991) supports the spiral of declining elder mobility resulting from a fear of falling. Coping potential refers to whether and how the person can manage the demands of the encounter with the environment. Coping potential is not actual coping but only an evaluation by a person of the prospects for doing or thinking that will change or protect the person-environment relationship.

This study will examine what the effect of a specific environmental modification, The Pull, could have on an elderly individual's fear of falling. Enhancement of the environment will alter the perception of the environment, personal resources and experience, and ability to transfer from a sit to a stand.

Literature Review

A literature search was performed to explore the research on falls, fear of falling, fall efficacy, factors associated with falling, and environmental modifications. The review of literature is arranged to: 1) examine the various factors associated with falls in the aging person in general and specifically long term care residents; 2) present factors associated with serious injury occurring with a fall of the institutionalized older person; 3) explore the locations where falls occur; 4) determine how fall prevention and injury prevention interventions are evaluated; and 5) examine the various definitions authors have given to fear of falling.

Factors Associated with Falls

There are many causes of falls in the elderly. Speechley and Tinetti (1990) have suggested that factors influencing falls may be categorized as either intrinsic or extrinsic. Intrinsic factors, also called host factors (Hindmarsh & Estes, 1989), include characteristics found within the individual. These characteristics are physiological or pathological (Ross, 1991). Extrinsic factors are environmental factors (Hindmarsh & Estes, 1989; Perry, 1982).

In a study by Lach et al. (1991) reliability of a fall classification system was evaluated on elderly community dwellers. The falls in the four major categories of the classification system included; falls related to extrinsic factors (55%), falls related to intrinsic factors (39%), falls from a non-bipedal stance (8%) and unclassified falls (7%). Intrinsic physiological risk factors associated with normal aging include: impairment of vision, hearing, and neurologic system - impaired sensory awareness, psychomotor slowing, altered vestibular function, musculoskeletal joint stiffness, and decreased muscle strength. Intrinsic pathological risk factors are disorders in cardiovascular, neurological, metabolic, psychiatric, pulmonary, musculoskeletal, urological, nephrological, hematological, and endocrine systems. Side effects of medication, the misuse of alcohol, and pain are also classified as risks. The risk of falling can be increased by taking multiple medications (Hindmarsh & Endes, 1989; Tinetti, Speechley, & Ginter, 1988; Tinetti, Williams, & Mayewski, 1986) or by not taking medication as prescribed.

Extrinsic related falls are related to the environment. The environment of an older person contains numerous hazards that may either contribute to or be solely responsible

for fall causation. Extrinsic factors have been described by a number of authors in different ways. Lach and associates (1991) listed extrinsic factors to include polished floors, loose rugs, obstacles and articles of furniture. Extrinsic factors also relate to rooms in the house or institution, such as kitchen, bathroom, bedroom, stairs and hallways, and the outdoors where a majority of activities of daily living take place. Other extrinsic factors include poor lighting, assistive devices, clothing, and footwear.

Setting

The differences in fall risk are also dependent on the setting in which the elderly live. The distinction between community dwellers and institution residents, as they relate to fall risk, has evolved in the literature. There are empirically tested differences in fall risk between the two groups. A look at the common reasons elderly people are admitted to institutions substantiates the differences between the two categories and include decreased ability to independently perform activities of daily living such as toileting, decreased ability to transfer from sitting to standing, general activity intolerance, and decreased cognitive function.

The following characteristics have been summarized from the literature for community-dwellers:

1. A third to half of the subjects reported "falling" or "potential to fall."
2. Falling increased with age, however falls decreased in 80 to 90 years old.
3. Women were more likely to fall at a two to one ratio.
4. Isolated elderly (divorced, widowed, or single) are at greater risk.

5. The elderly treated for falls have increased risk of hospitalization, death, or long-term immobility (Exton-Smith, 1977; Tinetti, 1988).

In a prospective case control study by Waller (1978) comparing two groups of community dwellers, group I were patients admitted to the emergency department after having fallen while group II was a random sample of elderly individuals living in their home within the same community. Waller found that 30% of the group II community controls reported falling in the previous year. Thirty percent of the persons who had fallen reported the primary cause had been an acute or chronic health problem. Thirteen percent admitted ingestion of alcohol before the fall. Among the healthy elderly, rough or slippery ground accounted for 54% of falls compared to the sick elderly in whom this factor accounted for only 14% of falls. The author concluded that falling was common among the elderly and represented a serious problem particularly among the sick elderly.

Tinetti, Speechley, and Ginter's (1988) study on risk factors for falls among elderly persons living in the community included a detailed evaluation of fall causation, including standardized measures of mental status, strength, reflexes, balance, and gait, in addition to the subjects' homes being inspected for fall hazards. Predisposing factors for falls identified in order of significance included; sedative use, cognitive impairment, disability of the lower extremities, abnormalities of balance and gait, and foot problems. The authors found the risk of falling increased linearly with the number of risk factors, from 8% with none to 78% with four or more risk factors ($p < .0001$) (Tinetti et al., 1988).

Research on falls and fall causation for the institutionalized elderly has been more prolific for community dwellers due to the mandated reporting of falls through incident

reports. As early as 1966, Rodstein reported 25 percent of the residents of one institution fell during a six-month study period. Twenty percent of all falls occurred during acute illness (heart attack, stroke, pneumonia) and 30 percent during chronic illness. The most frequent circumstances of falling were transfers into or out of bed and off chairs or wheelchairs. Rodstein found most of the residents were receiving tranquilizers, but the falls did not occur during the time of maximal effect (1978).

In a follow-up study, Rodstein (1978) found that environmental hazards directly caused only 11 out of 140 falls. In a more dependent population of subjects (assisted living) compared to more active residents (independent living) illness was implicated in a greater number of falls, and transfer was often the precipitating event.

Factors associated with serious injury during falls by ambulatory institutionalized residents were described by Tinetti in 1988. In this descriptive study, neither age, sex, baseline morale score, specific diagnosis, postural blood pressure, visual acuity, balance and gait assessment, nor medication use distinguished injured from noninjured fallers. Most falls (84%) occurred during basic activities such as walking or rising from a chair.

In general, Tinetti and associates (1988) describe a person at risk for falls as having the following risk factors; cognitive impairment, history of a previous fall, use of sedatives, balance and gait problems, any lower extremity impairment, and presence of foot problems. The use of benzodiazepines, phenothiazine, and antidepressants increased the risk of falling, independent of other risk factors. The risk of falling increased as the number of risk factors increased, but the risk of falling was reduced by modifying even a few factors (Tinetti et al., 1994).

There is growing evidence supporting a relationship between the onset of acute illness and an increased incidence of falling. In a retrospective study by Kuehn and Sendelweck (1995), data suggested a more definitive link of acute illness to increase number of falls. The authors also found a correlation of decreased mobility, general weakness and physical instability to an increased number of falls. These aspects of functional ability, were also found to be major risk factors in determining the potential for falls (Kippenbrock & Soja, 1993; Tinetti, Speechley, & Ginter, 1988).

Elderly functional ability is the key for distinguishing level of care categories within an institution. Kuehn and Sendelweck (1995) reported significant differences between the rate of falls for the Level I (independent) residents (mean = .071 falls per month) and the Level II (partially dependent) residents (mean = .245 falls per month). This suggested a greater vulnerability for those elders who were somewhat functionally compromised but still determined to maintain themselves as independent as possible. Barbieri (1983) noted, upon interviewing 25 subjects who had fallen, that none had asked for assistance before falling. These subjects were reported to value autonomy and independence.

Fall Location

In a more recent study on the epidemiology of adverse and unexpected events in the long-term care setting by Gurwitz, Sanchez-Cross, Eckler, and Matulis (1994), examination of circadian patterns on the incidence of falls, fall-related injuries, and non-fall related injuries were found to be related to resident care level. All resident care units were classified into levels of care based on the residents' ability to a). perform activities of daily living, and b). move about the facility independently. The three levels of care classification

include: independent, semi-dependent, and dependent. Falls were the most frequently reported incident (52.2%) of all the 3,390 adverse and unexpected events over the one year study period. Falls occurred most commonly during ambulation (46.8%). All sit to stand (from bed, wheelchair, chair, commode or toilet) transfers accounted for 46.9% of the falls. The annual incidence of falls per 100 beds varied substantially according to resident care level. Overall incidence rates were highest for semi-dependent (393 falls per 100 beds) followed by dependent (269 per 100 beds), and lastly, independent care residents (155 per 100 beds) (Gurwitz et al., 1994). These rates are consistent with those of previous reports of mean annual incidence rate of 169 falls per 100 beds (range, 65 to 360 per 100 beds) (Rubenstein et al., 1994),

Fleming and Pendergast (1993) studied physical condition, activity pattern, and environment as factors in falls by adult care facility residents requiring custodial care. In an institution where environmental hazards had been minimized (increased lighting, no path obstacles, even flooring throughout, appropriate furniture height), 294 falls occurred involving 95 residents during the three-year period. One hundred sixty seven falls (57%) occurred in the residents' rooms, 16% were in private or shared bathrooms, while 23% were associated with circulation areas such as hallways, elevators, doorways, and outdoor walkways. Stairways accounted for 4% of the falls.

The most common precipitating causes of the 294 falls were environmental factors (50%). The most common environmental factor was furniture at 50%, with walkers at 15%, followed by floor finish, stairs, footwear, and slippery or uneven flooring. The residents' physical conditions contributed to 24.3% of the total falls with dizziness, loss of

balance, and "collapsed knees" accounting for 81% of the falls. Falls were precipitated by physical activities in only 8% of the total fall occurrences. The primary risk factor associated with falls appeared to be interactions between physical condition of residents and the environment. A limitation of this study was the use of an incident report inconsistently filled out or incomplete which captured the description of fall by the resident and/or care giver over a three year period which were. In about 17% of the falls surveyed, no apparent cause was given. Some falls may not have been reported by residents, particularly if there were no injuries (Fleming & Pendergast, 1993).

Nursing home residents tended to fall at predictable periods during the day (Kalchthaler, Bascon, & Quintos, 1978). These peak periods coincided with peak resident activities such as waking in the morning, dining, toileting, or with nursing staff activities such as shift change or breaks.

The most common fall location in the hospital and institution is the bedroom (Kalchthaler et al., 1978; Tinetti et al., 1988; Uden, 1985). Studies have shown that most falls in nursing homes occur while transferring from a bed, chair, or wheelchair (Berry, Fisher, & Lang, 1981; Gryfe, Amies, & Ashley, 1977).

Transferring from a chair, wheelchair, or toilet are difficult maneuvers for the elderly to do. Difficulty getting up from a sitting position may be related to muscle weakness, arthritis, deconditioning, or neurologic disease. Instability upon standing, such as staggering or holding onto objects or another person, can be related to the presence of hypotension, sensory deficits, vertigo, or even joint or foot pain. There is a weak

correlation between overall physical strength and the individual's ability to perform various functional tasks (Tinetti & Ginter, 1990).

