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Channing Williams
Langston University

Nikita Lewis
Langston University

Victoria Thomas
Langston University

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Signature Page

Thesis Approved:

Teresa Frazier, MSN RN

Thesis Committee Chairperson

Ameika Brown, BSN RN

Thesis Committee Member

Kia Anderson, MBA RN

Thesis Committee Member

Dean of the Honors Program

Vice President for Academic Affairs

Reducing Inpatient Falls and Fall Related Injuries in Acute Care Settings

Channing Williams, Nikita Lewis & Victoria Thomas

Langston University

Reducing Inpatient Falls and Fall Related Injuries in Acute Care Settings

Introduction

Falls are a continually rising issue in today's healthcare. In acute care settings, patient falls make up 38% of all adverse events in which include physical injury, undesirable emotional and financial outcomes for the client (Angn, Mordiffi, Wong, Devi, & Evans, 2007). Falls in the hospitals lead to fear, pain, decreased healing, longer in-patient stays, further health-related complications. Falls may also cause patient discomfort and affect quality of life. Prevention of falls is an important goal of hospitals world-wide. Research has been conducted to determine the clinical effectiveness and implementation of a fall prevention. Although falls in hospitals cannot always be prevented, using the most accurate measures to decrease the incidence of falls is necessary.

Problem Statement

Exercise, risk assessments and fall prevention programs have been studied to assess and prevent the occurrence of falls. Studies show that Tai Chi exercise programs can safely improve physical strength and reduce fall risk for fall-prone older adults (Choi, Moon, & Song, 2005). Risk assessments, such as the Heindrich II Fall Risk Model, are potentially useful in identifying patients at high risk for falls in acute care facilities (Angn, Mordiffi, Wong, Devi, & Evans, 2007). According to Haines, Hill, Bennell and Osbourne, fall prevention programs, which

incorporate exercise in addition to usual care may also assist in the prevention of falls in the subacute hospital setting (2007). While each of these has been shown to decrease the incidence of falls, this study will examine whether utilizing these variables together will decrease the incidence of falls significantly in older adults, aged 65 or older.

Purpose Statement

The purpose of this study is to evaluate the effectiveness of the use of fall prevention program, which include exercise and risk assessments to reduce the incidence of inpatient falls and fall related injuries in acute care settings in older adults, aged 65 or older. With these findings, hospitals and other acute care settings can decrease their incidence of falls and other fall related injuries.

Hypothesis

This study hypothesizes that older adults aged 65 or older that participate in a fall prevention program which includes a risk assessment and exercise are less likely to experience an inpatient fall or fall related injury in an acute care setting than those older adults who do not participate in a fall prevention program.

Review of Literature

Over the years, the incidence of falls in hospitals has continually been studied. Although most studies of falls have shown that the risk factors include age, gender, certain medications, mental status, chronic diseases and environment, the most effective measure to examine the decrease incidence of falls is the use of a fall prevention program which includes exercise and fall risk assessments.

Exercise for physical and emotional health can help prevent mobility problems such as falling. Research has shown that exercise can safely improve physical strength and reduce fall

risk for fall-prone older adults (Choi, Moon, & Song, 2005). Similar to the aforementioned study, Lin, Wolf, Hwang, Gong, & Chen (2007) also found that exercise training is the better intervention in quality life outcomes for the client, as opposed to education and home safety assessments. According to Haines, Hill, Bennell and Osbourne (2007), an exercise program provided in addition to usual care may assist in the prevention of falls.

Furthermore, Robertson, Campbell, Gardner, & Delvin (2002) stated that exercise is even more effective in reducing fall-related injuries when offered to those with a history of a previous fall. It is evident that exercise is a vital key to decreasing the incidence of falls in inpatient settings and in improving quality of life outcomes. Not only do patients who participant in exercise benefit from the prevention of falls, but in addition, literature has shown that other advantages of overall health can occur.

In 2005, Choi, Moon, & Song found that exercise improves strength and balance among patients. Other research has revealed that functional balance and gait as well as activities of daily living are enhanced with exercise (Lin, Wolf, Hwang, Gong, & Chen, 2007). Comparable investigations established that participants who had their balance, strength and mobility assessed upon referral for the exercise program advanced these factors when they were assessed prior to discharge (Haines, Hill, Bennell and Osbourne, 2007). Exercise is truly essential in reducing the incidence of falls.

