

Fall Prevention in Frail Elderly Nursing Home Residents

A Challenge to Case Management: Part I

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Parts I and II of this article examine the impact of a falls prevention program on the fall incidents among the residents in a nursing home. It was hypothesized that a diagnostic, therapeutic, and preventive approach should be used for nursing home residents identified as being at high risk for falls in order to reduce the number of fall incidents and to improve quality of life for this vulnerable population. The program effectively targeted both intrinsic and extrinsic factors to reduce risks facing the residents. The effectiveness of the program was evaluated by examining changes in the rate of falls after the program was implemented. The results identified that a multifaceted program, one that utilized multiple personalized interventions, was effective in reducing the falls rate of frail (those with complex medical and psychosocial problems) nursing home residents, and that muscle-strengthening interventions may be beneficial for this vulnerable population. Program outcomes verified that case managers can impact quality of life for frail elderly nursing home residents by promoting their independence and safety, and postponing problems resulting from inactivity. Part I discusses the background and process of a falls program and factors contributing to the occurrence of falls. Part II will examine the interdisciplinary team approach to assessment, method, and implementing strategies for an effective fall prevention program. Tools used for prevention, monitoring, and investigation of falls will be detailed in Part II.

In 1997 there were 34 million Americans 65 years of age and older (Rothchild, Bates, & Leape, 2000). This population is expected to double by 2030, with the most dramatic increases anticipated in those over 85 years old. "Nearly 2 million Americans live in nursing homes, and the figure is expected to reach 5 million by 2030" (Rothchild et al., 2000, p. 2717). In addition, the average nursing home resident has become older, sicker, and more functionally dependent in recent years (Rothchild, Bates, & Leape, 2000). Older patients are at greater risk, have unique problems, and require age-appropriate measures to achieve acceptable levels of safety in nursing homes. "The 1985 National Nursing Home Survey showed that over 60% of the residents had a limitation in mobility" (Burke & Walsh, 1997, p. 342). Normal aging is accompanied by a decrease in activity that influences strength, decreases balance, and leads to gait changes, all of which can precipitate falls in the elderly. The consequence of falling may

result in psychological effects, such as loss of independence and confidence, injuries, and mortality. "Among persons 85 years and older, one of five fatal falls occurs in a nursing home" (Rubenstein, Josephson, & Robbins, 1994, p. 442).

SIGNIFICANCE OF THE PROBLEM TO CASE MANAGEMENT

A major challenge for case management is to promote independence and safety in the elderly and postpone problems resulting from inactivity. Case management plans need to further the greatest possible independence, while striving to provide safety for our patients. Rubenstein et al. (1994) reported that "to prevent falls, a systematic therapeutic approach

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to residents who have fallen is necessary, and close attention must be paid to identifying and reducing risk factors for falls among frail older persons who have not yet fallen" (p. 442). "The more frail people are, the more they depend on the environment for support, both before and after falls" (Funk, Tornquist, Champagne, & Wiese, 1992, p. 45).

THE NATURE OF THE FALLS PROGRAM AND CASE MANAGEMENT PLAN

A comprehensive case management plan, including a multidisciplinary falls program, was implemented to determine what effect it would have on frail nursing home residents fall behaviors. The program involved a preassessment and careful postfall assessment, coupled with recommendations for specific treatment and preventive interventions. The assessments were designed to uncover general health problems as well as risk factors contributing to the fall. A multidisciplinary team reviewed the assessments, focusing on identifiable causes, risk factors, and individualized preventive approaches. Also, the team's therapeutic recommendations were directed toward treating active problems, minimizing risks, and correcting environmental hazards. While complete elimination of falls in frail nursing home residents is unrealistic, minimizing their frequency is a realistic goal of quality case management. The specific beneficial outcome desired from the falls program was to reduce the number of recurrent falls, which would also impact quality of life and decrease morbidity and mortality of residents.

LITERATURE REVIEW

Unfortunately, the frail elderly are often excluded from studies or research. However, in order to better understand the impact of physical deconditioning and multisystem diseases on homeostasis, the scope of case management must broaden to encompass the aging population. "The growing number of nursing home residents underscores the need to develop and implement preventive programs for this vulnerable population" (Ray et al. 1997, p. 557). Many interventions to prevent falls are more appropriately carried out by healthcare providers rather than by the person at risk of falling.