Changes in mobility occur gradually with age. Gait, balance control, and stability comprise the function of mobility and rely on the following factors: the ability to use visual, somatosensory, and vestibular inputs for postural stability, activation of appropriately organized postural muscle response synergies, use of adaptive mechanisms to shift the dominant sensory input controlling posture, and activation of postural muscles with sufficient force to correct for threats to balance (Woollacoot, 1993).

The use of an objective gait and balance assessment tool to measure changes in mobility has been refined by Tinetti (1986). Objective evaluation of performance of mobility activities by the elderly provides additional assessment information for fall risk and the gradual decline in mobility seen with ageing.

Fear of Falling

A study measuring the relationship between postural performance measured using 5 types of balance tests, and fear of falling was reported by Maki, Holliday, and Topper in 1991. There was correlation between specific body stances and maneuvers to fear of falling. Unfortunately, the causal relationship could not be ascertained: whether the fear of falling affected balance-test performance in an artifactual manner, or whether the fear and poorer performance were related to a true deterioration in postural control (Maki et al., 1991).

Poor mobility has been associated with fear of falling and depression (Franzoni et al., 1994; Tinetti, Richman, & Powell, 1990). Fear of falling may precede or may result

from a fall, and will increase the risk of falling. A fall event may initiate the cascade of decreased mobility, decreased activities of daily living, decreased body system functioning, and increased susceptibility to disease in the elderly. Bhala, O'Donnell, and Thoppil (1982) described ptophobia or the phobic fear of falling as the phobic reaction to standing or walking. Fear of falling can compromise quality of life, including loss of confidence, and lead to significant lifestyle changes, such as self- and externally imposed activity limitations, reduced social interaction, and impaired independence (Walker & Howland, 1991). The fear of falling itself can further complicate and contribute to risk factors for falls (Hindmarsh & Estes, 1989; Tinetti & Speechley, 1989; Tinetti et al., 1988; Walker & Howland, 1991).

In the study by Franzoni et al. (1994), which was part of a longitudinal study of residents' health status in a nursing home, the authors attempted to: identify the characteristics of people who have a fear of falling; investigate the association of this fear with the frequency of falls; and demonstrate the predictive value of fear of falling with respect to functional decline over 24 months' follow-up. The 54 subjects were assessed for fear of falling by answering a "yes" or "no" question. Patients in the fear and no fear groups were found to differ significantly on the Barthel Index for acitivities of daily living (ADL) assessment ($p = .05$), the Tinetti Gait and Balance Assessment Scale ($p = .04$), and the frequency of psychotropic drug use ($p = .01$). Subjects with a fear of falling were more impaired in activities of daily living (Barthel Index) and in postural and gait performance (Tinetti Assessment for Gait and Balance), and had increased use in number of psychotropic drugs (Franzoni et al., 1994). During the period leading to the follow-up

at 24 months, patients with fear fell more frequently than those with no fear. In the 24 month follow-up period, those subjects with a fear of falling at baseline showed a decline in functional status ($p = .003$). Thus in mobile patients, the fear of falling can be a clinically important predictor of functional decline.

Research on the operationalization of fear of falling for the purpose of determining the extent to which fear of falling exerts an independent effect on functional decline continues to gain importance in the literature. In a study by Arfken, Lach, Birge, and Miller (1994), examination of the prevalence of fear of falling in 890 elderly persons, ages 66 to 81+, living in the community was measured along with the association between number of falls, quality of life, and frailty of the individual. The extent of fear of falling was measured using the question, "At the present time, are you very fearful, somewhat fearful or not fearful that you may fall (again)?" Results showed the prevalence of fear increased with age and was greater in women.

After the effect of age and gender were removed, those who were very fearful of falling continued to have an elevated risk for worse quality of life on such measures as depressed mood, less than satisfied with life, and infrequently leaving the building. Those subjects who were very fearful of falling were most likely to be frail or have falls on all measures. Almost 85% of those subjects who were very fearful of falling had impaired balance ($N = 67$).

Instruments Measuring Fall Efficacy and Fear of Falling

Tinetti, Richman, and Powell (1990) developed the Falls Efficacy Scale to measure on a 0 - 10 scale how confident an individual is in performing certain activities such as

taking a bath or shower, and reaching into cabinets or closets. The authors equated lack of confidence in performing tasks with fear of falling (fall self-efficacy) which restrains the level of function in elderly persons. In other words fall self-efficacy is a predictor of actual behavior. Tinetti, Mendes de Leon, Doucette, and Baker (1994) measured fear of falling (yes / no) and fall-related efficacy (0 - 10 scale) in relationship to activities of daily living among community-living elders. Through multiple regression analysis the authors found a strong independent association between activities of daily living and lack of confidence, or fall self-efficacy (F = 101.17 (2, 1005) $p < .0001$). In contrast, fear of falling was only marginally related to ADLs. The mean fall related self-efficacy score was lower among fallers than non-fallers ($p < .0001$). In other words, the lower the fall efficacy score, the less confidence the individual had in his ability to perform tasks which was related to falls.

Dayhoff and associates (1994) challenged the use of low self-efficacy as a measure of a person's fear, so developed the Falling Questionnaire based on Lazarus' Cognitive, Motivational, Relational Theory (1991). Questions are posed in such a way as to allow individuals to reflect on thoughts and feelings about the possibility of falling in the next month and what that would mean to them. The answers were scored on a 0 - 4 scale based on how strongly they agreed or disagreed with the statement. The higher the score on the Falling Questionnaire, the greater fear of falling by the individual. Dayhoff et al. believed fear of falling was an emotion generated after an appraisal of the environment, and individual resources and experiences. Fear of falling was a complex emotion and can be interpreted as a lack of confidence or fear in performing singular tasks. Also, the

authors believed fear of falling could not be ascertained by posing a simple "are you afraid of falling" question which required a yes/no response.

Fall Assessment

Assessing circumstances surrounding a fall is important in the elderly population in order to uncover general health problems, specific conditions, and risk factors contributing to fall. Rubenstein, Robbins, Josephson, Schulman, and Osterweil (1990) utilized a postfall assessment to determine specific interventional strategies to reduce the incidence of falls within a long-term residential care facility. In the randomized controlled trial, 160 ambulatory subjects were randomly assigned to receive either a comprehensive postfall assessment or usual care. The assessment included a detailed physical examination, environmental assessment, laboratory tests, electrocardiogram, and 24-hour Holter monitoring. Probable cause or causes for the fall, identified risk factors, and fall prevention recommendations were made for the experimental group based on results of the assessment.

Fall rates between the two groups showed no significant difference (Rubenstein et al. 1990). The intervention group had a large reduction in hospitalization admission rates and days. The most common reasons for admissions for both groups were acute infections (31%), cardiac conditions (26%), and fractures (17%). There was a reduction in admissions of the three previously mentioned conditions for the intervention group. Subjects in the intervention group had 9% fewer falls and 17% fewer deaths than controls by two years, but these trends were not statistically significant (Rubenstein et al. 1990).

Additional risk assessment and fall prevention studies are underway. The national data base of injury prevention in the elderly, called FICSIT, or Frailty and Injuries: Cooperative Studies of Intervention Techniques, have accumulated data on a variety of interventions, including endurance, flexibility, and balance training, the use and effectiveness of hip pads, and nutritional supplementation (Buchner et al., 1993).

Fall prevention multifactorial interventional results from the FICSIT study to reduce the risk of falling among community dwellers have been reported by Tinetti et al. (1994). Preliminary results from the FICSIT study support the need for assessment and intensive treatment to reduce several risk factors for falling. The study reported a decreased risk of falling by 30% with a simultaneous reduction of fear of falling in community dwellers (Tinetti et al., 1994). As is generally the case with multifactorial interventions, the effectiveness of any one of them is uncertain. Cummings and Nevitt (1994) state, "Although it makes sense to create safer environments, we need to determine how effectively such changes reduce the risk of falling" (p. 872).

A summary of the literature reviewed on interventions indicated the concept of a one-size-fits-all fall prevention intervention is unrealistic although further development and evaluation of specific interventions, especially environmental modifications, is important. Grab bars, extra handrails, clearly marked steps, and sufficient space to maneuver are some of the environmental features that allow individuals to conduct their lives more safely (Dean & Ross, 1993; El-Faizy & Reinsch, 1994).

The environmental modification under study for this paper is named "The Pull." The Pull is designed to assist people who have lower extremity muscle weakness and find

it difficult to come to a stand from the sitting position (Langworthy, personal communication). The Pull provides a handle at hip height to help a person pull to a stand and have support while standing. It optimizes and maintains an individual's physical function, and was designed so arm muscles can help leg muscles while coming to a standing position thus utilizing a person's strengths to overcome his or her weaknesses (Appendix A). The Pull was invented by a medical doctor specializing in the study of Orthopaedic Surgery and who has a background in aeronautical design (Langworthy, personal communication, 1995).

A preliminary trial of The Pull occurred in a 410 bed acute care hospital. The purpose of the original trial was to determine patient populations which might benefit from using The Pull. In addition, a comparison of subjects' ease of transfer from sit to stand using the device versus not using the device was made from subjective and objective data. Twenty subjects, ages 48 to 85, participated in the trial. The primary diagnosis of hospitalization included below knee amputation, rib fracture, pelvic fracture, hemiarthroplasty related to hip fracture, stroke, and total hip or total knee replacement. Nurse evaluation of the subjects' transfer ability while using The Pull was favorable. All subjects improved in their ability to transfer, either progressing from a "standby assistance" to "independent transfer" or "needs assistance of 1 or 2" to "less assistance required" by using The Pull. The subjects expressed overall satisfaction in using The Pull for transfer (Munski & Langworthy, 1996).

In addition, patients were given the opportunity to use The Pull for a thirty day period at home upon discharge. Specific patient populations identified who benefited from

The Pull included individuals with Parkinson's disease, proximal muscle weakness, and extremity impairment which made transfers difficult.

In addition to the acute care setting, use of The Pull has been ongoing within the community over the past three years. Data which have been collected on 25 subjects were consistent with the results from the acute care setting. All subjects admitted to the community study (N = 25) were referrals from health care professionals familiar with the device. The prospective participants had either sustained a fall, experienced dislocated hip arthroplasty, or other post surgical complication. Two subjects utilized the Pull as a means to better facilitate wheel chair to chair transfer. Subjects had the option of rejecting the device if they felt it would not benefit them during the initial sit to stand evaluation. Anecdotal data collected from subjects and the subjects' family demonstrated increased independence for subjects within the home. Several family members reported they had significant burdens lifted off of them by having the use of The Pull. Eight of the subjects reported that if they had not obtained higher independence during sit to stand transfer by using The Pull, they would have had to go to assisted living care facilities. The Pulls were then left in the subjects' homes until they either had regained full sit to stand independence without the devices, they no longer wanted the devices, or they passed away. Subjects were allowed to keep the devices permanently, if they wished. The Pull has allowed all subjects to remain independent in their homes without a fall incident, including six elderly subjects with significant risks and history of falls (Langworthy & Munski, 1997).