Fall risk assessments determine the level of risk a patient has for falling and what preventive measures should be taken to ensure patient safety. Various scales used as a risk assessment tool used to identify patients at high risk for falling. The Morse Scale has items that include history of falling, presence of a secondary diagnosis, intravenous therapy or intravenous lock, type of gait, use of walking aids, and mental status (Schwendimann, Milisen, Buhler, &

Geest, 2006). McFarlane-Kolb (2004) has shown that utilizing the Morse Scale at a cut-off score equal to or greater than 50 is a good baseline indicator for accurate identification of fall risk.

However, other studies differed. According to Angn, Mordiffi, Wong, Devi, & Evans (2007), utilizing the Morse Fall Scale at a cut-off score of 25 proved strong sensitivity value of 88% and was deemed a successful tool in examining patients risk for falls. Schwendimann, Milisen, Buhler, & Geest (2006) also used the Morse Fall Scale as their fall risk assessment with a 55-point cut-off. Their research showed a sensitivity of 84% and a specificity of 73%, respectively, when determining the occurrence of falls in hospitalized patients. The intervention group of this study was more at risk for falls; however fewer patients with multiple falls were observed. Due to the various cut-off scores, conflicting findings could be evident. However, because more studies utilized a cut-off score of greater than or equal to 50, this study will use a cut-off score of 50.

Although some literature suggests the use of the Morse Scale as a risk assessment tool, Yauk, Hopkins, Phillips, Terrell, Bennion, & Riggs (2005) utilized the Scott and White Falls Risk Screener. After logistic regression identified individual characteristics associated with an increased risk of a fall, such as history of falls, ambulation assistance, disoriented, and bowel control problems, the Scott and White Falls Risk Screener showed a 70% sensitivity and 57% specificity (Yauk, Hopkins, Phillips, Terrell, Bennion, & Riggs, 2005). Although applying this risk assessment proved to be a lower sensitivity and specificity, it can still decrease the risk of falls in patients in the hospital by alerting nurses to provide appropriate fall precautions for these patients. However, the Morse Fall Scale proved to be more effective in do so.

Although many studies have researched exercise to prevent falls and risk assessments to identify patients at risk for falls, few have utilized exercise and risk assessments together to

evaluate the effectiveness of decreasing the incidence of inpatient falls. The theoretical framework of this study is based upon Angn, Mordiffi, Wong, Devi, & Evans (2007), which used the Morse Fall Scale and Choi, Moon, & Song (2005), which used tai chi exercise to decrease the incidence of inpatient falls. This study intends to evaluate the effectiveness of a fall prevention program which includes the Morse Fall Scale risk assessment and exercise in older adults aged 65 or older.

Annotated Bibliography

Citation 1

Kertzman, H., Chetrit, A., Brin, L., & Toren, O. (2004). Characteristics of falls in hospitalized patients. *Journal of Advanced Nursing*, 47 (2), 223-229.

Problem Statement/Purpose Statement

The purpose of this article was to study the characteristics of patient falls during hospitalization in 1998 and compare these characteristics with the period between 1978 and 1981.

Literature Review/Background/Theory

A constant concern in the healthcare system in the enormous incident of patient falls in a hospital setting. Previous literature and research findings suggest that certain risk factors determine falls. This study was influenced by Plati, Lanara and Mantas' 1992 research, which reported the risk factors for falls as age, gender, certain medications, mental status, chronic diseases and environmental factors. Falls may lead to fear, pain, slight or severe injuries, increase the duration of hospital stay, cause patient discomfort and affect quality of life.

Methodology/Methods

This article conducted a retrospective study performed in a 2000-bed medical center in Israel. Reports of 711 fall incidents in 1998 were compared with 328 reports in 1978–1981. Information gathered included age, gender, department, shift, reasons, severity of injury, tests and treatment after injury.