It has been reported that over two-thirds of persons living in nursing homes will fall; that there are up to 422 falls per 1000 bed days; or a mean of 1.5 falls/bed/year; with approximately 50% of the 2 million nursing home residents nationwide falling each year and over 40% of such institutionalized fallers hospitalized at least once annually with an average

stay of more than 6 days (Burke & Walsh, 1997; Edelberg, 2001; Funk et al., 1992; Glaser, 1998; Millen, 2001; Ray, et. al., 1997; Rubenstein et al., 1994; Rubenstein, Robbins, Josephson, Schulman, & Osterweil, 1990; Swift, 2001; Walker, 1998). Bayne (1997) reported that "the number one reason for admission to skilled nursing facilities is falls, with 31% from accidents, 17% from balance or gait problems, 13% from dizziness, 9% from so-called 'drop attacks', 5% from unknown causes, 5% from confusion, 2% from visual problems, 1% from syncope, and 17% from other causes" (p. 22). Within an institution, Rubenstein et al. (1994), stated that the frail, high-risk resident tends to fall secondary to gait disorders, weakness, dizziness, and confusion; whereas the community-based person's falls are more related more to their environment. Gregg, Pereira, and Caspersen (2000) reported that walking accounts for 39% of nonsyncopal falls, while 20% due to ascending and descending stairwells.

"In 1985, falls [in the United States] resulted in more than 2 million injuries, 369,000 hospital admissions and nearly 9000 deaths" (Rothchild, Bates, & Leape, 2000, p. 2719). Estimates in 1977, by the National Center for Health Services Research and Health Care Technology Assessment, were that over 6% of all medical care dollars for elderly were spent on unintentional injury, with the majority spent for falls injuries (Province et al., 1995). "This was estimated to have reached \$3.7 billion by 1984, and the prospect is that these figures will likely increase into the next century as the average age of the U.S. population increases" (Province et al., 1995, p. 1342). Englander, Hodson, and Terregrossa (1996) predicted that by 2020, the cost of fall injuries would top \$32.4 billion. The long-term nursing home residents typically suffer from multiple debilitating conditions and functional dependencies that are directly related to nursing time and costs of care.

Expense is only one factor related to falls; however, nearly 25% of fall victims sustain a serious injury from the fall and the likelihood of dying from complications associated with falling increases with age (Eliopoulos, 1997). In addition, once injured in a fall, an elderly person has a much higher case fatality rate than does a younger counterpart who has fallen (Rubenstein et al., 1994). "Accidents are the fifth leading cause of death in older adults, and falls constitute two thirds of these accidental deaths" (Rubenstein et al., 1994, p. 442). In a study by Rubenstein et al. (1990), elderly adults injured in falls were shown to have a higher mortality rate than those without fall injury. This is consistent with the belief that falls are a marker for disease and risk.

Mortality is higher among nursing home fallers (than fallers within the community or acute care) because of their greater frailty and the fact that there are very few fit elderly in nursing homes (Funk et al., 1992). According to Baker and Harvey (1985), there are approximately 1800 fatal falls in nursing homes in the United States annually. Among geriatrics 85 years and older, 20% of all fall-related deaths occur in nursing homes.

Even if no physical injury occurs, fall victims often develop post-fall syndrome or a fear of falling. This has serious consequences for physical functioning and quality of life. For example, victims of a fall may reduce their activities to prevent falls, thus precipitating a cycle of increased dependency, loss of function, loss of confidence, social isolation, depression, and a decreased quality of life (Burke & Walsh, 1997; Edelberg, 2001; Eliopoulos, 1997; Funk et al., 1992; Province et. al., 1995; Rose & Clark, 2000; Tinetti & Williams, 1997; Walker, 1998). Ironically, these self-imposed restrictions on activity only serve to increase the older adult's risk for falling and lead to further immobility (Burke & Walsh, 1997; Rose & Clark). The immobility may result in thrombosis, dehydration, contractures, pressure ulcers, constipation, incontinence, infection, and overall deconditioning. If the nursing home nurse suspects that the resident has post-fall syndrome, then it is important to validate the suspicion with the patient. This psychosocial assessment should provide an insight into the level of ability and the skills that the resident is using to adapt to his or her limitation in mobility and lead to a case management plan.

FACTORS CONTRIBUTING TO THE OCCURRENCE OF FALLS

When establishing a program or plan for fall prevention, it is necessary that the case manager understand why falls occur. In its simplest terms, a fall results from an uncorrected loss of balance. Loss of balance can result from several intrinsic and extrinsic factors. However, the majority of geriatric falls are multifaceted in nature. "The great majority of falls in old age have multiple causes, usually including postural instability, and are precipitated by little external demand" (Funk, Tornquist, Champagne, & Wiese, 1992, p. 46). Intrinsic risk factors relate to the person, and include the following:

- **Age:** The risk of falls is greatest for women, especially those over 75 years old (Burke & Walsh, 1997; Rothchild, Bates, Leape, 2000; Rubenstein et al., 1994; Swift, 2001), probably largely related to osteoporosis.

