A Fall Prevention Program For Elderly Individuals

Exercise in Long-Term Care Settings
Walking and strength training are examples of effective strategies to offset declining strength and improve balance, thus reducing falls and promoting well-being.

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ABSTRACT
The purpose of this research was to explore the role of exercise in preventing falls, specifically assessing the effectiveness of an ankle strengthening and walking program to improve balance, ankle strength, walking speed, and falls efficacy and to decrease falls and subjects' fear of falling. Sixteen individuals participated in the study which was conducted at two nursing homes. Subjects were assigned randomly to an intervention or control group. The participants in the intervention group completed a 3-month supervised program of ankle strengthening exercises and walking. Descriptive statistics were used to characterize the sample, and differences in the least square means were used to assess the outcome variables (i.e., balance, ankle strength, walking speed, falls, fear of falling, falls efficacy) before the exercise program, and again at 3 months and 6 months after the program for the intervention and control subjects. Findings for the intervention group from pretest to 3-month posttest were, for the most part, maintained or in the predicted direction, suggesting that regular exercise shows promise for preventing deterioration and improving fall-related outcomes for elderly nursing home residents.

Elderly individuals in nursing homes are especially prone to falling and the ensuing complications. Two specific objectives in Healthy People 2000 call for a reduction in deaths from falls and fall-related injuries and a reduction in the number of hip fractures among older adults that, in turn, will reduce hospitalizations for this condition (United States Department of Health and Human Services [USDHHS], Public Health Service, 1991b). A panel for the National Institute for Nursing Research identified the need to investigate programs and strategies that will decrease the likelihood of falls in long-term care settings as a priority area for research (“Nursing Panel Recommends,” 1994). In particular, the role of exercise in fall prevention was cited as beginning to show promise (“Nursing Panel Recommends,” 1994).

Older adults can benefit from muscle strengthening exercises (Fiatarone et al., 1990; Topp, Mikesky, Dayhoff, & Holt, 1996). It has been shown that walking is a common form of physical exercise among nursing home residents and their attitudes toward physical exercise are largely positive (Ruuskanen & Parkatti, 1994). Although the use of exercise to prevent falls in older adults seems reasonable, the effectiveness of exercise as a fall prevention strategy for older adults in long-term care settings has not been tested and reported extensively. This article reports the findings from a pilot study intended to examine the role of exercise in fall prevention. Specifically, the purpose of this research was to assess the effectiveness of an ankle strengthening and walking program in improving balance, ankle strength, walking speed, and confidence to perform daily activities without falling (i.e., falls efficacy); and in decreasing elderly nursing home residents' fear of falling and number of falls.

LITERATURE REVIEW
Falls
Falling is a serious problem for elderly nursing home residents. The
mean incidence rate is 1.5 falls per bed per year (Rubenstein, Josephson, & Robbins, 1994). Falling multiple times also is problematic (Watson & Mayhew, 1994). In fact, repeated falling is a strong predictor for admission to a nursing facility (Tinetti & Williams, 1997). Gaebler (1993) found that hospitalized patients who were multiple fallers were 2.5 times more likely to be transferred to a nursing home than a group of hospitalized single fallers.

**Risk Factors**

**Intrinsic Factors.** Intrinsic factors include general risk factors such as increased age and having a history of falls (Dunn, Rudberg, Furner, & Cassel, 1992; Kiely, Kiel, Burrows, & Lipsitz, 1998; Malmivaara, Heliovaara, Knekt, Reunanen, & Aromaa, 1993; Sullivan & Badros, 1999). Other intrinsic factors that increase the risk for falling include age-related physiological changes as well as pathological diseases of various body systems, especially cardiovascular, neurologic (in particular balance and gait), musculoskeletal, and urologic (Kilpack, Boehm, Smith, & Mudge, 1991; Rubenstein et al., 1994; Stalenhoef, Crebolder, Knottnerus, & van der Horst, 1997; Watson & Mayhew, 1994). In addition to physiological and pathological changes, the probability of falling increases with the use of medications, particularly antihypertensives, phenothiazines, and sleeping medications (Stalenhoef et al., 1997; Watson & Mayhew, 1994).