Summary/Findings

The findings showed that rates of falls per 1000 admissions in psychiatric, elder care and rehabilitation departments in 1998 were statistically significantly higher than in the earlier period. Rates of 115, 91, 85, respectively, per 1000 admissions were reported in 1998 compared with 34, 9, 19, respectively, in the period 1978–1981. The percentage of reported falls in the younger age group (under 50) was higher in the later survey (1998), and a higher proportion occurred outside the patient's room. Most of the reported falls in 1998 occurred during the morning shift ($P < 0.001$).

Conclusion/Implications for Nursing Practice

In conclusion, the increased number of falls could be an outcome of increased awareness. Nevertheless, the causes and place of falls differ for the two periods. Some of the reasons may be related to an intervention program carried out after the first survey. The latest survey results will serve as an important basis for a further intervention program in specific departments to ensure patient safety. This increases nurses awareness of characteristics of patient falls over a time period.

Citation 2

Lin, M., Wolf, S., Hwang, H., Gong, S., & Chen, C. (2007). A Randomized, Controlled Trial of Fall Prevention Programs and Quality of Life in Older Fallers. *Journal of the American Geriatrics Society*, 55 (4), 499-506.

Problem Statement/Purpose Statement

The purpose of this study was to compare the effects of three fall-prevention programs (education (ED), home safety assessment and modification (HSAM), and exercise training (ET)) on quality of life (QOL), functional balance and gait, activities of daily living (ADLs), fear of falling, and depression in adults aged 65 and older.

Literature Review/Background/Theory

Prevention of falls is extremely important consideration for older adults. Falls are often the most common cause of injuries and hospital admission and can also lead to psychological trauma, motor deficits, loss of autonomy, and an enormous economic costs. In some cases, clinicians typically underestimate patients' desires for information on their condition and on healthcare services. However, this study was influenced by Greenfield, Kaplan, and Ware's study of 1985, which suggested that enhancing patient participation in decision making may result in better health outcomes and a better sense of well-being. Through health related quality of life (QOL) assessment tool, it can evaluate the effects of medical treatments and healthcare services and most importantly, provide a comprehensive profile of fall prevention programs.

Methodology/Methods

This study was a four month randomized, controlled trial including 150 participants who were aged 65 and older who had experienced a fall. This study was conducted in Shin-Sher Township, located in Taichung County in west central Taiwan, which is a rural agricultural area.

QOL was assessed according to the brief version of the World Health Organization Quality of Life instrument (WHOQOL-BREF), functional balance and gait according to functional reach and Tinetti balance and gait, ADLs according to the Older Americans Resources and Services questionnaire, fear of falling according to a visual analog scale, and depression level according to the Geriatric Depression Scale.

Summary/Findings

The score changes for the exercise training group were 2.1 points greater on the physical domain (95% confidence interval (CI) = -1.2–5.3), 3.8 points greater on the psychological domain (95% CI = 0.7–7.0), and for the WHOQOL-BREF, 3.4 points greater on the social domain (95% CI = 0.7–6.1) and 3.2 points greater on the environmental domain (95% CI = 0.6–5.7) than for the education group. The score change for each domain of the WHOQOL-BREF for the home safety assessment and modification group was greater than that for the education group, although these results were not statistically significant. The exercise training group also had greater improvements in functional reach, Tinetti balance and gait, and fear of falling than the education group.

Conclusion/Implications for Nursing Practice

In conclusion, the QOL outcome supports the superiority of exercise training over the other two interventions in older people who have recently fallen. This finding also parallels those gathered from functional measures. Therefore, nurses should support and use exercise training as an intervention for patients who have experienced falls. Exercise training is essential in the future. Not only because it facilitates balance and strengthens gait, but also because it improves quality of life outcomes.

Citation 3

Haines, T., Hill, K., Bennell, K., & Osbourne, R. (2007). Additional exercise for older subacute hospital inpatients to prevent falls: benefits and barriers to implementation and evaluation. *Clinical Rehabilitation*, 21, 742-753.

Problem Statement/Purpose Statement

The purpose of this study is to to evaluate the clinical effectiveness and implementation of a falls prevention exercise program for preventing falls in the subacute hospital setting.