Summary and Implications for Study

Falls pose a significant threat to the elderly population. Risk factors for falls among the elderly are numerous and differ between community dwellers and institution residents. Contrary to popular belief, falls are not part of the normal ageing process, but are due to one or several interacting factors such as physical illness and impairments, poor nutrition, medications, and environmental hazards.

Fear of falling and variations in fear are a result of the individual's appraisal of what harm might occur as a result of a fall. As an individual has difficulty rising from a chair and experiences stumbling, or has initial loss of balance upon rising, the impact of the repetitiveness of an altered transfer ability with ongoing appraisals may drive the individual to more acute negative emotions. The individual may fear "sudden, concrete harm" as a result of a fall. How the individual manages the demands of this kind of encounter with the environment will depend on the ability to cope with future events, personal resources, and past experiences.

Studies on falls and falling provide information to guide selection of appropriate interventions for fall prevention. This study will examine what the effect of a specific environmental modification, The Pull, could have on an elderly individual's fear of falling. It is perceived that enhancement of the environment through use of The Pull will alter the individual appraisal of the environment, personal resources and experience, and ability to transfer from a sit to stand.

Interventions to maintain and optimize elderly mobility while decreasing fall risk and incidence continue to be investigated. Specific interventions such as The Pull may allow individuals to maintain independence in the home or institution.

Hypotheses

Using the Falling Questionnaire (Dayhoff et al., 1994) as a measure of fear of falling, the following hypotheses were explored in this study:

1. There is a difference in fear of falling between elderly who receive and utilize The Pull for transfers and those who do not receive The Pull.
2. There is a difference in fear of falling between elderly residents of a long term care facility with low transfer ability and those with high transfer ability.
3. There is a difference in fear of falling between elderly residents of a long term care facility who perceive difficulty rising from a chair and those who do not perceive difficulty rising from a chair..

In addition to the above hypothesis, the relationships between specific demographic variables and fear of falling were examined.

Definition of Terms

Fall

An unexpected involuntary loss of balance by which a person comes to rest on the ground or at a lower level.

Fear of Falling

A phobic reaction to falling while standing or walking.

Environmental Modification - The Pull

The Pull is a platform, large enough to sit a chair on, with a cane handle attached (See appendix A). The platform may be placed under a chair, bed or commode, at arm's length from the handle. The cane handle is adjusted to the user's hip height. The individual is able to sit in the chair, grab the handle, and using his legs and arm, come to a standing position with the weight of transferring divided between the upper body and legs. Standing in front of the chair on the platform while holding on to the stationary cane handle provides the stability to transfer from a sitting to standing position, while allowing for 3 point fixation for balance.

Transfer Ability

The combination of moves required to transition from a sitting position to a standing position. In this study an objective score is determined to measure an individual's transfer ability.

The Pull Education

Education for the institutionalized elderly and institution staff included a verbal explanation on the use of the device, correct placement of the device, demonstration of use, and return demonstration by the subject and staff member.

CHAPTER THREE

METHODS

Research Design

This study was conducted using a pretest-posttest control group experimental design (See Figure 1). One long term care institution within the community was selected from a group of facilities offering residential and assisted living care levels. The residents of the residential and assisted living care levels within the institution were randomly assigned to the control or experimental group. This design was selected in order to manage external threats of validitity such as staffing patterns, policies, and care delivery, when comparing results from two different long term care institutions.

Figure 1. Pretest-posttest control group experimental design.

GROUP	Pretest	Intervention	Posttest
CONTROL	O1		O2
EXPERIMENTAL	O1	X	O2

Note. Pretest (O1) includes administration of the Falling Questionnaire and demonstration of transfer. Posttest (O2) is administration of the Falling Questionnaire. Intervention (X) is education and placement of The Pull.

A questionnaire measuring fear of falling (Falling Questionnaire) (Appendix B) and an assessment tool measuring ability to transfer from a sitting to a standing position (Modified Tinetti Balance and Gait Assessment) was administered to all experimental and control subjects upon consent to participate in the study (Appendix D). The experimental group received The Pull as part of the intervention. The intervention included placing The Pull within the participant's living area under the chair most commonly used. Education of the experimental group participants included use of The Pull, demonstration of use of The Pull, return demonstration by the subjects, as well as education of the institution staff on use of The Pull. After subjects used The Pull for six weeks, the researcher returned to administer the Falling Questionnaire, reviewed events for the subject over the six week time period including number of falls experienced, health status changes, and percentage of time The Pull was used when sitting in the identified chair.

The control group of residents did not receive an intervention following the initial interview and administration of the Falling Questionnaire. The subjects were informed of a follow-up interview to occur in 6 weeks. The post-test consisted of administering the Falling Questionnaire, recording the number of falls experienced within the previous six weeks, and health status changes.

In order to minimize maturational influences, such as sickness and mortality, a 6 week time period was chosen between the pretest and posttest. Based on experience with a pilot test, the six week period was enough time to allow the subjects time to become accustomed to using The Pull while integrating it into their coping strategies. Testing effect in a pretest-posttest design could affect the outcome of the study. Compensatory

rivalry was controlled by administering the instruments to the control group first, followed by the experimental group.

Setting and Sample

The study was conducted in a long term care institution in a midwestern community. The institution provided a full continuum of care including independent living, retirement residence, assisted living and skilled nursing. The institution was one of a group of institutions willing to participate in the study which provided residential and assisted living care levels. The particular institution was selected because it was not participating in other studies at the time.

The Director of Patient Care provided the researcher a list of 235 residents in the residential and assisted living care levels of the institution. Residents were assigned randomly to the experimental or control group using a table of random numbers. To be eligible for the study, participants must have resided longer than 3 months within the institution, not be currently participating in a study on aging, and able to read, speak, and understand English. They also had to be ambulatory and not requiring assistance of another person to ambulate, and not have a relative already participating in this study. Subjects could not be cognitively impaired so must have scored greater than 23 on the Mini-Mental State Examination (MMSE) (Appendix E) as described by Folstein, Folstein, and McHugh (1975).

The sample size was 20 in both the experimental and control groups, for a total of 40 subjects. Data were collected during a six month period from October 1997 through March 1998. Control group subjects were approached initially for participation. Of the

30 potential control group subjects contacted, four refused to participate and five did not meet criteria for the following reasons: non-ambulatory (n = 2), decreased cognitive function (n = 1), already in study on aging (n = 1), out of town (n = 1). Twenty-one subjects agreed to participate, were found eligible and completed the initial interview. One subject declined to continue further in the study, leaving 20 subjects in the control group who completed both parts of the study.

Upon completion of data collection from the control group, informational letters were sent to the first 40 randomly assigned residents in the experimental group. During the initial contact with potential subjects in the experimental group, this investigator encountered an unwillingness to participate in a study testing an environmental device. The refusal rate was 50% (20) of the first group of experimental subjects. In addition, eight of these potential subjects did not meet criteria, while three residents were gone for the winter months.

A conference was held with the Director of Patient Care at which time she sent a letter to the next group of 40 potential subjects, encouraging participation in the study. A revised letter indicating the endorsement of the institution for the study was sent to these residents and initial contact was made. In the second group of potential experimental subjects 11 declined to participate, four did not meet criteria, while three were unavailable to participate.

Of the 70 potential subjects contacted in the experimental group, 31 (44%) declined to participate while 16 (23%) did not meet criteria for the following reasons: decreased cognitive function (n = 6); non-ambulatory (n = 3); relative already in the study

(n = 1); out of town (n = 6). Twenty-two subjects gave consent to participate, met inclusion criteria, and completed the initial interview. Two subjects were dropped from the study due to declining health, leaving 20 subjects in the experimental group.

Instruments

The instruments used in this study include the Mini-Mental State Exam (MMSE), Modified Falling Questionnaire, Modified Tinetti Gait and Balance Assessment Scale, and demographics of the subjects.

Mini-Mental State Examination

The Mini-Mental State Examination (MMSE) (Appendix E) is one of the most frequently used mental status questionnaires (Tombaugh & McIntyre, 1992). The MMSE consists of a variety of questions, has a maximum score of 30 points, and ordinarily can be administered in 5-10 minutes. The questions are grouped into seven categories such as orientation to time, orientation to place, registration of three words, attention and calculation, recall of three words, language, and visual construction. The MMSE score is the total number of correct answers to the 11 questions. A score of 23 or less generally has been accepted as indicating the presence of cognitive impairment (Folstein, Anthony, & Parhad, 1985; Magaziner & Bassett, 1987).

With this cut-off score of 23/24 the MMSE had a sensitivity of 86% and a specificity of 80% for identifying cognitive impairment (Foreman, 1987). Test-retest reliability ranged from .56 to .98 (Folstein et al., 1975). Although the MMSE is adversely influenced by low educational levels (Magaziner, Bassett, & Hebel, 1987), it has been

found to provide a specific and sensitive measure of mental status for elderly persons. some of whom may have limited formal education.

Falling Questionnaire

In this study, the instrument used to measure fear of falling was the Falling Questionnaire (FQ) developed by Dayhoff et al., (1994). When permission to use the authors' 20 item tool was obtained (Appendix F), this researcher modified the instrument to delete items which were not appropriate for institutionalized elderly as suggested by Nancy Dayhoff (Appendix B).

The authors'original instrument was composed of 30 items to measure the appraisals of harm and coping potential related to potential falls and the emotion of fear. Subjects rate their fear on a four-point Likert-type scale to measure the extent to which they agree or disagree with each item. A higher score is related to more appraisals of harm and a higher level of fear (Dayhoff et al., 1994).

Dayhoff's revised 20 item instrument of the FQ measure the following: (a) harm outcomes, the consequences of a fall in terms of anticipated physical and existential harm, and fear associated with these anticipations (Dayhoff et al., 1994) (#5, 6, 7, 8, 10, 11, 14); (b) coping potential, a person's evaluation of his ability to do something that will change or protect the person-environment relationship (Lazarus, 1991) (# 9, 12, 15, 17, 20); (c) degree of threat, the extent of concern an individual experiences due to anticipated harm or loss (Lazarus & Folkman, 1984) (#13, 16, 19); and (d) future expectancy, which refers to the perceived probability that things are likely to change for better or worse (#1,

2, 3, 4, 18,). Five of the items were stated positively and were reversely scored so that the higher the score, the more negative the appraisals and the higher the fear.

To assure a high degree of construct validity, the following methods were used in the FQ development: factor analysis, comparison with measures of related constructs, and contrasted-group comparisons. Correlations among the four factors were computed to identify the factors' independence. The results supported the anticipated directions of correlation, indicating that the greater the anticipated adverse consequences, the poorer the anticipated coping potential, and the lower the future expectancy that things are likely to change for the better, the greater the fear of falling. The authors recommend using the total score to measure fear of falling.