- **Acute and chronic diseases:** Especially dehydration, arthritis, diabetes neuropathy, cardiovascular disorders, dementia or confusion, peripheral vascular disease, incontinence and nocturia. "The chronic conditions are unlikely to improve or resolve, and each decrement in health and functioning requires renewed efforts and new strategies for helping patients maintain as much of their mobility, activities, psychosocial well-being, and self-care ability as possible" (Glaser, 1998, p. 132). The focus, according to Glaser, should not only be on the diseases, but on the individual's abilities.
- **Depression:** "The chances of falling were more than 30 times greater for patients who were depressed than for patients who were not depressed" (Funk et al., 1992, p. 67).
- **Neurologic conditions:** Any insult that undermines neurologic function increases fall risk, such as cerebral vascular accident or Parkinson's disease.
- **Muscular-skeletal conditions:** Decreased muscle mass or sarcopenia, and degeneration of large joint mechanoreceptors which alters proprioception, occurs with aging. It has been reported that between the ages of 50 and 70, the average adult loses 30% of muscle mass or strength, with even greater losses after the age of 70 (Butler, 2000; Christmas & Andersen, 2000; Walker, 1998). This decrease also lowers bone density, which increases risk of fractures, with or without a fall. In addition, older adults "typically exhibit increased sway stemming from two factors: a decreased ability to control a narrow base of support during ambulation and a reduction in stride length" (Edelberg, 2001, p. 42). These changes, according to Walker (1998), result in shorter, slower strides, which impedes an older adult's mobility and increases difficulty in adapting to sudden environmental changes.
- **Foot disorders:** Abnormally long toenails, deformities, or bunions impact gait.
- **Visual impairments:** Loss of ambient and peripheral vision, loss of contrast or color sensitivity, and problems with glare develop from cataracts, glaucoma, macular degeneration, and night blindness all intensify risk.
- **History of previous falls, especially falls involving fractures:** "Nursing home residents with fall history were more than three times as likely to fall during the follow-up period than residents without a fall history" (Kiely, Kiel, Burrows, & Lipsitz, 1998, p. 551).
- **Nutritional status:** Due to a variety of reasons (lack of access, confusion, decreased thirst, etc.),

frail adults frequently do not drink enough fluids, especially water. Thus, they tend to dehydrate and develop electrolyte imbalances readily.

- Use of medications or alcohol: Numerous studies have validated an association between medications and falls, especially hypnotics, psychotropics, antidepressants, cardiovascular agents, and diuretics. "Moreover, empiric and anecdotal data have consistently shown that any patient taking three or more prescription medications is at risk of falling" (Edelberg, 2001, p. 43). Also, the more medications the patient takes, the greater the risk of errors or interactions that can contribute to falls (Kimbell, 2001). Secondary to the decline in liver and kidney function, medications and alcohol are metabolized slower, which increases their toxic effects. Thus, even in small quantities, alcohol can cause gait disorders in the elderly.
- Postural hypotension and syncope: "Episodes of brief loss of consciousness account for approximately 4 to 8% of falls, and up to one third of older patients with syncope have recurrent episodes" (Edelberg, p. 42). Postural hypotension, Edelberg states, results in approximately 5% of falls, and is often related to medications, dehydration, baroreceptor sensitivity, or deconditioning.

Conversely, extrinsic factors, or outside risks precipitating falls involve the following:

- Task goals of the frail older adult: These include walking to the toilet, rising from a lying or seated position, or bathing.
- Environmental constraints: According to Rubenstein et al. (1994), environmental constraints account for 16% of nursing home falls. Due to aging and disease, frail elderly are more prone to environmental hazards, including: different walking surfaces such as carpeting to flooring, stairs, highly polished floors, or outdoor patios; altered lighting (e.g., direct or indirect lighting, glare, and low ambient lighting); IV poles, commodes, and overbed tables that move when grasped for support; externally imposed time constraints, such as meal times; inappropriate soled footwear; high beds, clutter; spills or wet floors (often secondary to incontinence); and lack of hand rails or skid-proof strips.
- Assistive devices: Improper use of assistive devices, especially if the device is incorrect for the resident, if it is the wrong size, if the resident lacks instruction in its safe use, or if the resident

does not use the brakes during transfers, can all exacerbate fall risk.

- Physical restraints: Restraints have been indicated in studies as resulting in an increase in falls (Glaser, 1998; Neufeld, Foley, Dunbar, Cohen, & Breuer, 1999; Rubenstein et al., 1994). According to Rubenstein et al. (1994), "the risk for a fall related injury was 10 times greater for residents who had been restrained at some time during a 1-year study period than those who had not been restrained" (p. 445).
- Relocation: There is a high incidence of falls within the first week of admission to a nursing home, or readmission after a hospital stay, or after changing a resident's room. Staff need to be aware of the importance of orienting the resident to the room not just on arrival, but throughout the next several days, until the resident seems familiarized with the surroundings. This is especially important on the evening and night shifts as visual clues decrease and the resident becomes tired and more forgetful of their surroundings.
- Staffing: There is an increase in falls when staffing is low, such as during breaks and at shift changes when residents are not as closely observed (Rubenstein et al., 1994), and when there is agency or relief staffing who are not familiar with the residents.