Literature Review/Background/Theory

Falls are an reoccurring issue in a subacute hospital setting. This study used Judge's 2003 research study as its conceptual theory. Its previous literature review concluded that a variety of exercise program models may be beneficial for improving balance, strength and mobility amongst frail and older patient groups. Exercise interventions such as group tai chi, group resistance training and home-based strength, balance and mobility programs have also been shown to reduce falls in combination with education programs, management of reduced vision and home hazard modification. This study aimed to examine the individual effectiveness of the exercise program employed in this study in preventing falls and in improving patient strength, mobility and balance. Barriers to patient attendance at exercise program sessions were also examined.

Methodology/Methods

The research that was conducted was a randomized controlled trial, subgroup analysis. The participants were patients of a metropolitan subacute/aged rehabilitation hospital who were recommended for a falls prevention exercise program when enrolled in a larger randomized controlled trial of a falls prevention program. The participants in both the control and

intervention groups who were recommended for the exercise program intervention were followed for the duration of their hospital stay to determine if falls occurred. Participants had their balance, strength and mobility assessed upon referral for the exercise program and then again prior to discharge. Participation rates in the exercise program were also recorded.

Summary/Findings

Intervention group participants in this subgroup analysis had a significantly lower incidence of falls than their control group counterparts (control: 16.0 falls/1000 participant-days, intervention: 8.2 falls/1000 participant-days, log-rank test: $p = 0.007$). However, few differences in secondary balance, strength and mobility outcomes were evident.

Conclusion/Implications for Nursing Practice

In conclusion, this exercise program provided in addition to usual care may assist in the prevention of falls in the subacute hospital setting. Nurses should take advantage of this research and utilize exercise programs in addition to usual care to prevent falls. New and creative ways to use exercise as an intervention could also be used for patient's plan of care.

Citation 4

McFarlane-Kolb, H. (2004). Falls risk assessment, multitargeted interventions and the impact on hospital falls. *International Journal of Nursing Practice*, 10, 199-206.

Problem Statement/Purpose Statement

The purpose of this study had two aims. One was to identify whether the introduction of a falls risk assessment and falls prevention protocol would have an effect on falls incidence and severity among surgical patients within a regional, acute hospital. The second aim was to investigate whether the falls risk assessment tool (Morse Falls Scale) more accurately profiled fall risk, relative to other risk factors.

Literature Review/Background/Theory

There is a significant need to validate existing scales in the accurate assessment of falls risk. Researchers have evaluated numerous fall risk assessment tools; but this study modeled McCollam's 1995 study, which successfully evaluated and implemented a research based assessment innovation in the United States of America (USA) using the Morse Falls Scale. Previous research has utilized fall prevention projects, which target specific risk factors of falling, such as cognitive impairment. However, few have measured the impact of their intervention on fall outcomes, in which this study intended to investigate.

Methodology/Methods

A comparative design compared and described differences in falls data within and between two study cohorts before and after a multitargeted intervention was introduced. The study was conducted in a 30-bed colorectal/vascular ward within a 600-bed regional teaching and research organization that services a large area of western Victoria, Australia. In order to profile fallers and non-fallers, a quasi-random sample of 100 patient admissions were split in two cohorts. Cohort 1999 was all patients admitted to the 30-bed surgical ward between May 8, 1999 and August 8, 1999. Cohort 2000 was all patients admitted to the same 30-bed surgical ward between May 8, 2000 and August 8, 2000. Cohort 2000 were profiled by a fall risk assessment tool on admission. Patient histories were also obtained on each cohort.

Summary/Findings

A cut-off score of ≥ 50 using the Morse Scale was a good baseline indicator for accurate identification of fall risk and outcomes verify that the modified Morse Falls Scale, in combination with other risk factors, more accurately profiled fall risk among this population. Fall

incidence among the intervention cohort did not increase significantly despite a rise in the number of hospital admissions and a significantly higher reported fall risk potential.

Conclusion/Implications for Nursing Practice

In conclusion, the presence of more key risk factors as well as a greater proportion of people identified to be at risk of falling had a greater risk potential to falling. An increase in the number of at-risk patients might also equate to higher patient acuity and greater nursing demands. The tool was effective in being able to accurately identify those patients to be at risk of falling. Nurses should utilize the Morse Falls Scale to identify fall risks of all patients from admission to discharge and constant surveillance is necessary to ensure patient safety and reduce falls in hospital settings.