**Extrinsic Factors.** Extrinsic factors refer to environmental hazards that increase the likelihood of a fall, at home or in a long-term care setting (Walker & Howland, 1991; Watson & Mayhew, 1994). Common examples of hazards include presence of scatter rugs, slippery floors, and inadequate lighting.

**Consequences**

Consequences of falling are numerous and include fractures and/or soft tissue injury, death, and the fear of falling again (National Safety Council, 1997; Sattin et al., 1990; Walker & Howland, 1991). In 1994, falls were the leading cause of death for people age 75 and older, and falls among adults age 55 and older accounted for 81% of all fall deaths from 1979 to 1987 (National Safety Council, 1997; USDHHS, 1991a). In a study examining fall-related emergency department visits for a 2-year period for all ages, injury severity increased significantly with age. And 62% of the emergency department visits that resulted in hospitalizations involved individuals age 65 and older (Mathers & Weiss, 1998). Another significant consequence for older adults is fear of falling, which may compromise independence and quality of life (Tinetti, Mendes de Leon, Doucette, & Baker, 1994). Therefore, falls have emotional as well as physical costs.

**Exercise Studies**

There is mounting evidence that various types of exercise (e.g., progressive resistance strength training, flexibility training, aerobic exercise) are effective in offsetting declining strength as well as improving balance and gait velocity in older adults (Chandler & Hadley, 1996; Hopp, 1993). Several exercise studies have shown an improvement in upper and lower extremity strength of elderly individuals (Fiatarone et al., 1994; Judge, Underwood, & Gennosa, 1993; Lord, Caplan, & Ward, 1993; Skelton, Young, Greig, & Malbut, 1995). Gait speed of older adults also improves with exercise (Judge, Underwood, & Gennosa, 1993; Topp et al., 1996). In addition, balance has been shown to improve with different types of exercise for elderly individuals (Judge, Lindsey, Underwood, & Winsemius, 1993; Lord et al., 1993). Another benefit of exercise for older adults is increasing joint flexibility, especially of the ankles and knees (Mills, 1994; Topp et al., 1996).

Finally, the act of walking requires adequate balance and is an appropriate exercise strategy for most older adults. Roberts (1989) examined the effect of a 6-week (three times per week) walking program on balance in older adults. The intervention group had significantly better balance scores than the control group, and balance was improved significantly from pretest to posttest for the intervention group, in comparison to the control group. In another study, nursing facility residents (mean age = 87.6) who participated in a walking program showed improvement in their ambulatory status and a decrease in falls after participating in the program (Koroknay, Werner, Cohen-Mansfield & Braun, 1995). Subjects included residents who could ambulate at least 5 feet and those who needed the help of one individual to ambulate. Ambulatory status was measured on a seven-point scale ranking from "independence" to "complete dependence," and the authors described the measurement of falls as the occurrence of falls during the past month (information was provided by the nursing staff) (Koroknay et al., 1995).

Exercise programs frequently are recommended as strategies to prevent falls (American Nurses’ Association, 1994; Ulfarsson & Robinson, 1994; Watson & Mayhew, 1994), and studies to test the effectiveness of exercise to prevent falls are growing in number. Tinetti et al. (1994) studied older adults living in the community who had at least one risk factor for falling. The intervention group subjects were given a combination of adjustment in their medications, behavioral instructions, and exercise programs, whereas the control group received the "usual health care" plus social visits. A 1-year follow up showed the intervention subjects fell significantly less than the control group, were significantly more confident they could perform 10 common activities without falling, and had a significantly
greater mean decline in the total number of risk factors, compared to control group subjects. Lord, Ward, Williams, and Strudwick (1995) identified a trend for control group subjects to cite the causes of their falls as being balance related more often, compared to exercise group subjects. A study by Province et al. (1995) found the fall interventions that included exercise were effective in reducing the risk of falls, especially the interventions that included balance training.