Evidence of reliability of the FQ is based on a study by Dayhoff et al. (1994) of 171 older adults participating in senior citizen activities. Cronbach's coefficient alpha for internal consistency was .81 for the entire scale. Test-retest reliability of the total FQ using Pearson's correlation was .57 ($p < .01$) indicating moderate temporal stability. Dayhoff et al. expected the tool to exhibit low to moderate consistency in performance due to the fact that appraisals and emotions are highly contextual.

In this study, two questions were removed from Dayhoff's (1994) 20 item tool per the author's suggestion, due to the subject population residing in a long term care facility. In the Modified Falling Questionnaire used in this study the two questions removed were question number 5 - "If I fall, I would have to stop doing activities, such as shopping, that I am doing now," and question number 11 - "I do not have the help I need to recover from any injury due to a fall." Again, subjects rate their fear on a four-point Likert-type scale to

measure the extent to which they agree or disagree with each item. Scores for the current study's Modified Falling Questionnaire could range from 18 to 72. A higher score indicated a greater fear of falling.

Cronbach's alpha for internal consistency was analyzed for the pretest and posttest administration of the Falling Questionnaire (see Table 1). Statistical analysis showed a .75 reliability coefficient for the prestest and a .81 for the posttest, which is consistent with Dayhoff's results as seen in Table 1. In this study, test-retest reliability of the control group (n =20) of the total FQ using Pearson's correlation was .79 at a 6 week interval.

Table 1

Internal Consistency for Falling Questionnaire

Falling Questionnaire	Dayhoff (N = 148)	Munski (N = 40)	
		Pretest	Posttest
Cronbach's Alpha	.81	.75	.81

Dayhoff et al. (1994) examined the relationship of the Falling Questionnaire (FQ) with other instruments. Correlation between the FQ and the Profile of Mood States as part of the Total Mood Disturbance Score (TMDS) produced results which were anticipated with a low correlation with the TMDS (r = .06, p > .05), as was the correlation with the Tension-Anxiety subscale score (r = .25, p > .05). When the FQ was compared to the Fall Efficacy Scale developed by Tinetti, Richman, and Powell (1990),

the correlation was moderately strong and significant ($r = .49$, $p < .01$) (Dayhoff et al., 1994).

Tinetti Gait and Balance Assessment Scale

Transfer ability was measured using components of a modified version of Tinetti's Gait and Balance Assessment Scale (Tinetti, 1986). The entire mobility test involves a series of simple tasks observing gait and balance. For the purpose of this study, tasks demonstrating components of a sit to stand transfer were taken from the balance section of the scale (Appendices D, G). The maneuvers observed during this study included sitting, standing up from a sitting position in a chair, and initial standing. Each task was scored either on a zero to one or zero to two scale. The combination of maneuvers: sitting, standing up from a sitting position and initial standing, determined a subject's ability to transfer or "transfer ability". The transfer ability score on each subject could range from 0 to 6, upon adding up all of the three scores. The higher the score, the better the ability to transfer from a sitting position to a standing position. The researcher observed all subjects in transfer skills to prevent discrepancy in interrater reliability, although interrater reliability of .9 has been reported (Tinetti, 1986).

Demographic Questionnaire

Additional data were obtained from the subject during the initial interview with the investigator. Demographic data included: age, sex, education, length of residency at long term care facility, medical history and medications currently being administered (Appendix H). Comorbidities included the following conditions: diabetes, neurological conditions (Cerebral Vascular Accident, Parkinson's disease), musculoskeletal conditions,

cardiovascular disease, depression, gastrointestinal conditions, respiratory conditions, sight changes (cataracts, glaucoma), hypothyroidism. Medications were grouped in the following manner: sedatives/hypnotics, narcotics, antidepressants, analgesics/Non-steroidal antiinflammatories, antianxiety, antiarrhythmic, antianginals, antihypertensives, antihistamines, diuretics, thyroid hormones, anticoagulants, insulin, respiratory (inhalers, theophylline), and anticholinergic. This information assisted in describing the sample.

Procedure

Protection of human subjects approval was obtained from the Grand Valley State University Human Subjects Review Committee (Appendix I). Permission to collect data at the long term care institution was obtained through the Quality Assurance Committee of the institution (Appendix J), and supported by the Medical Director of the institution.

Data were collected during a six month period from October 1997 through March 1998. During this period, 100 residents within the long term care institution were approached regarding study participation.

An informational letter regarding the upcoming study on mobility was mailed to the first 40 randomly assigned residents in the control group (Appendix K). Initial contact by the investigator was made directly at the residents' living area within the institution. The Verbatim Instructions for Participants was read to the potential subjects of the control group which included information on the purpose of the study (Appendix L). Following verbal consent of the subject, a written consent was signed which included an explanation of ethical considerations such as confidentiality, voluntary nature of participation, freedom

to discontinue at anytime, subject refusal to participate not affecting care, as well as study posing no personal risk or discomfort to subject (Appendix M).

Of the first 30 potential control subjects contacted, four refused to participate and five did not meet criteria. All subjects who met criteria for inclusion were interviewed for their response on the demographic questions and the Falling Questionnaire. All subjects were asked to demonstrate their transfer ability by sitting in an armless chair, rising to their feet and walking approximately 10-15 feet, then returning to sitting in a chair.

The investigator read the instructions aloud for the Falling Questionnaire. A yellow 8x5 card with the responses; Strongly Disagree, Disagree, Agree, and Strongly Agree, printed boldly in black was held by the investigator in front of the subject to prompt the answer. If there were any questions by the subject, the investigator responded in a non-committal manner.

The second and final contact with the control group subjects was six weeks after the initial interview. The investigator inquired about any change in health status and number of falls during the preceding six week period. The Falling Questionnaire was administered in the same manner as previously. One subject declined to continue further in the study upon posttest data collection, leaving 20 subjects in the control group.

Upon pre and posttest data completion of the control group, informational letters were sent to the randomly assigned residents in the experimental group (Appendix N). The difficulty enlisting participants into the experimental group has previously been described. Initial contact of the experimental group was made as previously described with the control group. Twenty two subjects were enlisted into the study.

Potential subjects in the experimental group were asked to consider participating in a study to explore how utilizing The Pull would affect their ability to transfer from a sitting to a standing position, per the Verbatim Instructions for Participants (Appendix L). Again the consent form included ethical considerations such as confidentiality, voluntary nature of participation, freedom to discontinue at anytime, subject refusal to participate not affecting care, the study posing no personal risk or discomfort to subject as well as there being no cost associated with the study (Appendix O).

All experimental group subjects who met criteria for inclusion were interviewed in the identical manner as the control group. The experimental group received The Pull within their living space along with individual instruction, demonstration, and return demonstration of use of The Pull. Education of the institution staff during the intervention time period focused on use of The Pull and mobility, not on fear of falling so as to decrease staff influence on subjects' appraisal.

After the six week period of The Pull intervention, a posttest interview identical to the posttest of the control group was performed. Data on percentage of time The Pull was utilized while sitting in their chair was also collected. Two subjects from the experimental group were dropped from the study due to a change in health status which required transfer to the skilled nursing unit, leaving twenty subjects in the experimental group.

CHAPTER FOUR

RESULTS

The purpose of this study was to answer the following questions: 1) what effect does an environmental intervention (The Pull) have on fear of falling in institutionalized elderly, 2) what is the relationship between transfer ability and fear of falling in the institutionalized elderly, and 3) what is the relationship between specific demographic variables and fear of falling. All analyses were computed using the Statistical Package for the Social Sciences.

Characteristics of Subjects

The experimental and control groups were compared in demographic and other variables to examine the similarities and differences between the two groups. Table 2 shows the comparison of gender, ethnic background, ambulatory status, difficulty rising from a chair, and history of falls, using chi square statistical analysis.

The experimental group in this study was composed of 7 men and 13 women, while the control group included 3 men and 17 women. All of the subjects in the experimental and control group were Caucasian. Ambulatory status was significantly different between the two groups ($X^2 = 12.13$, $df = 1$, $p = .0005$). In the experimental

group there were five independent ambulators and 15 subjects who used a cane or walker. while in the control group 16 ambulated independently, three used a cane or walker and

Table 2

Demographic Characteristics of the Experimental and Control Groups including Gender, Ethnic Background, Ambulatory Status, Perceived Difficulty, and History of Falls

	Group				
	Experimental (n = 20)		Control (n = 20)		
Characteristic	n	%	n	%	X^2 (p)
Gender					
Male	7	35	3	15	2.13
Female	13	65	17	85	(.14)
Ethnic background[a]					
White	20	100	20	100	N/A
Other	0	0	0	0	
Ambulatory status[b]					
Independent	5	25	16	80	12.13
Cane/Walker	15	75	3	15	(.0005)
Wheelchair/Amigo	0	0	1	5	
Difficulty rising from a chair					
Yes	13	65	11	55	.42
No	7	35	9	45	(.52)
History of falls					
Yes	16	80	13	65	1.13
No	4	20	7	35	(.29)

[a] Statistical analysis not computed.

[b] Cane/walker and wheelchair/amigo collapsed for statistical analysis.

one subject used an amigo for distances greater than fifty feet due to lower extremity neuropathy. Because of the sample size the cane / walker and wheelchair / amigo group was collapsed for chi square analysis.

Within the experimental group 13 (65%) perceived themselves as having difficulty rising from a chair compared to 11 (55%) subjects in the control group. Of the 20 experimental subjects, 16 (80%) stated having a history of at least one fall. Having a history of at least one fall occurred in 13 (65%) of the control group.

Additional comparison of the experimental and control group is shown in Table 3. Statistical analysis by t-test compared age, education, length of residence within the long term care facility, cognitive function, comorbidities, medications, and transfer ability. Age was not significantly different between the two groups, with a mean age of 85.6 years for the experimental group and 83.05 years for the control group. The level of formal education for the experimental group averaged 14.35 years, ranging from 12 to 20 years, while the educational level within the control group ranged from 3 to 20 years, with an average of 13.55 years. Years of residence within this long term care institution was significantly different between the two groups ($t = 2.93$, $df = 38$, $p < .01$). The experimental group ranged from 0.5 to 23 years, with an average length of residence at 8.25 years while the average length of residence for the control group was 3.5 years, with a range of 0.33 to 14 years.

Cognitive function as measured by the MMSE was similar between the two groups. A mean score of 28.20 (SD = 1.67) was calculated for the experimental group and 29.0 (SD = 1.45) for the control group.

Table 3

Sample Distribution by Age, Education, Length of Residence at Extended Care Facility, Cognitive Function, Comorbidities, Medications, and Transfer Ability

	Group				
	Experimental (n = 20)		Control (n = 20)		
Characteristic	M	SD	M	SD	t
Age (years)	85.6	5.51	83.05	7.98	1.18
Education (years)	14.35	2.62	13.55	3.83	0.77
Length of residence (years)	8.26	6.36	3.50	3.49	2.93**
Cognitive function	28.20	1.67	29.00	1.45	1.62
Comorbidities	2.65	1.22	1.90	1.19	1.83
Medications (number)	3.85	2.06	2.90	1.92	1.51
Transfer ability[a]	3.60	1.31	4.55	1.35	2.25*

* $p < .05$ ** $p < .01$

[a] Transfer ability score measured by Modified Tinnetti Assessment.