Citation 5

Angn, K., Mordiffi, S., Wong, H., Devi, K., & Evans, D. (2007). Evaluation of three fall-risk assessment tools in an acute care setting. *Journal of Advanced Nursing*, 60 (4), 427–435.

Problem Statement/Purpose Statement

The purpose of this article is to evaluate the validity of three fall-risk assessment tools used to identify patients at high risk for falls.

Literature Review/Background/Theory

In an acute care setting patient falls make up 38% of all adverse events in which the consequence is physical injury and undesirable emotional and financial outcomes for the client. No single fall-risk assessment tool has been conclusively validated.

Methodology/Methods

The Morse Fall Scale, St Thomas Risk Assessment Tool in Falling Elderly Inpatients, and Hendrich II Fall Risk Model were validated in inter-rater reliability and validity studies in

2003. This included assessment of the probability of disagreement, j-values, sensitivity, specificity, positive predictive values and negative predictive values of the assessment tools with the associated 95% CI.

Summary/Findings

In the validity study, 5489 patients were recruited to observe 60 falls. The Morse Fall Scale at a cutoff score of 25 and Heindrich II Fall Risk Model at a cutoff score of 5 had strong sensitivity values of 88% and 70%, respectively. The Morse Fall Scale was a successful tool in examining patients risk for falls.

Conclusion/Implications for Nursing Practice

The Heindrich II Fall Risk Model is potentially useful in identifying patients at high risk for falls in acute care facilities. This assessment would be helpful for any health care provider. Assessing patients at risk for fall would cut down on unintentional accidents.

Citation 6

Schwendimann, R., Milisen, K., Buhler, H., Geest, S. (2006). Fall prevention in a Swiss acute care hospital setting reducing multiple falls. *Journal of Gerontological Nursing*, 13-21.

Problem Statement/Purpose Statement

The purpose of this study is was to evaluate an approach to fall prevention in which risk assessment and a protocol of nursing interventions were used to reduce the risk of falls. This is important in avoiding poor patient outcomes.

Literature Review/Background/Theory

Many of the reported adverse events or accidents in hospitalized patients are due to falls. The fall rates in hospital settings are increasing and have effects in patient lives. Consequences of falls in include minor to severe injuries or even death.

Methodology/Methods

In this quasi-experimental study, the effectiveness of a nurse-led fall prevention program was evaluated in a 300-bed Swiss hospital. Four hundred and nine patients were included: intervention group (n = 198), usual-care group (n = 211). The program consisted of training nurses in the use of the Morse Fall Scale, and the implementation of 15 selected preventive interventions.

Summary/Findings

In the intervention group, the proportion of patients at risk for falls was higher ($p = .048$), and fewer patients with multiple falls were observed ($p = .009$). The intervention program showed an effect in preventing multiple falls, but not first falls.

Conclusion/Implications for Nursing Practice

This fall prevention program showed an effect in preventing multiple falls, but not first falls. The intervention program offered nurses an approach to delivering preventive care in patients with a high fall risk and systematic monitoring of fall events. As a nurse it is important for us to do what is best for our clients. In preventing them from having multiple falls we will prevent injuries.

Citation 7

Choi J. H., Moon, J., Song R. (2005). Effects of sun-style tai chi exercise on physical fitness and falls. *Journal of Advanced Nursing*, 51 (2), 150-7.

Problem Statement/Purpose Statement

This paper reports a study to determine changes in the physical fitness (knee and ankle muscle strength, balance, flexibility, and mobility), fall avoidance efficacy, and fall episodes of institutionalized older adults after participating in a 12-week Sun-style Tai Chi exercise program.

Literature Review/Background/Theory

Fall prevention has a high priority in health promotion for older people because a fall is associated with serious morbidity in this population. Regular exercise is effective in fall prevention for older adults because of improvements in strength and balance. Tai Chi exercise is considered to offer great potential for health promotion and rehabilitation, particularly in the maintenance of good mental and physical condition in older people.