The consequences of falls in older adults are serious and can affect both physical and emotional well-being. There is evidence that older adults, even frail older adults, can improve muscle strength, balance, and gait velocity with exercise, and there are beginning indications that exercise can play an important role in preventing falls. The research goals of this study were to assess the effectiveness of an ankle strengthening and walking program to:

- Improve balance.
- Increase ankle strength.
- Improve walking speed.
- Decrease falls.
- Decrease subjects’ fear of falling.
- Improve subjects’ confidence in performing daily activities without falling.

For this study, a fall was defined as an unexpected event in which individuals found themselves on the ground and the potential for injury exists (Tideiksaar, 1989).

METHODS

Design

A pretest-posttest design was used to evaluate changes in balance, ankle strength, walking speed, falls, fear of falling, and falls efficacy, with measures taken at baseline and again at 3 months and 6 months after initiation of the intervention.

Sample and Setting

The study was conducted at two long-term care facilities located in the midwestern United States. Subjects were recruited who:

- Were at least age 65.
- Were able to ambulate independently or with an assistive device.
- Were able to speak and understand English.
- Had a score of 20 or higher on the Mini-Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975).
- Did not have an unstable physical condition, evidence of terminal illness, or a history of acting-out or abusive behavior.

Procedure

The Director of Nursing at the nursing homes identified potential subjects, and physician approval to participate was obtained. After the subjects gave their written consent, the MMSE (Folstein et al., 1975) was administered. Subjects who scored 20 or higher then were interviewed to collect baseline data on all variables, and medical charts were reviewed for fall history, medications, and chronic conditions. Based on their Risk Assessment for Fall Scale II (RAFS II) (Ross, Watson, Gyldenvand, & Reinboth, 1991) scores, subjects were matched in pairs and assigned randomly within each pair to the intervention or control group. In this study, there were two individuals who were roommates, and they were assigned to the same group to lessen the possibility of contamination between the intervention and control groups. Baseline assessments were repeated 3 and 6 months after initiation of the intervention for both the control and intervention groups. In addition, medical records were checked monthly to determine if any subjects had fallen.

Intervention

Supervised exercising was completed three times weekly for 3 months, lasting approximately 20 minutes each time, with the ankle strengthening exercises completed first, followed by the supervised walking. Equipment necessary for the exercise program included any assistive device the subject usually used and a straight chair.

Ankle Strengthening Program

Subjects were instructed to:

- While standing upright with feet slightly apart on the floor, hold on to the back of a straight chair.
- Slowly raise both heels until body weight is on balls of the feet and hold for a count of three.
- Do 5 to 10 repetitions, increasing the number of repetitions as strength increases.

In addition to strengthening the ankles, this exercise served as a warm up for the walking program (Greninger & Kinney, 1988; Hurley, 1988; Perkins-Carpenter, 1991).

Walking Program

Subjects walked, with a research member at their side, for 10 minutes, if tolerated. Time was increased until 10 minutes of sustained walking was reached, if possible. After that level was reached, distance and gait speed were increased according to each individual’s capabilities.

Variables and Instruments

Demographic Information

Six items were included that assessed: age, gender, marital status, race, education, and length of residency at the nursing home.

Fall History

Subjects’ charts and incident reports were reviewed to ascertain if any of the subjects had fallen in the year prior to the study and during the study.

Cognition

The MMSE (Folstein et al., 1975) is an 11-item screening test of cognitive function. Scores range from 0 (severe dementia) to 30 (normal). A score of 23 or lower has been established as indicative of cognitive impairment (Cockrell & Folstein, 1988). Test-retest reliability over a 24-hour period was at least .89 in a psychiatric and neurologic population, and interrater reliability was at least .82. Validity was established by a significant, positive
Instructions: For each statement, circle the number that best represents the level of confidence expressed, using the code shown below.