Actual number of comorbidities and number of medications taken in the experimental group exceeded those of the control group but was not at a significant difference ($p > .05$). The experimental group averaged 2.65 comorbidities, while the number of medications taken ranged from zero to 10 with a mean of 3.85. Eighty percent

of the subjects identified cardiovascular disease in their medical history, musculoskeletal conditions followed at 75%. Antihypertensives were the most common medication taken at 75%, followed by diuretics (55%), analgesics, (55%), antiarrythmics (40%), and narcotics (30%). The number of comorbidities for the control group was 1.90. Cardiovascular disease and musculoskeletal conditions were identified most frequently by the control group subjects but at a lower rate of 50% and 45%, respectively. Medications most frequently taken included antihypertensives (55%), analgesics (50%), and thyroid (35%), with a range of 0 to 10 medications taken per subject and a mean of 2.90.

The transfer ability score had a possible range of 0 to 6. The lower the score mean indicated a decreased or poorer transfer ability. The experimental group scores ranged from 0 to 5, with a mean of 3.60. The control group scores were higher than the experimental group with a mean of 4.55 and range of 4 to 6.

The results showed that the groups did not differ significantly from each other on age, education, cognitive function, comorbidities, and number of medications. The control and experimental groups contrasted in three areas at a level of statistical significance in regards to the length of time of residence within the institution, ambulatory status, and transfer ability score. The experimental group averaged five years more of residence than that of the control group ($t = 2.93$, $df = 38$, $p < .01$). Independent ambulators were highest among the control group ($n = 16$) than the experimental group ($n = 5$). Differences in ambulatory status between the two groups was statistically significant ($X^2 = 12.13$, $df = 1$, $p < .001$). The experimental group had a significantly lower score for

transfer ability indicating a higher degree of difficulty moving from a sitting to a standing position compared to the control group ($t = 2.25$, $df = 38$, $p < .05$).

Also, during the posttest interview both groups were asked if there had been any change in health status or if they had experienced a fall incident during the period between the pretest and posttest. Six of the 20 in the experimental group experienced a change in health status for the worse while two in the control group reported a change. A fall incident was reported by three experimental group subjects (two outside of room, one caught toe on edge of The Pull platform) compared to one in the control group (within room) during the intervention period.

Hypotheses Testing

Hypothesis One

In this study the first hypothesis was: There is a difference in fear of falling between elderly living in a long term care facility who receive and utilize The Pull for transfers than those who do not receive The Pull. Analysis of covariance (ANCOVA) was used to analyze the first hypothesis. As described in the procedure, the Falling Questionnaire was administered to the control and experimental groups as a pretest and then six weeks later as a posttest. During this six week period of time the experimental group had the environmental modification, The Pull, placed in their personal living area. The control group did not receive an intervention. At the time of the posttest interview, subjects were asked from memory how often they utilized The Pull while sitting in the designated chair where The Pull was placed. The answers ranged from 25% to 100%, with a mean of 76.3%, ($SD = 21.94$) of usage.

The Falling Questionnaire was used in this study, to measure fear of falling. Scores for the Falling Questionnaire can range from 18 to 72. The lower the score, the lower the fear of falling, conversely the higher the score the greater the fear of falling. Results of the groups pretest measures showed the control group had a mean of 45.9, while the experimental group was 46.75 as shown in Table 4. T test results show the two groups did not significantly differ from each other ($t = 0.60$, $df = 38$, $p > .05$) on the pretest. In the posttest measures the control group mean was 45.95, intervention group 44.55. T test analysis of the posttest measures showed the groups were not significantly different ($t = 0.99$, $df = 38$, $p > .05$). The adjusted mean of the posttest score for the experimental group was calculated to be 44.2, while the control group was 46.3. A summary of the results are shown in Table 4.

Table 4

Comparison of Experimental and Control Groups by Fear of Falling Measure

	Group						
	Experimental (n = 20)		Control (n = 20)				
Fear of falling	M	SD	M	SD	t	df	p
Pre test	46.75	4.58	45.90	4.42	0.60	38	.55
Posttest							
Obtained	44.55	4.16	45.95	4.77	0.99	38	.33
Adjusted	44.20		46.30				

Comparison of the experimental and control groups' fear of falling measures was performed using the pretest measure of fear as the covariate (See Table 5). Results of the ANCOVA obtained were statistically significant. Fear of falling was significantly lower for elderly residents living in a long term care institution utilizing The Pull than those who did not utilize The Pull, after adjusting the influence of the pretest measure of fear on the posttest measure ($p = .016$). Thus, hypothesis one was supported.

Table 5

Analysis of Covariance for Posttest Fear of Falling Scores

Source of variation	df	SS	MS	F	p
Between groups	1	43.36	43.36	6.83	.016
Covariate	1	510.29	510.29	75.04	.000
Within groups	37	251.61	6.8		

Hypothesis Two

T-tests for independent sample were used to analyze the second hypothesis; there is a difference in fear of falling between elderly residents of a long term care facility with low transfer ability and those with high transfer ability. Combined data from the experimental group and control group were used to test this hypothesis ($N = 40$). Scores obtained during the initial interview, the pretest measure of fear of falling (Falling Questionnaire) and transfer ability score (Modified Tinetti Assessment) were used. The

subjects (N = 40) were divided into two groups based on their transfer ability score which could range from zero to six. Data was dichotomized into a high score (5 to 6) or low score (0 to 4).

As can be seen in Table 6, subjects with low transfer ability had a mean score on the Falling Questionnaire of 46.91 (SD = 4.21), while the subjects with a high transfer ability had a mean Falling Questionnaire score of 45.61 (SD = 4.780). Results showed there was no significant difference between the two groups with respect to the fear of falling measure ($t = 0.91$, $df = 38$, $p > .05$). Transfer ability alone does not affect fear of falling in elderly residents living in a long term care facility. The second hypothesis was rejected.

Table 6

Comparison of Subjects with Low Transfer Ability and High Transfer Ability and Fear of Falling Measure

Characteristic	M	SD	t	df	p
Transfer ability					
Low (0 - 4)	46.91	4.21	0.91	38	.37
High (5 - 6)	45.61	4.78			

Hypothesis Three

The third hypothesis: There is a difference in fear of falling between elderly residents of a long term care facility who perceive difficulty rising from a chair and those

who do not perceive difficulty rising from a chair, was analyzed by using t-test for independent sample. As in the second hypothesis, combined data from the experimental group and control group were used to test this hypothesis (N = 40). Scores obtained during the initial interview, the pretest measure of fear of falling (Falling Questionnaire) and subjects' perceived difficulty rising from a chair (yes or no) were compared (See Table 7). Subjects who answered yes to having difficulty rising from a chair (n = 24) were in one group, while subjects who answered no (n = 16) were in the other group.

Subjects who perceived themselves as having difficulty rising from a chair had a mean score of 46.79 (SD = 4.16) on the Falling Questionnaire, compared to subjects who did not perceive difficulty rising from a chair scored 45.62 (SD = 4.94). The two groups did not differ significantly in the fear of falling measure thus, the third hypothesis was rejected ($t = 0.81$, $df = 38$, $p > .05$).

Table 7

Comparison of Subjects with Perceived Difficulty Rising from a Chair and No Perceived Difficulty Rising from a Chair and Fear of Falling Measure

	Fear of falling				
Characteristic	M	SD	t	df	p
Perceived difficulty					
Yes	46.79	4.16	0.81	38	.42
No	45.62	4.94			

The results of this study show that fear of falling is less in elderly residents of a long term care facility who used The Pull for six weeks compared to residents who did not use The Pull. Thus, hypothesis one was accepted. Hypotheses two and three of this study were not accepted. That is, transfer ability and perceived difficulty rising from a chair do not affect fear of falling alone.

CHAPTER FIVE

DISCUSSION AND IMPLICATIONS

Discussion

The purpose of this study was to examine the effect of an environmental modification (The Pull) on fear of falling in elderly persons living in a long term care facility.

Hypothesis One

The findings of this study showed that The Pull as an environmental modification decreases an elderly person's fear of falling. In the ANCOVA statistical analysis the pretest fear of falling measure was factored out as the covariate thus showing a significant difference in the fear of falling measure of the experimental group compared to that of the control group, hence the hypothesis was supported.

The experimental group and control group were found to be equal in age, gender, level of education, cognitive function, history of falls, comorbidities, and number of medications used. Interesting though, the average age of subjects within this study was 84. This age is considered to be the old - old population at which time falls become the leading cause of death (Ross, 1991). This finding may suggest an increase number of falls hence a greater fear of falling. A comparison was made to Dayhoff's (1994) subjects who had a mean age of 75 compared to 84 in this study. Responses on the Falling

Questionnaire were calculated out to a mean item response to determine an average fear level per question. The number of items in the Falling Questionnaire used by Dayhoff was 20 compared to 18 items in this study. The calculated mean item response in this study was 2.60 for the experimental group and 2.50 for the control group compared to Dayhoff's subjects with a mean item response of 2.36. This gross comparison may be indicative of an increase fear of falling due to increased age compared to the lower mean item response seen in a younger age population.

The groups differed with respect to length of residence, ambulatory status, and transfer ability. The experimental group had lived in the extended care facility on average five more years than the average of the control group even though years of age was not significantly different between the two groups. This finding along with significant differences in transfer ability and ambulatory status between the groups indicates a more frail population in the experimental group. The longer residence of the experimental group may have been a direct factor in the decline of ambulatory status and transfer ability. The experimental group had more difficulty transferring from a sitting position to standing position and required ambulatory devices more often.

The experimental group as a whole expressed a higher degree of fear of falling as measured by the pretest Falling Questionnaire which may be reflective of the more frail population. The frail elderly are the most vulnerable because they are somewhat functionally compromised but still determined to be active, as reported by Kuehn and Sendelwick (1995).

The subjects comprising the experimental group self selected participation within this study. Many potential subjects reasoned they had no need of a device to assist in a sit

to stand transfer so declined participation, even though objective evaluation of their transfer ability indicated a possible benefit to participate. Willingness to participate in this study may indicate the subjects felt they could make some changes to help in their mobility or prevent a fall. Many potential subjects who refused to participate expressed enthusiasm for The Pull, but "for someone else who needs it more than I do."

The 20 subjects completing the intervention period utilized The Pull in their living space for six weeks. Upon completing the study, subjects were given the choice to keep The Pull at no cost or have it removed. Eight of the 20 requested to keep The Pull, while the others had various reasons for removal such as: preference utilizing the arms of the chair to lift up, difficulty accommodating the size of The Pull within a small living area, and no longer felt need for assistance in a sit to stand transfer.