Methodology/Methods

A quasi-experimental design with a non-equivalent control group was used. A total of 68 fall prone older adults participated in the study, and 29 people in the Tai Chi group and 30 controls completed the post-test measures. The Tai Chi exercise program was provided three times a week for 12 weeks in the experimental group. Data was analyzed for group differences using t-tests.

Summary/Findings

At post-test, the experimental group showed significantly improved muscle strength in knee and ankle flexors and extensors. They also improved in flexibility and mobility compared with the control group. There was no significant group difference in fall episodes, but the relative risk ratio for the Tai Chi exercise group compared with the control group was lower. The experimental group reported significantly more confidence in fall avoidance than did the control group.

Conclusion/Implications for Nursing Practice

The findings reveal that Tai Chi exercise programs can safely improve physical strength and reduce fall risk for fall-prone older adults in residential care facilities. When providing a discharge plan for patients it is important to include all that will aid them in their strive to better

health. The information in this article will be helpful in what we can teach our clients i=to improve their quality of life.

Citation 8

Renteln-Kruse, M., Krause, T., & Geogr, D. (2007). Incidence of In-Hospital Falls in Geriatric Patients before and After the Introduction of an Interdisciplinary Team–Based Fall-Prevention Intervention. *Journal of the American Geriatrics Society*, 55, (12), 2068–2074.

Problem Statement/Purpose Statement

This article describes a prevention program and its effects on the incidence of falls in geriatric hospital wards. The objective of this historically controlled prospective study was to evaluate the effect of an interdisciplinary team approach on reducing the number of falls in geriatric hospital inpatients by comparing long periods before and after introduction of the intervention.

Literature Review/Background/Theory

Recent reports from randomized, controlled trials of fall prevention in a subacute hospital specializing in rehabilitative care of elderly patients and in a community hospital's elderly care wards showed a reduction in fall incidence and the relative risk of recorded falls.

Methodology/Methods

The study took place in the geriatric clinic of an academic teaching hospital in the northwest corner of Hamburg, Germany. It was a prospective cohort study with historical control including all 4,272 patients (mean age 80,69% female) before and 2,982 (mean age 81, 69% female) after introduction of the intervention. The intervention included fall-risk assessment on admission and reassessment after a fall; risk alert; additional supervision and assistance with the

patients' transfer and use of the toilet; provision of an information leaflet; individual patient and caregiver counseling; encouragement of appropriate use of eyeglasses, hearing aids, footwear, and mobility devices; and staff education. Measurements included standardized fall incidence reporting, activity of daily living and mobility status, number of falls and injurious falls, and number of patients who fell.

Summary/Findings

Before the intervention was introduced, 893 falls were recorded. After the intervention was implemented, only 468 falls were recorded (incidence rate ratio (IRR) = 0.82, 95% confidence interval (CI) = 0.73–0.92), 240 versus 129 total injurious falls (IRR = 0.84, 95% CI = 0.67–1.04), 10 versus nine falls with fracture (IRR = 0.40, 95% CI 0.51–3.85) and 611 versus 330 fallers. The relative risk of falling was significantly reduced (0.77, 95% CI = 0.68–0.88). A structured multifactorial intervention reduced the incidence of falls, but not injurious falls, in a hospital ward setting with existing geriatric multidisciplinary care. Improvement of functional competence and mobility may be relevant to fall prevention in older hospital inpatients.

Conclusion/Implications for Nursing Practice

In conclusion, in addition to medical interventions, nurse should focus on the improvement of functional abilities and mobility of clients to prevent its decline, which could be an important aspect in multifactorial fall prevention in the hospital.

Citation 9

Yauk, S., Hopkins, B., Phillips, C., Terrell, S., Bennion, J., Riggs, M. (2005). Predicting In-Hospital Falls Development of the Scott and White Falls Risk Screener. *Journal of Nursing Care Quality*, 20, (2), 128-133.

Problem Statement/Purpose Statement

This study focused on developing a simple, practical fall risk screener using routine admission and daily in-hospital stay data.

Literature Review/Background/Theory

Falling is the most common type of accident that occurs in hospitals; 2% of all patients admitted fall. Inpatient length of stay is typically lengthened if a person falls while in the hospital. Hip fractures are the most frequent serious injury resulting from a fall, with an associated annual cost of about \$20.2 million.