1 = No confidence at all to 10 = Extreme confidence

"How confident are you that you can…

1. Take a bath or shower
2. Reach into closets
3. Do “light” housekeeping (e.g., clean up your nightstand or dresser)
4. Walk around the nursing home
5. Get in and out of bed
6. Get up at night to go to the bathroom
7. Get in and out of a chair
8. Get dressed and undressed
9. Do personal grooming (e.g., wash your face, comb your hair)
10. Get on and off the toilet

...without falling?"

_____ = of Total 100

Figure. Modified falls efficacy scale. Adapted with permission from Tinetti, M.E., Richman, D., & Powell, L. (1990). Falls efficacy as a measure of fear of falling. Journal of Gerontology, 45(6), P239-P243.

correlation between elderly subjects’ MMSE scores and their scores for the Wechsler Adult Intelligence Scale (Folstein et al., 1975).

Mobility/Activity Information. Subjects were observed for their level of mobility, including assistive devices used. In addition, subjects were asked how often they walk, attend group exercise classes, and participate in other activities or exercises.

Balance. The ability to maintain balance was measured by a stop-watch for up to 10 seconds for three stances:
- Parallel stance (feet together, side by side).
- Semi-tandem stance (toe of one foot beside heel of other foot).
- Tandem stance (heel of one foot touching and in a straight line with toe of the other foot).

No assistive devices were allowed, eyes were open during the stances, and arms could be in any position. Test-retest reliability of the balance assessments demonstrated reproducibility coefficients of .70 to .99, and the tandem stance measure has been shown to discriminate between normal subjects and those with vestibular disease (Bohannon, Larkin, Cook, Gear, & Singer, 1984; Graybiel & Fregly, 1966).

Ankle Strength. A heel-raising exercise was used to assess ankle strength. For 30 seconds, the number of times subjects could raise their heels at least 2 inches off the floor, while holding onto the back of a straight chair, were counted (Perkins-Carpenter, 1991).

Walking Speed. Using a stop-watch, the amount of time to walk 6 meters was measured (Buchner et al., 1993). Same-day test-retest reliability of walking speed was found to be high (reproducibility coefficient > .90) (Guralnik, Branch, Cummings, & Curb, 1989; Reuben & Sui, 1990).

Fall Risk Assessment. The RAFT II (Ross et al., 1991) is a 13-item tool that provides an indication of the risk for falling. Items assessed are: length of time since admission, age, history of falling, balance, mental status, agitation, depression, anxiety, vision, communication, medications, chronic diseases, and urinary function. Scores range from 1 to 39, with risk increasing as the score increases. A score of 14 or higher indicates a high risk for potential of trauma by falling. The RAFT II was used in an acute care hospital and three extended care facilities and found to be 90% accurate for predicting falls.
TABLE 1
DEMOGRAPHIC CHARACTERISTICS OF THE STUDY SAMPLE

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total Group (N = 16)</th>
<th>Control Group (n = 7)</th>
<th>Intervention Group (n = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Men</td>
<td>4</td>
<td>25.0</td>
<td>3</td>
</tr>
<tr>
<td>Women</td>
<td>12</td>
<td>75.0</td>
<td>4</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65 to 70</td>
<td>1</td>
<td>6.3</td>
<td>1</td>
</tr>
<tr>
<td>71 to 75</td>
<td>2</td>
<td>12.5</td>
<td>0</td>
</tr>
<tr>
<td>76 to 80</td>
<td>2</td>
<td>12.5</td>
<td>1</td>
</tr>
<tr>
<td>81 to 85</td>
<td>5</td>
<td>31.3</td>
<td>3</td>
</tr>
<tr>
<td>86 to 90</td>
<td>3</td>
<td>18.7</td>
<td>1</td>
</tr>
<tr>
<td>91 to 95</td>
<td>3</td>
<td>18.7</td>
<td>1</td>
</tr>
<tr>
<td>Education</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Some formal schooling</td>
<td>5</td>
<td>31.3</td>
<td>1</td>
</tr>
<tr>
<td>High school graduate</td>
<td>6</td>
<td>37.5</td>
<td>4</td>
</tr>
<tr>
<td>Post-high school</td>
<td>5</td>
<td>31.3</td>
<td>2</td>
</tr>
</tbody>
</table>

