Falls: Are Rural Elders at Greater Risk?

Accidental falls have been shown to contribute significantly to the morbidity and mortality of the elderly, whether they live in urban or rural areas. Among those in the U.S. age 65 and over, a leading cause of death from injury is accidental falls (Baker, Narvy, & Karph, 1992). The results of injury-producing falls range from minor soft-tissue injuries to fractures and subsequent disabilities (Kiel, O'Sullivan, Teno, & Mor, 1991). As people age, falls are notably more serious. In those age 75 and older, the death rate due to falls in 1990 was 59 per 100,000 individuals, with males of this age having only slightly more fall deaths than females (National Safety Council, 1993).

Accidental falls have a significant impact on people who fall, the health care community, and society. Falls in elderly persons are likely to lead to subsequent increased use of health care, including hospitalizations, health care provider contacts, and nursing home admissions. Even if there is no physical injury from a fall, the anxiety and fear that become part of the lives of many who have fallen lead to increased health care contacts and decreased sense of well-being. It is becoming increasingly clear that different groups of older individuals fall for different reasons (Speechley & Tinetti, 1991; O'Loughlin, Robitaille, Boivin, &
Suissa, 1993). Cwikel, Fried, and Galinsky (1990) concluded that older fallers with no major health concerns were likely to dismiss falls as inconsequential, providing the fall did not result in injury. Remedial programs to address fall risks, founded on understandings of older patients’ specific risks and vulnerabilities, have been successful (Fiatarone et al., 1990; Rubenstein, Robbins, Josephson, Schulman, & Osterweil, 1990), therefore, it is imperative to focus on the specific risks faced by different groups of elderly that are particular to their life situations.

Analysis of population changes since the 1960s reveals both a net and relative loss in the numbers of elderly in metropolitan areas (a geographic area of at least 50,000) and a gain in numbers in non-metropolitan areas. This population trend, which in the 1970s was due to migration of elderly into non-metropolitan areas, and to diminished numbers of young people in these same areas both before and after that decade, is thought now to have stabilized (Fuguit & Beale, 1993). In recent years, considerable attention has been given to the health status and the costs of care of rural elderly. Research indicates that if there is a comparative health disadvantage among rural elderly, it is slight, but that rural residents generally lack access to a variety of health services (Cutler & Coward, 1988; Leinbach, 1988; Coward, Duncan, & Freudenberger, 1994).

Studies that investigate accidental falls specifically among rural elderly in the United States are not readily found. In an unpublished 1984 study, Pfister investigated factors associated with falls in a small sample (N=20) of rural elderly. Of the 10 subjects who fell, the majority did so more than once in the year prior to the study, and, among those who fell, there was a higher than expected incidence of injuries.

Studies are found in international research on the rural elderly. Finnish researchers (Ryynanen, Kivela, Honkanen, Laippala, & Soini, 1991) concluded that, among community-living elderly, 23% to 39% fall at least once a year, a finding that held true in Finland for the rural elderly as well. Japanese researchers studied the incidence of and the circumstances related to falls among the elderly in a rural community in Japan, and found that most falls occurred during the daytime and outdoors, with the primary cause of falls being extrinsic, rather than intrinsic (Yasumura et al., 1991; Yasumura et al., 1994). A study of home accidents in rural Sweden revealed that the majority of home accidents occurred in connection with moving, play or recreation, and hobbies. The predominant types of injuries were contusions, fractures, and wounds (Schelp & Svanstrom, 1986).

Studies have revealed that certain risk factors apply to both community-living and institutionalized elderly. Risk factors common to both groups include: a fall history, musculoskeletal problems, a prior fall associated with activities of daily living, isolation in living arrangements, number of medications, psychoactive medications, and limited mobility (Craven & Bruno, 1986; Robbins, Rubenstein, Josephson, Schulman, & Osterweil, 1989). Risk factors, however, cannot predict a fall with certainty, and an adult with no identifiable risk might experience a fall.

Figure 1 indicates that many interrelated factors contribute to falls among elderly; and that regardless of fall history, self-perceived risks to health and safety can influence behavior, ultimately increasing or decreasing fall risk. Aging may be associated with health factors that lead to falls; independent of age, environmental factors also can lead to falls. Many elderly, as fallers or nonfallers, develop a sense of vulnerability to personal health and safety. The individual can respond to this feeling of insecurity with wise precautions, leading to a decreased fall risk. However, if no precautions are taken, or if none are increased, they may lead to a cycle of repeat falls.