As described earlier, Lazarus' Theory of Cognitive Motivation Relational Theory (1984) delineated two critical processes that mediate the person-environment relationship, cognitive appraisal and coping. Individual appraisal of the environment determines why and to what extent a particular transaction or series of transactions between the person and the environment is stressful. Coping is the process through which the individual manages the demands of the person-environment relationship and the emotions generated by the appraisal.

Applying Lazarus to this situation, when an individual has a fear of falling, ongoing appraisals occur which are influenced by past experiences, personal resources, health status, ambulatory status, and history of falls. An environmental modification using The Pull could alter the appraisal of fear of falling. As repeated successful attempts to stand from a sitting position using The Pull occur, the individual makes ongoing appraisals of his

environment in relation to himself. The harm which could occur as a result of a fall still exists, but the ability to control the environment and actively prevent a fall is in place. Thus, the appraisal is affected thereby altering the negative emotions generated, in other words decreasing the fear of falling is decreased.

Hypotheses Two and Three

As the study results showed, transfer ability alone or perceived difficulty rising from a chair alone does not affect fear of falling in elderly residents living in a long term care facility. There are many factors affecting the person-environment exchange which support Lazarus' (1991) theory of ongoing appraisals. Personal resources and experiences, environmental changes, medications, and physical health are just a few of the factors impacting the evaluation and emotional response of fear of falling. The sample size in this study was not large enough to allow the t test statistical analysis to show a relationship of transfer ability to perceived difficulty rising from a chair.

Limitations

Several threats to internal and external validity existed in this study such as selection, maturation and health, instrumentation, and mortality. Group differences on the dependent variables may be the result of initial differences rather than the effect of the independent variable. The pretest-posttest design identified similarities and differences in the groups prior to the intervention so a comparison of the groups could be made based on the pretest results. In addition, analysis of covariance using the pretest as the covariate was performed to control initial differences between the groups.

Maturation refers to processes occurring within the subjects during the course of the study as a result of time rather than as a result of the treatment (Polit & Hungler,

1987). In order to minimize maturational influences, such as sickness and mortality, a six week time period was chosen between the pretest and posttest. The six week period was enough time to allow the subjects time to become accustomed to using The Pull while integrating it into their coping strategies yet, short enough so that changes in health would be minimized. As it was, two subjects within the experimental group were dropped from the study due to declining health and subsequent transfer to the nursing care level. The subject who caught her toe on the edge of The Pull platform did not sustain injury from the event.

To minimize the differences of instrumentation with the subjects, an attempt was made to limit dialogue to a script. However, there were situations in which subjects proceeded to discuss concerns or ask questions. This researcher attempted to keep answers within the content described in the script.

Testing effect in a pretest-posttest design could affect the outcome of the study as subjects could remember the Falling Questionnaire from the pretest interview. Compensatory rivalry was controlled by administering the study to the control group first, followed by the experimental group.

Threats to external validity included the Hawthorne effect, novelty effect, and experimenter effect. Certain subjects may have responded differently simply because they knew they were participating in a study, so the consent forms were written reflecting the purpose of the study as mobility for the control group and The Pull evaluation for the experimental group, instead of the investigation of fear of falling (Appendices C, D).

The researcher was aware that the group which had received The Pull might respond more enthusiastically because of the novelty of the intervention. During the

intervention period, subjects were overheard talking about the study going on. In fact, two subjects invited other residents not in the study to try out The Pull in their rooms.

To prevent this researcher from unconsciously communicating her expectations to the subjects in hopes of supporting the hypothesis a script was followed for consistency (Appendix E). Also, to prevent inconsistency between interviewers, which would influence the results of the study, she was the sole interviewer for both groups.

Another limitation of the study not anticipated was the refusal rate to participate of the potential experimental group subjects. Many residents perceived this researcher as trying to sell a product, or as part of a telemarketing scam. As this researcher communicated to the residents support from the Director of Patient Care Services, acceptance increased only slightly. Finally, characteristics of the sample must be taken into consideration. The sample population is atypical because 100 % of subjects (N = 40) were Caucasian. Also, due to the size (N = 40) and nature of the sample within one long term care institution, generalization of the findings will be limited.

These potential threats to internal and external validity must be kept in mind when analyzing the data and making conclusions regarding fear of falling of elderly residents living in a long term care institution.

Implications

There are several implications which can be drawn from this study. As health care providers interact with elderly individuals, ongoing assessments regarding mobility status, functional ability and fear of falling need to occur. Instruments are available to assist in these assessments. The Falling Questionnaire is just one tool which can be used to measure fear of falling and monitor changes in response. Utilization of assessment tools

which detect risk for falls and fear of falling is imperative so that we can document reliability and validity of these tools as the study of falls and fall causation expands and becomes more refined.

Upon identifying individuals at risk for falls who may or may not have a fear of falling, specific interventions or multifactorial interventions should be determined and implemented to decrease risk of falls and fear of falling. Cost and practicality of interventions should be considered as well as ensuring "the fit" of the intervention. In this study, The Pull was shown to decrease fear of falling in residents living in a long term care facility. The residents in the experimental group were characterized as a more frail population who demonstrated increased difficulty in transfer ability. The Pull may have been a "good fit" for this group overall, although subject comments suggested the fit was better for some than others.

The cost of interventions reducing the risk for falls is an economic and health concern. The cost of The Pull is relatively low compared to some alternatives. Many subjects in the long term care institution were using Lift chairs which electrically lifted the individual to a semi-standing position. This device not only costs three times more than The Pull, it promotes decline in the users strength by eliminating use of lower extremity musculature performing a transfer. Further research showing a decline in falls and fear of falling through using environmental modifications may support financial reimbursement of these devices.

This study provides the framework for subsequent studies on environmental modifications in relation to fear of falling. Continued development and research on

environmental modifications to reduce the risk of falls and fear of falling is imperative to impact this health care concern.

Recommendations

The findings of this research study raise several questions that suggest a need for further investigation. The author suggests the following as areas meriting further research.

It would be of interest to conduct a similar study with a variance in sample. The study could be repeated in multiple long term care facilities. A comparison of results between facilities would be important to vary the sample characteristics and effect of long term care facilities. Also, enlarging the sample size to include subjects of different ethnic backgrounds and levels of health would add to the generalizability of the results.

The length of time of the intervention could be extended. To allow for a longer period of adaptation, the environmental modification within the living space could be lengthened prior to the posttest to allow more time for adaptation. The extended length of time would allow more time if actual number of falls were being tallied. Also, measuring possible health benefits, such as an increase in lower extremity strength and benefits of increased mobility, from using The Pull over a length of time

Adjusting inclusion criteria or adding more demographic data such as eyesight, to detect vision changes and tripping over the device, and actual of number of falls within a three, six, and 12 month period prior to the study would enable the researcher to examine a decrease in fear of falling and number of falls if length of intervention time increased.

The dependent variable, fear of falling, could be evaluated more thoroughly over time. A longitudinal study would assist in evaluating how fear of falling levels change

over time. Perhaps the Falling Questionnaire could be used to assess pre-intervention. after six weeks, than three months, and at six months post-intervention.

Summary

Falls and fall-related injuries are major concerns, especially for the elderly. A fear of falling is a phenomena common among elderly individuals whether they have fallen or not. Fear of falling frequently leads to decreased mobility and function, causing decreased muscle strength, balance, and other physiological changes which put the individual at a greater risk for falls. The literature supports fall prevention requiring a multifactorial approach. Interventions to prevent falls, to halt the debilitating spiral of post-fall decline, and decrease the fear of falling need to be implemented and researched. The purpose of this study was to answer the following question: What effect does an environmental intervention (The Pull) have on fear of falling in residents living in a long term care institution. This research, while of an introductory nature, showed that The Pull decreased fear of falling in elderly residents of a long term care institution. It is hoped that a decreased fear of falling and increased ability to transfer from a sitting position to a standing position will maintain elder mobility and strength, thus reduce the incidence and risk of falls.

APPENDICES

THE PULL™

Optimize & Maintain Physical Function

The Pull™ provides a handle at hip height to help a person pull to a stand and have support while standing.

MUSCLE WEAKNESS & OSTEOPOROSIS

Many changes occur in the body as people age. Not only is there a loss of bone density, but there is often muscle weakness as well. Muscles that work the hip and knee are often affected, and people with the loss of muscle in these areas can find it difficult to come to a stand from a sitting position. Dizziness or lightheadedness may often accompany the position change when going from the sitting position to the standing position.

Osteoporosis is a loss of bone density that makes bones both stiff and brittle. It affects both women and men, but women are affected more frequently at an earlier age.

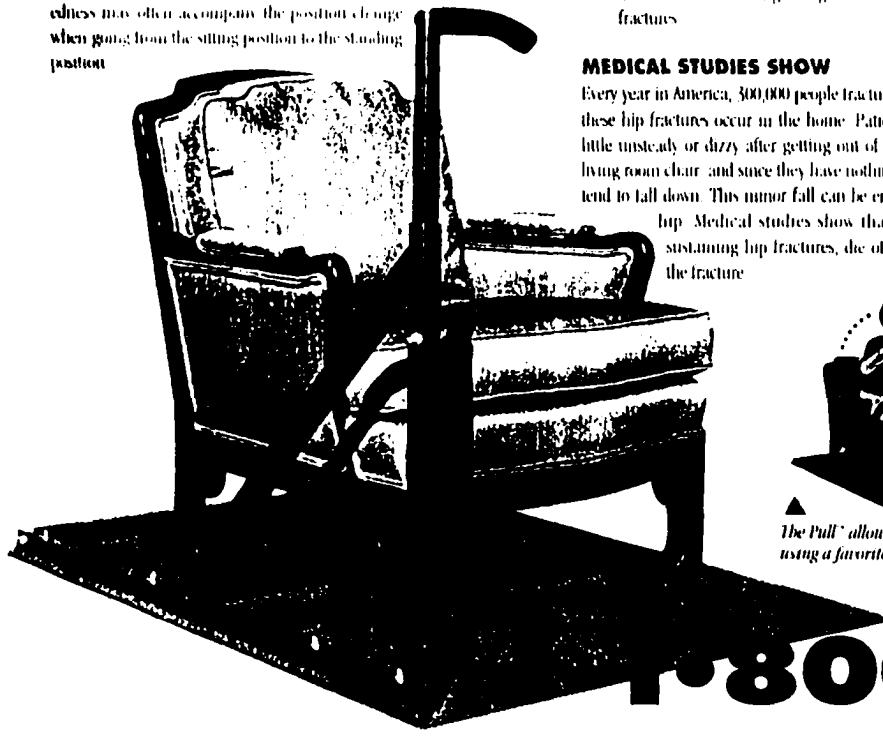
- 50% of women reaching the age of seventy will have X-ray evidence of osteoporosis
- 30% of women reaching the age of seventy will suffer hip fractures