(Gyldenvand, 1984; Reinboth, 1985).

Fear of Falling. Subjects were asked “How concerned are you about falling?” to which they could respond “not at all concerned,” “somewhat concerned,” “fairly concerned,” or “very concerned.” If the subject responded somewhat, fairly, or very concerned, the follow-up question, “Do you think this concern has made you cut down on the activities that you used to do?,” was asked to which the subject responded with a “yes” or “no.” Test-retest reliability for the first question was excellent (Kappa = .66) and lower for the second question (Kappa = .36) (Tinetti, Richman, & Powell, 1990). Test-retest reliability was assessed prior to this study and was also excellent for the first question (Cronbach’s alpha = .96).

Falls Efficacy. The Falls Efficacy Scale (FES) (Tinetti et al., 1990) is a 10-item tool designed to assess the degree of perceived self-confidence at avoiding a fall during each of 10 relatively nonhazardous activities of daily living routinely performed by community-dwelling elderly individuals. Validity was established by consensus among therapists, nurses, and physicians concerning the activities to include in the FES. Test-retest reliability for a sample of community-dwelling elderly individuals and residents of an intermediate care facility revealed a Pearson’s correlation of .71 (Tinetti et al., 1990). The tool was modified for this study so the list of activities was appropriate for elderly nursing home residents. The items “prepare meals not requiring carrying heavy or hot objects” and “answer the door or telephone” were deleted and replaced with the items “do light housekeeping in your room” (e.g., clean the nightstand or dresser) and “get up at night to go to the bathroom.” The item “reach into cabinets or closets” was modified to “reach into closets,” and the item “walk around the house” was changed to “walk around the nursing home” (Figure).

Data Analysis
At pretest, descriptive statistics were computed for all the variables, including demographics, to characterize the sample and assess the initial equivalence of the intervention and control groups. Following the posttests, descriptive statistics were calculated again, and the statistical procedure of differences in the least square means was applied to assess the effect of the intervention on the major outcome variables (i.e., balance, ankle strength, walking speed, falls, fear of falling, and falls efficacy).

RESULTS
Sample Characteristics
The sample (N = 16) consisted of 12 women and 4 men between the ages of 66 and 95 (mean age = 82.8). Eleven subjects were widowed, two were married, one was separated/divorced, and two subjects had never been married. All participants were White with varying levels of education. Selected demographic
and sample characteristics data are summarized in Table 1.

Baseline Results
For the total sample at pretest, the range for the MMSE scores was 24 to 29 (mean = 26.19). Scores for the RAFTS II ranged from 10 to 18 with a mean of 13.89. Mean balance times were (10 seconds maximum): parallel stance = 10; semi-tandem stance = 8.27; and tandem stance = 4.00. Mean number of heel raises (ankle strength) was 12.75, and the mean for the 6-meter walking speed was 20.53 seconds. Fear of falling mean score was 2.19, and the mean score for the FES was 28.00. When comparing the mean scores for the control and intervention groups, initial equivalence was achieved except for falls efficacy. The mean baseline measures for the total sample, control group, and intervention group are presented in Table 2.