**PROBLEM STATEMENT**

In an effort to shed light on the question of falls among the rural elderly, a health care issue with a potential for preventive interventions, this research was designed to answer: What is the incidence of falls, and what risk factors, if any, are associated with falls among a
group of rural, community-living older adults?

For the purpose of this study, the definition of fall was taken from the Kellogg International Work Group on the Prevention of Falls by the Elderly: A fall is defined as “an event which results in a person coming to rest inadvertently on the ground or other lower level, and other than as a consequence of the following: sustaining a violent blow, loss of consciousness, sudden onset of paralysis...or an epileptic seizure (Gibson, Andres, Isaacs, Radebaugh, & Worm-Petersen, 1987, p. 4). The term faller will be used, not to label a person or group of people, but to facilitate this report, and will identify a person who has fallen at least once in a designated period of time.

METHODS

Study Participants

A non-random, voluntary sample of 31 subjects age 65 or older, residing in a rural area of the Olympic Peninsula in northwest Washington, participated in the study: 12 were males and 19 were females, with an age range from 65 to 89 years (M=76.6). (Rural was defined as a community of less than 2,500 inhabitants, per the U.S. Census Bureau.) Of this group, 16 had fallen in the past year and 15 had not fallen. More than half (61%) were married; the remaining 39% were single, widowed, or divorced. All subjects lived in private homes. Sixty-one percent lived with another person, and 61% had dog(s) or cat(s) for pets.

Instruments and Procedure

The instrument “Study of Falls in the Elderly” has been used histori-
cally to assess fall risks in elderly populations. Content validity and reliability of the tool were ascertained by Perry (1982) and Craven and Bruno (1986). The earliest published study using the tool was by Perry (1982), who found 86% agreement on questions concerning the number of falls, and perfect agreement on items regarding cause of fall, injury, and medications. This instrument was also used by Pfister (1984) in her research into falls in a rural population.

The data obtained with the instrument included: demographics, history of previous falls, circumstances surrounding most recent fall, recent illnesses, clothing worn at time of fall, medications, sensory/motor changes, voiding problems, ambulation, self-perception of safety and confidence; and environmental safety and confidence. All data were obtained by self-report of subjects.

Subjects were invited to participate in the study by means of a posted notice that was shared with members of the community’s senior citizens club. A list of eligible people who were willing to participate was readily developed and appointments were made by phone for interviews in subjects’ homes or at the senior citizens club. Every person who expressed interest in the study was enrolled, without regard to fall history. Individual interviews were conducted with each subject by one of the investigators.

RESULTS

Fall Incidence

Data regarding falls were collected exclusively from subjects who had fallen at least once in the previous year. Fifty-two percent of subjects (n=16; mean age 76) had sustained at least one fall, and 48% (n=15; mean age 77) had not fallen in the previous year. In each age group there was a fairly balanced number of fallers and non-fallers. In general, fallers were represented in greater numbers in the 75 and younger age group, with the greatest number (n=5; 31%) among the 71- to 75-year-olds. The second greatest number (n=4; 25%) was among the 65- to 70-year-olds (Figure 2). These two groups together comprised 56% of the fallers.

Males and females were represented in each age group. The number of women equaled or exceeded the number of men in all groups except one, the age group of 81- to 85-year-olds. Women significantly outnumbered men (4:1) in the oldest group. Proportionately more males (67%; n=8; mean age 77) than females (42%; n=8; mean age 75) were fallers.

Data regarding frequency of falls revealed that 50% (n=8; mean age 75) of those who fell did so only once. Of repeat fallers, 50% (n=4; mean age 77) fell twice, 38% (n=3; mean age 81) fell three times, and 12% (n=1; age 68) fell 10 times in the previous year. Repeat fallers were equally represented with regard to gender (female n=4; male n=4). The mean age of both female and male repeat fallers was the same—77 years.

Figure 2. Age distribution: faller and non-faller groups.

Fall Circumstances

For those subjects identified as fallers, detailed information about the fall event was gathered only with regard to the most recent fall event. Falls occurred in a variety of settings, which are enumerated in Table 1. For the purposes of analysis and discussion, the fall events are identified in Table 1 as to whether they occurred indoors (44%) or outdoors (56%), and whether or not the subject was engaged in an activity that involved maintenance or support of the home (44%).