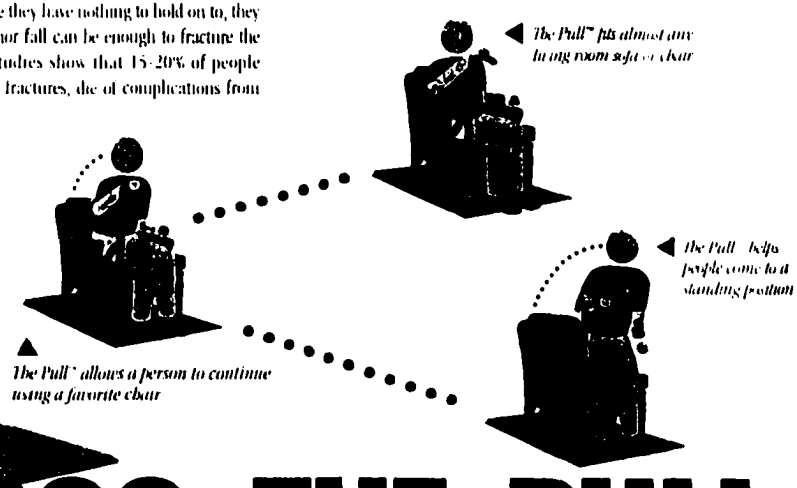
MEDICAL STUDIES SHOW

Every year in America, 300,000 people fracture their hips. Many of these hip fractures occur in the home. Patients frequently feel a little unsteady or dizzy after getting out of their favorite sofa or living room chair, and since they have nothing to hold on to, they tend to fall down. This minor fall can be enough to fracture the hip. Medical studies show that 15-20% of people sustaining hip fractures, die of complications from the fracture.

JUST WHAT IS THE PULL™?

The Pull™ was developed by a medical doctor specializing in the study of Orthopedic Surgery. It is designed to assist people who have muscle weakness and find it difficult to come to a stand from the sitting position. The Pull™ provides a handle at hip height to help a person pull to a stand and have support while standing. It optimizes and maintains an individual's physical function, and was designed so arm muscles can help leg muscles while coming to a standing position thus utilizing a person's strengths to overcome his or her weaknesses. The Pull™ is not a cure. It simply provides for, and helps in, independent activity, as a cane or walker does.





1•800•THE•PULL

Appendix B

ID#___

MODIFIED FALLING QUESTIONNAIRE

As people grow older, sometimes they become concerned about falling. "Falling means tripping, slipping, or stumbling in such a way you come to rest on the floor or the ground. Please take a moment to reflect on the thoughts and feelings you might have about the possibility of falling in the next month and, if you fell, what that falling would mean to you.

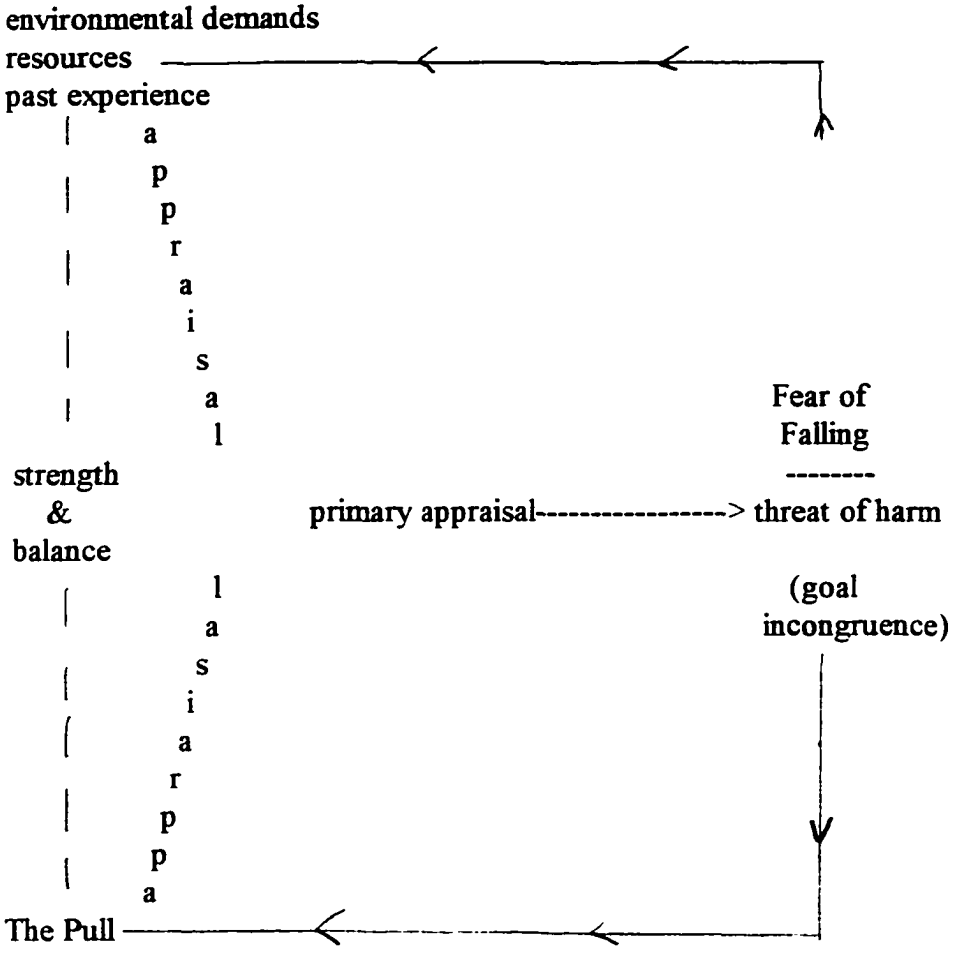
I am going to say several statements, pertaining to the possibility of falling. Please tell me the extent to which you agree or disagree with the statements. There are no right or wrong answers; answer each statement with the first idea that comes to your mind.

	Strongly disagree - SD Disagree - D Agree - A Strongly Agree - SA			
	1	**2**	**3**	**4**
1. It is likely that I will fall in the next month.	SD	D	A	SA
2. If I fall, chances are I will be hurt in some way.	SD	D	A	SA
3. I cannot prevent a fall.	SD	D	A	SA
4. I am afraid of falling.	SD	D	A	SA
5. If I fall, my life would change.	SD	D	A	SA
6. The thought of falling really frightens me.	SD	D	A	SA
7. I will probably fall if I get dizzy or trip.	SD	D	A	SA
8. I can probably prevent myself from falling.	SD	D	A	SA
9. Recovery from an injury due to a fall would be difficult for me.	SD	D	A	SA
10. I could make some changes in my life to prevent a fall.	SD	D	A	SA
11. I frequently limit my activities to prevent a fall.	SD	D	A	SA
12. I stand to lose a lot from an injury due to a fall.	SD	D	A	SA
13. I seldom think about the possibility of falling.	SD	D	A	SA
14. One of my worst fears is that I will fall.	SD	D	A	SA
15. It is very likely that I could fall without being injured.	SD	D	A	SA
16. I know many people in situations similar to mine who have fallen.	SD	D	A	SA
17. My life would never be the same if I was injured in a fall.	SD	D	A	SA
18. The older people get, the more likely they are to fall.	SD	D	A	SA

Dayhoff, N., Baird, C., Bennett, S., & Backer, J. (1994). Fear of falling: Measuring fear and appraisals of potential harm. Rehabilitation Nursing Research, 3, 97-104.

Appendix C

Conceptual Framework: Stress and Appraisal



Modified Cognitive Motivational Relational Theory by R. Lazarus, 1991, Emotion and adaptation. New York: Oxford University Press.

Appendix D

ID#___

MODIFIED TINETTI ASSESSMENT TOOL

Balance Tests

Initial instructions: Subject is seated in hard, armless chair. The following maneuvers are tested.

1. **Arises**

Unable without help	=0	
Able, uses arms to help	=1	
Able without using arms	=2	_____

2. **Attempts to arise**

Unable without help	=0	
Able, requires >1 attempt	=1	
Able to arise, 1 attempt	=2	_____

3. **Immediate standing balance** (first five seconds)

Unsteady (swaggers, moves feet, trunk sway)	=0	
Steady but uses walker or other support	=1	
Steady without walker or other support	=2	_____

Total _____

"Performance-oriented assessment of mobility problems in elderly patients," by M. E. Tinetti, 1986, Journal of the American Geriatrics Society, 35, p.119-126.
Copyright 1986 by M.E. Tinetti.

Appendix E

ID#____

MINI-MENTAL STATE EXAMINATION (MMSE)

Questions		Points	
1.	What is the: Year? Season? Date? Day? Month?	5	_____
2.	Where are we: State? County? Town or City? Hospital? Floor?	5	_____
3.	Name three objects (Apple, Penny, Table), taking one second to say each. Then ask the patient to tell you the three. Repeat the answers until the patient learns all three.	3	_____
4.	Serial 7s. Subtract 7 from 100. Then subtract 7 from that number, etc. Stop after five answers.	5	_____
5.	Ask for the names of the three objects learned in #3.	3	_____
6.	Point to a pencil and watch. Have the patient name them as you point.	1	_____
7.	Have the patient repeat "No ifs, and, or buts".	2	_____
8.	Have the patient follow a three-stage command: "Take the paper in your right hand. Fold the paper in half. Put the paper on the floor".	3	_____
9.	Have the patient read and obey the following: "Close your eyes". (Write in large letters).	1	_____
10.	Have the patient write a sentence of his or her own choice.	1	_____
11.	Have the patient copy the following design (overlapping pentagons).	1	_____
		Total points possible =30	_____ total

Appendix F

INDIANA UNIVERSITY
PURDUE UNIVERSITY
INDIANAPOLIS

25 April 1996

Joan Munski
1048 Brown Wood N.W.
Grand Rapids, MI 49504

Dear Joan:

SCHOOL OF NURSING

I am please that you and your advisor have decided to measure Fear of Falling using the Falling Questionnaire. We deliberately did not use "fear" in the title in order to avoid a negative response to completing the questionnaire.

I have enclosed a copy of the falling questionnaire; you have my permission to use the questionnaire in your research. If you decide to use the questionnaire, I would ask that you share with me any information that might contribute to further refinement of the items or scale, for example, evidence of reliability (or lack thereof) or any problems that you might encounter in using it.

My experience with using the tool is with community-residing older adults. Who ever is administering the questionnaire usually sits with them to encourage them to respond with the first answer that comes to their mind. Respondents sometimes want to analyze the statements for all possible ramifications and conditions. It is important that they respond with the first thought that is stimulated by each statement. If you use the questionnaire as a mail survey, you would want to emphasize to them that they should not ponder the answers to the questions, but respond with the first idea that comes to them.

We obviously have common research interests. I have enclosed my card; if you wish additional information about the Falling Questionnaire, please feel free to contact me via Internet, FAX, or whatever communication is best for you. Best wishes for a successful and fun experience with your study.