Outcome Results
Regarding the number of falls for the total sample at pretest, 12 of the 16 subjects had fallen in the past year, with two subjects falling more than once. For the control group, seven falls occurred in the year prior to the study, six occurred from pretest to 3-month posttest, and six occurred between the 3-month and 6-month posttests. The corresponding numbers for the intervention group were 12, 22, and 20, respectively for pretest, 3-month posttest, and 6-month posttest.

Although statistical significance was not reached with the small sample size, results for the intervention group from pretest to 3-month posttest were maintained or were in the predicted direction. For balance, mean scores for all three stances did not change. For ankle strength, the mean score for number of heel raises increased, and the mean time for the 6-meter walk improved. Fear of falling mean score was unchanged, and the mean score for falls efficacy decreased (lower scores indicate increased confidence). From the 3-month to 6-month posttests, mean scores for the intervention group remained approximately the same with deterioration in the tandem stance and ankle strength.

For the control group, mean scores from pretest to 3-month posttest remained relatively constant for all tests. From 3-month to 6-month posttest, the parallel stance, semi-tandem stance and fear of falling mean scores remained unchanged, and all other mean scores deteriorated. One exception was walking speed, which increased for the control group at the 6-month posttest. Results are displayed for both groups at pretest, 3-month posttest and 6-month posttest in Table 3.

Overall, the exercise program was well received and tolerated by subjects. Subjects did not voice physical complaints related to completing the exercises, nor did they express reluctance to do the exercises. At the 3-month and 6-month posttest, one subject in the intervention group was walking, on occasion, without a walker which was used at all times prior to this study.

DISCUSSION
Most of the outcome variables changed in the desired direction for the intervention group, indicating the ankle strengthening and walking
### TABLE 3
**Pretest, 3-Month Posttest, and 6-Month Posttest Means for the Control and Intervention Groups**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Control (n = 7)</th>
<th>Intervention (n = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>3-Month Posttest</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel Stance (up to 10 sec)</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Semi-Tandem Stance (up to 10 sec)</td>
<td>8.21</td>
<td>7.87</td>
</tr>
<tr>
<td>Tandem Stance (up to 10 sec)</td>
<td>4.49</td>
<td>5.08</td>
</tr>
<tr>
<td>Ankle strength</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(number of heel raises in 30 sec)</td>
<td>13.71</td>
<td>13.71</td>
</tr>
<tr>
<td>Six Meter Walking Speed (in sec)</td>
<td>16.98</td>
<td>17.42</td>
</tr>
<tr>
<td>Fear of Falling*</td>
<td>2.00</td>
<td>2.29</td>
</tr>
<tr>
<td>Falls Efficacy§</td>
<td>16.00</td>
<td>16.29</td>
</tr>
</tbody>
</table>

* n = 7 because two subjects completed the intervention and 3-month posttest but did not complete the 6-month posttest due to illness or death.
† 1 = not at all concerned; 2 = somewhat concerned; 3 = fairly concerned; 4 = very concerned.
§ Falls Efficacy Scale: 10 = extreme confidence to 100 = no confidence at all.

The program is an effective means to improve balance, ankle strength, walking speed, and falls efficacy. With larger samples, the desired outcome of reducing fear of falling and the ultimate goal of reducing falls also may be accomplished. Regarding balance, the parallel stance was the easiest task for subjects and, therefore, may be expected to show the least amount of improvement. In fact, all subjects were able to hold the parallel stance for the 10-second maximum. The semi-tandem stance was moderately difficult for subjects, and the tandem stance was even more difficult for all participants, with both remaining relatively unchanged with exercise. Nevertheless, because of their difficulty, these two tests are likely to show the greatest improvement with a larger sample.

Ankle strength showed promise of improvement with the exercise program and remained nearly the same for the control group, which was not surprising because participants were performing an exercise specifically directed at the ankles. During the exercise period from pretest to 3-month posttest, walking speed improved slightly for the intervention group and remained fairly constant for control subjects, which would be anticipated because the intervention included walking on a regular basis.