Sixty-two percent (n=10) of sub-
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Projects were alone when they fell; the remaining six (38%) were in the company of at least one adult. No subject had a warning before falling, was ill before falling, or had been confined to bed before falling. Most falls (n=14; 88%) occurred between 6 AM and 6 PM. Only two falls occurred between 6 PM and 6 AM.

Fallers in this study experienced only minor injuries as result of their falls. Thirty-one percent (n=5) of fallers sustained injuries, ranging from a bloody nose to minor soft-tissue abrasions and bruises. Of the injury falls, 80% (n=4) occurred to those who had fallen only once in the previous year. The one subject who had fallen 10 times was among those not injured. Of the five who were injured, four (80%) were female, and only one was male. No faller received medical treatment as a result of his or her fall(s).

Characteristics of Fallers

Seventy-five percent (n=12) of the fallers lived with at least one other person, 75% (n=12) were married, 13% (n=2) widowed, 6% (n=1) single, and 6% (n=1) divorced. Of fallers, 63% had pets. The daily average number of medications taken by fallers was 2.7, and by non-fallers 2.3. While fallers took more cardiovascular drugs than did non-fallers, the difference between groups was not significant.

Sensory/motor status was evaluated through a variety of questions regarding difficulties with vision and ambulation. In this regard, differences between the groups were slight to nonexistent.

Self-assessment of individual health and of health compared to others was evaluated through two multiple-choice questions. Fallers generally rated their health as better than non-fallers rated theirs: 59% (n=13) of the 22 subjects who rated their health as excellent or good were fallers, while 41% (n=9) were non-fallers; and no subject rated his or her health as poor or as worse than others of similar age.

A pair of questions utilizing a Likert-type scale yielded data regarding feelings of personal confidence and safety when mobile. Of the fallers, all subjects felt very confident or confident when mobile and felt very safe or safe when moving about. In a series of questions designed to evaluate general concern about falling, subjects were asked to rate their degree of concern in 14 different environments or activities. Fallers indicated no concern about falling in any of the 14 situations or activities.

Precautions to prevent falls were taken by 81% (n=25) of subjects with more non-fallers (n=14) stating they took specific actions to prevent falls than did fallers (n=11). Railings in the bathroom, a cane when outdoors, and holding on to something nearby when walking were the most common precautions.

Discussion

This study validated findings from many investigations which have reported that falls are a common occurrence among community-living elderly. Over 50% of the rural-living elderly subjects in this study, though, had fallen at least once in the preceding year, which is a higher fall rate than the 30% to 35% rate generally reported in the literature. The apparently high rate of falls reported in this population may be related to the definition of fall that was used and the investigators' opportunity to classify each participant strictly in accordance with that definition. Many subjects in this study were heard to dismiss their falls and identify themselves as a non-faller, saying, for example, "It was my fault," or "It wasn't a real fall; I didn't get hurt." Because of the nature of the data collection sessions, it was possible to clarify the working definition of fall with the subjects, and to accurately identify their fall status.

Most falls reported in this study, including those among repeat fallers, did not result in serious injury, which was an unexpected finding. Of the 31% of falls in this study that resulted in injuries, none were serious or required medical attention.

Another unexpected finding was lack of apparent relationship between medication profile and fall status. While more subjects took cardiovascular drugs than any other category, there was no significant difference in such use between faller and non-faller groups.

Nocturia has been identified as a significant risk factor for falls in other studies. While 87% of the subjects in this study experienced nocturia, it did not prove to be a risk factor.

Environmental factors, such as tripping on a piece of firewood and
having brush snap underfoot, contributed to well over half of the falls in this study in a very rural environment. This study, in which most participants rated their health as excellent or good, and generally appeared to exemplify healthy aging, supported earlier research with regard to intrinsic factors being associated with falls in those who are frail, and environmental factors being associated with falls in those who enjoy better health.

Nearly half of the falls in this study were related to home maintenance or support, and reflect demands of rural living. The investigators observed that women and men in this region, because of lifestyle choices and necessity, routinely engage in physical activities (such as stepping off and on a moving tractor, pruning trees, working outdoors in the rain) which support their independent living. All subjects who fell while outdoors stated no intention of discontinuing the type of activity in which they were involved when they fell. These individuals have had little choice but to provide for their own needs through the years; and, as long as adequate good health allows, they expect to maintain their homes, yards, and farms with a self-sufficiency to which they aspired in their youths.