Sincerely,

[redacted]

Nancy E. Dayhoff EdD RN
Associate Professor
Department of Nursing of Adults

DEPARTMENT OF NURSING
OF ADULTS

1111 Middle Drive
Indianapolis, Indiana
46202-5107

317-274-2035
FAX: 317-278-1856

Appendix G

Yale University

Mary E. Tinetti, M.D.
Department of Internal Medicine
School of Medicine
333 Cedar Street
P.O. Box 208025
New Haven, Connecticut 06520-8025

Campus address:
20 York Street
DC-023
Telephone: 203 688-5238
Fax: 203 688-4209
Email: mtinetti@gwpo.ynhh.com

April 8, 1998

JoAnn Munski, R.N.
1048 Brownwood NW
Grand Rapids, MI 49504

Fax: 616.774.7342

Dear Ms. Munski,

Thank you for your fax, received April 6, requesting permission to use the Tinetti Assessment for Gait and Balance in your study measuring fear of falling after utilizing "The Pull". Mary was able to review your request, and has given permission for you to use her scale in your work.

I am faxing this letter, as well as a copy of your fax with Dr. Tinetti's O.K. on it, to you today. I will also mail the originals, including Dr. Tinetti's signature, back to you at the above address.

Thank you for your kind letter, and best wishes in your endeavors! If you have any questions, please call or write again.

Sincerely,

[redacted]

Anna Marie Ciresi
Administrative Assistant
for
Mary E. Tinetti, M.D.

LETTERS:TINETTI MUNSKI.DOC

Appendix H

ID#___

DEMOGRAPHIC QUESTIONNAIRE

Subject Number _____ Age_____(years)

Gender 1. male_____ 2. female____

Race
1.African/Black American____
2.Hispanic____
3.White____
4. Asian/Pacific Islander ____
5. Native American____
6. Other_____

Education _____(years)

Length of residence within this institution_____(months)

-within previous institution/hospital _____(months)

Medical History
1._____ 4._____
2._____ 5._____
3._____ 6._____

Medications
1._____ 5._____
2._____ 6._____
3._____ 7._____
4._____ 8._____

"Do you feel you have difficulty rising from a chair?" 1.Yes____ 2. No____ If yes, How long? _____(months)

Ambulatory Status >50ft 1. Independent 2. Cane 3. Walker 4. Wheelchair/amigo

History of Falls? 1. Yes 2. No

Type of chair The Pull was placed under
1. Easy chair
2. Recliner
3. Lift chair
4. Dining table chair
5. Other

Falls during intervention period ? 1. Yes 2. No

Change in health status 1. Yes 2. No

Approximate percentage of time "The Pull" used _____%

GRAND VALLEY STATE UNIVERSITY
1 CAMPUS DRIVE • ALLENDALE MICHIGAN 49401-9403 • 616/895-6611

April 17, 1997

JoAnn Munski
1048 Brownwood NW
Grand Rapids, MI 49504

Dear JoAnn:

The Human Research Review Committee of Grand Valley State University is charged to examine proposals with respect to protection of human subjects. The Committee has considered your proposal, "***The Effect of an Environmental Modification on Fear of Falling in Institutionalized Older Persons***", and is satisfied that you have complied with the intent of the regulations published in the Federal Register 46 (16): 8386-8392, January 26, 1981.

Sincerely,

[redacted]

Paul Huizenga, Chair
Human Research Review Committee

Appendix J

September 16, 1997

JoAnn Munski
1048 Brownwood NW
Grand Rapids, MI 49504

Dear JoAnn:

The Institutional Review Committee of Clark Retirement Community has examined your proposal, **"The Effect of an Environmental Modification on Fear of Falling in Institutionalized Older Persons"**. The Committee approves of your proposal and agrees that Clark Retirement Community participate as a testing site for the aforementioned study.

Sincerely,

[redacted]

Joy Oostendorp
Director of Resident Care

CLARK Retirement Community

Joy Oostendorp
RN, MPA, NHA
Director of Resident Care

1551 Franklin S.E.
Grand Rapids, MI 49506-3331

616•452•1568
Direct: 616•452•1666 ext. 151
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Appendix K

Dear _____,

My name is JoAnn Munski. I am a registered nurse at a local hospital and also working on my Masters Degree in Nursing at Grand Valley State University. Through my experience as an orthopaedic nurse I have developed an interest in why older persons fall, their fear of falling, and ways to help prevent falls..

I am conducting a research study on mobility. The purpose of the study is to investigate the emotions regarding mobility, especially moving from a sitting position to a standing position.

During the next eight weeks I will be collecting information within Clark Retirement Community. The information collected is confidential and coded so names will not appear. The study poses no personal risk or discomfort to the individual, participation is voluntary.

I will be evaluating each persons' balance and ambulation skills. Only those who are able to ambulate without the assistance of another person will be asked to participate. The individual is free to withdraw from the study at any time and confidentiality will be protected. Refusal to participate in the study or withdrawal from the study will not affect care in any way. Participation in the study may contribute to new knowledge that may benefit others in the future.

Any questions or concerns about the project can be answered by myself at work, # 774-5267 or home, # 453-7016 or by Dr. Paul Huizenga, Chairman of the Grand Valley State University Human Research Review Committee at # 895-2472.

Sincerely,

JoAnn Munski, RN

Appendix L

Verbatim Instructions
Script for Informed Consent

Hello Mr./Ms. _____. My name is JoAnn Munski and I am a nurse at a local hospital. I am working on my Masters degree in Nursing at Grand Valley State University. I have been a nurse for many years and have worked with many people who have changed the activities they do and the way they move around as they got older.

I am conducting a study which looks at how older persons feel about their activity level and the types of activities they do, especially moving from a sitting position to a standing position. When you participate in this study, I will ask you to stand up from your chair, walk, and then sit down. I will then ask you a few questions about how you feel about performing certain activities and about falling. The interview should take about 15 minutes.

[Experimental group - I would like to ask you if you would try out a device called The Pull. Explanation of The Pull as described in the proposal content].

I would then come back in six weeks, to ask you your feelings about your activity level [experimental group - and how you liked using the Pull].

The study should pose no personal risk or discomfort to you. Your participation is voluntary. All information will remain confidential and anonymous. You are free to withdraw from this study at anytime. Refusal to participate in the study or withdraw from the study will not affect your care in any way. Participation in the study may contribute to new knowledge that may benefit others in the future.

Appendix M

ID#____

INFORMED CONSENT FOR HUMAN RESEARCH PROJECT

I,_____ agree to serve as a subject in the research study on mobility under supervision of JoAnn L. Munski, RN, graduate student Grand Valley State University. The purpose of the study is to investigate the emotions regarding mobility, especially moving from a sitting position to a standing position.

I understand that I will be asked to complete two interviews, each of which takes approximately 15 minutes to complete. I understand that I will complete the first one upon consent to participate in this study and the second one in six (6) weeks. The interviews will assess how I feel about my mobility and other activities I do.

I understand that this study poses no personal risk or discomfort to me. I realize that my participation may contribute to new knowledge that may benefit others in the future.

I understand that my participation is voluntary. I understand that confidentiality will be protected, that I am free to withdraw from participation in the investigation at any time and my care will not change if I withdrawal from the study. I have read and fully understand the above information. Any questions I have about the project will be answered by JoAnn Munski, phone 774-5267 or Dr. Paul Huizenga, Chairman of the Grand Valley State University Human Research Committee at 895-2472. I will receive a copy of this signed consent form. I will also receive a copy of the results of this study.

_____ _____

Date Subject's Signature

_____ _____

Date Witness' Signature

Appendix N

INFORMATIONAL LETTER TO PARTICIPANT'S FAMILY/SIGNIFICANT OTHER

Dear _____;

My name is JoAnn Munski. I am a registered nurse at a local hospital and also working on my Masters degree in Nursing at Grand Valley State University. Through my experience as an orthopaedic nurse I have developed an interest in why older persons fall, their fear of falling, and ways to help prevent falls within this age group.

An orthopaedic doctor in Grand Rapids has invented a device called "The Pull" for the purpose of preventing falls within the older population. The Pull helps a person move from a sitting position to a standing position. The Pull is a platform, large enough to sit a chair on. The compressive weight of the chair and the person's own compressive weight stabilizes the platform. A metal frame runs along the perimeter of the platform coming up into a cane like projection on the dominant side of the person. The platform may be placed under a chair, bed or commode, at arm's length from the handle. The older person is able to sit in the chair, grab the handle, and using his legs and arm, come to a standing position with the weight of transferring divided between the upper body and legs.

The Pull has been tested in a 410 bed hospital as well as in clients' homes over the past two years. Data has been positive with an overall increase in each person's ability to transfer from a sitting to standing position.

During the next six weeks we will be conducting research on "The Pull" within the nursing home your family member or significant other is residing. We are interested in studying how the device, The Pull, helps residents transfer from a sitting to a standing position. We are also interested in how the resident feels about his/her own mobility upon using The Pull. There will be no cost to you or your family member or significant other for The Pull.

The study poses no personal risk or discomfort to the individual, participation is voluntary. I will be evaluating each persons' balance and ambulation skills. Only those who are able to ambulate without the assistance of another person will be asked to participate. The individual is free to withdraw from the study at any time and confidentiality will be protected. Refusal to participate in the study or withdrawal from the study will not affect their care in any way. Participation in the study may contribute to new knowledge that may benefit others in the future.

Any questions or concerns about the project can be answered by JoAnn Munski, work phone 774-5267, home phone 453-7016 or Dr. Paul Huizenga, Chairman of the Grand Valley State University Human Research Review Committee at 895-2472.

Sincerely,

JoAnn Munski, RN

Appendix O

ID#___

INFORMED CONSENT FOR HUMAN RESEARCH PROJECT

I,_____ agree to serve as a subject in the research study of "The Pull" under supervision of JoAnn L. Munski, RN, graduate student of Grand Valley State University. The purpose of the study is to investigate the effectiveness of The Pull to help move from a sitting position to a standing position.

I understand that I will be asked to complete two interviews and use The Pull for six (6) weeks. Each interview will take approximately 15 minutes to complete. I understand that I will complete the first one upon consent to participate in this study and the second one after six weeks' use of The Pull. The interviews will assess how I feel about moving from a sitting to a standing position and other activities I do.

I understand that this study poses no personal risk or discomfort to me. I realize that my participation may contribute to new knowledge that may benefit others in the future.

I understand that my participation is voluntary. I understand that my name will not be used and confidentiality will be protected. I am free to withdraw from participation in the investigation at any time and my care will not change if I withdraw from the study. I have read and fully understand the above information. Any questions I have about the project will be answered by JoAnn Munski, phone 774-5267 or Dr. Paul Huizenga, Chairman of the Grand Valley State University Human Research Review Committee at 895-2472. I will receive a copy of this signed consent form. I will also receive a copy of the results of this study.

_____ _____

Date Subject's Signature

_____ _____

Date Witness' Signature

LIST OF REFERENCES

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