Subjects' falls efficacy seemed to improve with the exercise program, whereas it was unchanged for the control group. Although there was not an explicit psychosocial strategy to increase confidence, it may be that falls efficacy improves when subjects participated in an exercise program, and especially when the exerciser can see improvement in physical performance. On the other hand, fear of falling remained unchanged for the intervention and control groups. It may be that fear of falling is more difficult to affect than falls efficacy with an exercise program that does not include a psychosocial approach. Finally, the number of falls varied widely from time to time for both groups and will take a much larger sample size to show reductions in falls.

Twelve of the 16 subjects at pretest (75%) had fallen in the past year. Two of the 12 fallers (16.7%)
fell more than once, a smaller rate than reported by Watson and Mayhew (24.7%) (1994) and Tinetti, Williams, and Mayewski (31.6%) (1986). The small sample for this study may explain the variation from previous work. The fact that the number of falls for the control group in the present study remained unchanged from pretest to 3-month posttest and decreased at 6-month posttest is not well understood. In comparison, the number of falls increased for the intervention group from pretest to 3-month and 6-month posttest and may be explained partially because two subjects were ill in that time period (one was eventually hospitalized) and sustained clusters of falls.

There were limitations with this study. This was a pilot study with limited resources available and a small sample. In the future, the study can be replicated in settings with larger numbers and more diverse ethnicities. The only attrition that occurred was due to illness or death, an expected consequence of the subjects’ advanced age and level of health, compared to community-dwelling elderly individuals. Another possible limitation was subjects may tend to respond to certain questions according to how they believed the investigators wanted them to respond (e.g., confidence levels on the FES). To counteract this, subjects were instructed to respond according to how they truly felt rather than how they thought the investigators would want them to respond.

**IMPLICATIONS FOR GERONTOLOGICAL NURSING**

The findings from this study provide direction for nursing research and practice. The research needs to be repeated with a larger sample. The author currently is conducting the study at 10 sites to obtain a larger sample. Results for the intervention group from the 3-month to 6-month posttest periods with larger numbers will provide important information, including how long the benefits of exercising continue following cessation of regular exercise. The findings from this study suggest those benefits may last only a short time. With the exception of parallel stance, the exercise group’s mean scores were beginning to deteriorate from the 3-month to 6-month posttest scores. In addition and as expected, there was overall deterioration of mean scores for the control group except for the parallel stance and walking speed. Thus, the importance of initiating an exercise program and sustaining it is highly recommended to slow the process of physical aging.

When a resident is identified to be at risk for falls by a valid and reliable tool, such as the RAFTS II used in this study, it is essential to pinpoint the contributing factor(s). Sullivan and Badros (1999) described the use of an established fall risk assessment tool to develop a fall prevention program for use in a hospital. The program reduced the rate of falls and increased nurses’ fall risk assessment practice. If the factors contributing to the risk for falls are mobility-related, such as compromised gait or balance or muscular weakness, an exercise program that includes balance training and muscle strengthening is warranted. Exercise needs to be viewed as a health promotion and injury prevention strategy, rather than just as rehabilitation. Nurses should discuss it from that perspective in care planning sessions so staff and residents value exercise as an important strategy to prevent falls.

The exercises were simple for participants to understand and perform, needed no special equipment, and required a minimal time commitment—important considerations for initiating any exercise program. To increase time efficiency, exercises could be completed safely with groups of two to three people rather than on an individual basis as in this study. Because of the program’s simplicity, the program also is appropriate for elderly individuals with slight or moderate cognitive impairment.

Exercising is crucial for virtually everyone and is achievable when tailored to factors such as individual capabilities and level of health. Frail elderly individuals can benefit from exercise in many ways, not the least of which is reducing the chances of falling. As more is learned about what exercises are beneficial and in what quantity, exercise programs can be designed and conducted for older adults to achieve and maintain maximum levels of well-being.

**REFERENCES**


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