Some fallers affirmed that they had modified their approach to routine tasks in situations that might be risky. For example, one woman stated that when she needs items on a high shelf in the kitchen, she now climbs up on a stool chair rather than using one with a narrow base of support. Another described her caution in pruning fruit trees: she no longer climbs off the top of the ladder into the tree; instead, she props the ladder on branches, climbs up “only four or five feet,” and maintains her balance with her left hand while using a pruning saw with her right hand. The above anecdotes suggest that some rural elders may appraise situations as hazardous and decide not to retreat from them, but instead modify their behavior just to the point that the degree of risk seems acceptable.

Contrary to findings in other studies, 89% indicated no concern about falling in a variety of routine or recreational activities, and no fear of being injured should they fall. In fact a number of subjects stated that they expect to have accidental falls, and that their livelihood and/or the quality of their lives would be diminished if they took precautions to avoid all falls. A 75-year-old male who fell while hunting (due to falling over a log after becoming “crotch-bound” in his long underwear) asserted that, “You’re going to fall all the time in the woods, but nobody ever gets hurt.”

Although few subjects reported fear of falling, it is of interest that over 80% took some type of action to prevent falls, even if the actions might be seen as very conservative. Conceivably, the very preventive actions taken were sufficient to allow these elderly subjects to feel safe in their surroundings.

**LIMITATIONS**

This study had several limitations. The senior citizens club, through which most contacts were made, was comprised of life-long residents of the small community whose way of life required a high degree of independence. Frail elderly of the community may have been underrepresented in this study, either because they were underrepresented in the club and were thus inadvertently omitted from the sample; or because they, in fact, do not live in the community due to a selective loss of their numbers from this rural area to larger communities where more support services are available. While cognitive decline was not an exclusionary factor, both the means of subject recruitment and of data collection inadvertently excluded participation by individuals with dementia. By the nature of the population of this rural area, the sample included only Caucasians and those who speak English. While all data were collected through interview, the information compiled was based on retrospective self-report.

**NURSING IMPLICATIONS**

This study and other studies indicate that the fall-risk profile for rural elderly differs from that of their non-rural counterparts. In this study, the lifestyles of the subjects influenced their conduct with regard to health-related behavior and thus influenced the set of risk factors for falls. The concept that falls and injuries among elderly are necessarily associated...
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with frailty was abruptly modified through this study. This serves as a reminder that pre-judging any group of clients for whom health care is planned or provided may lead to erroneous conclusions and inappropriate plans of care.

Important goals when providing nursing care for older clients are to support independence, autonomy, and a maximal level of functioning. If nurses, in well-intentioned health promotion efforts to reduce accidental falls, advocate that elderly clients engage exclusively in behaviors that are free of risks, the goals previously cited will not be advanced. A fundamental practice for all health care providers, in their efforts to support the autonomy of clients, is to supply information that clients can use to make informed decisions about their health care.

These rural elders remind us that there is a range of safe and acceptable risk depending on the lifestyles and the demands of daily living. These same elderly may be at greater risk for falls and injury in an urban area than in the rural environment in which they have lived for much of their lives. In the rural environment they have acquired skills to protect themselves when tripping in underbrush or stumbling over firewood. These skills continue into late life and, with some modifications as they described to the investigators, serve them well in their advancing years.

Nurses who provide primary or acute care should also be aware that falls in the elderly may not be primary events, but indicators of an as yet undetected decline in health. Because it currently is well accepted that falls are a frequent and potentially devastating experience of older adults, it is reasonable to suggest that all health care providers give information and advice about fall prevention to their clients. This study also suggests that the health care provider tailor that information to the specific lifestyle of the older adult.

REFERENCES


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FALLS

KEYPOINTS


1. Advocating that elderly clients engage exclusively in behaviors that are free of risks may not always advance the goals of independence, autonomy, and a maximal level of functioning.

2. Falls in the elderly may not be primary events, but indicators of an as yet undetected decline in health, suggesting that the health care provider tailor fall prevention information to the specific lifestyle of the older adult.

3. There may be a range of safe and acceptable risk depending on the lifestyles and the demands of daily living.