As the number of risk factors increases, the risk for falling increases dramatically (Rubenstein et al., 1994). The most common causes of nursing home falls, according to the literature (Butler, 2000; Kimbell, 2001; Millen, 2001; Rubenstein et al., 1994), are weakness or physical frailty and gait problems, which account for 24% of falls. Lower extremity weakness, Rubenstein et al. (1994) reported, increases the fall risk six fold, and causes gait and balance impairment. These are the most serious immediate causes and risk factors for falls in the nursing home. According to Burke and Walsh (1997), muscular weakness is the result of four factors:

- aging changes in the musculoskeletal system,
- the effects of chronic disease and the medications used in their treatment,
- sedentary lifestyle, and
- undernutrition.

Regarding these factors, one potential risk is wheelchair overreliance by the staff and by the resident as the only form of safe mobility. While walking through nursing homes, it is all too common to hear "sit back down Mr. X, before you fall." The nurse must recognize both the risks and the benefits of

wheelchair use, and plan for staff to walk the resident to ensure that muscle strength is maintained.

Major patterns have been identified regarding causes of falls (Templer & Connell, 1994; Funk, Tornquist, Champagne, & Wiese 1992). The first causation, multitasking incidents, reflected difficulties walking and engaging in another activity concurrently. Excessive environmental demands referred to an absence of environmental features to compensate for the residents' functional losses, such as lack of handholds in open spaces or changes in lighting levels. The third major pattern causing falls was inappropriate use of assistive devices or use of inappropriate items as assistive devices, such as IV poles. The final pattern involved incidents caused by inappropriate transfer techniques, either independently by the resident or assisted by staff. Studying the circumstances surrounding a resident who has fallen helps to identify which pattern or patterns have potentially resulted in the fall. As with risks, once the pattern(s) are known, interventions can be adopted to mitigate the cause(s), thus reducing fall incidents.

Fall prevention programs have been demonstrated in the literature to be effective in nursing homes; however, the studies reviewed rarely adopted an approach in which both the intrinsic and the extrinsic risk factors were systematically manipulated. The program developed at Oak Brook Healthcare Centre was all encompassing. While many risk factors can be eliminated, some cannot; however, reducing the number of factors reduces the risk of falls. "Furthermore, the risk of falling increases with the number of risk factors present, suggesting that a multifaceted strategy of risk factor abatement may reduce the risk of falling" (Tinetti et al., 1994). Also, studying the risk factors may give an idea of which patients are going to fall. When a fall occurs, the elderly take longer to recover and risk significantly more complications; thus, the key word in safety is prevention.

SETTING AND SAMPLE

The program was conducted at Oak Brook Healthcare Center, a 156-bed skilled nursing home in Oak Brook, Illinois. The facility tends to have very few available beds and is currently 93% occupied. It is primarily comprised of long-term stay residents. Long-term stay residents "represent the majority of nursing home occupants, and account for approximately 80% of the costs of nursing home care" (Mulrow et al., 1994, p. 519). Typically, these residents have impaired functional and physical status that directly contributes to their high healthcare utilization and cost (Mulrow et al.). The average stay

for residents is 50 days for Medicare, and several years for custodial care. The mean age of the residents at the study site is 88 years old, with several residents over 100. According to observations by the case manager, Oak Brook Healthcare Centre has an older population than is typically found in nursing homes. Currently, 122 residents are female and 23 are male.

Prior to the initiation of the falls program, the case manager conducted a retrospective pilot study of the fall incidents over a 27-week period. There were 207 falls during the 27-week period prior to the falls program, with an average weekly census of 137.4. This translated into 0.0609 falls per resident per week. The fall rate was calculated as follows:

Number of patient falls per week ÷ Average weekly census for the week

The initial population involved in the concurrent study included all residents (Medicare and long-term care) at the facility from October 1999 until September 2001. All the subjects experienced a mean of three chronic conditions and took an average of six medications (not counting vitamins or as-needed medications). Of these residents, 98% were dependent in at least two activities of daily living; and 98% required a cane, walker, or wheelchair. One-half of the residents were known to have fallen prior to the program's initiation. Finally, urinary incontinence was reported in 80% of the subjects.

In our next issue we will fully examine the interdisciplinary team approach to assessment, method, and strategy implementation for an effective fall prevention program.

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