Methodology/Methods

A retrospective, case-control design was used for the study. The identifying characteristics of adult hospitalized fallers (cases) were compared to the characteristics of a group of randomly selected non-falling adults on the same units at roughly the same times (2 controls per 1 case). The medical records of the subjects were reviewed for patient data at the time of admission and at the time of a first fall for cases or at the midpoint of hospital stay for controls. The study sample was drawn from all adults hospitalized on medical-surgical units of a tertiary care facility in central Texas during the first 6 months of 2001. Logistic regression identified individual characteristics associated with an increased risk of a fall.

Summary/Findings

Four variables were identified: history of falls, ambulation assistance, disoriented, and bowel control problems, creating a fall risk model with 70% sensitivity and 57% specificity. The significant differences that appear in that table are relatively consistent with the findings in previous research. Patients who fall while in the hospital are significantly older; are more likely to have had a previous fall, problems with bowel control, some type of cognitive impairment

(e.g., disoriented or problems remembering), or a balance problem; or need assistance with toileting.

Conclusion/Implications for Nursing Practice

In conclusion, nurses should be aware of clients who have the frequently cited predictors of falls, which include history of a fall, dementia/confusion, elimination deficit (frequency or inability for self-care), decreased vision, and history of dizziness/ poor balance. These predictors can decrease the risk of falls in patients in the hospital by alerting nurses to provide appropriate fall precautions for these patients.

Citation 10

Robertson, M., Campbell, A., Gardner, M., & Delvin, N. (2002). Preventing Injuries in Older People by Preventing Falls: A Meta-Analysis of Individual-Level Data. *Journal of the American Geriatrics Society*, 50, (5), 905-911.

Problem Statement/Purpose Statement

The objectives of this meta-analysis of these trials were to estimate the overall effect of the exercise program on the numbers of falls and fall-related injuries and to identify subgroups that would benefit most from the program.

Literature Review/Background/Theory

There is little evidence from falls prevention intervention trials that preventing falls results in fewer injuries. Several randomized controlled trials have shown that exercise programs, alone or in combination with other interventions, can prevent falls, but sample sizes have usually been too small to show conclusively whether they also prevent injuries.

Methodology/Methods

This study pooled individual-level data from the four trials to investigate the effect of the program in those aged 80 and older, in those with a previous fall, and in men and women. One thousand sixteen community dwelling women and men aged 65 to 97. A program of muscle strengthening and balance retraining exercises designed specifically to prevent falls and individually prescribed and delivered at home by trained health professionals.

Summary/Findings

The overall effect of the program was to reduce the number of falls and the number of fall-related injuries by 35% (incidence rate ratio (IRR) = 0.65, 95% confidence interval (CI) = 0.57–0.75; and, respectively IRR = 0.65, 95% CI = 0.53–0.81.) In injury prevention, participants aged 80 and older benefited significantly more from the program than those aged 65 to 79. The program was equally effective in reducing fall rates in those with and without a previous fall, but participants reporting a fall in the previous year had a higher fall rate. This exercise program was most effective in reducing fall-related injuries in those aged 80 and older and resulted in a higher absolute reduction in injurious falls when offered to those with a history of a previous fall.

Conclusion/Implications for Nursing Practice

The exercise program participants showed improved balance and muscle strength measures. These improvements were not large, but small gains may be particularly important in those near to losing independent function. The program may be most effective in frailer, older people because the exercises increase strength and balance above the critical threshold needed for activities such as rising from a chair and going up and down the stairs and over home hazards.

Methodology

Study Design

A quasi-experimental design with a non-equivalent control group will be used. This design is appropriate because it helps in searching for knowledge and limits threats to validity (Angn, Mordiffi, Wong, Devi, & Evans, 2007). The independent variables are the 12 week tai chi exercise program and the Morse Fall Scale risk assessment. The dependent variables are the incidence of falls and fall related injuries.

Study Sample

The study sample will consist of 200 randomly selected participants from two acute care facilities in Oklahoma City, Oklahoma. Access to the two acute care facilities will be obtained by an initial contact to explain the purpose and a brief description of the study, its risk and benefits, and assurances of anonymity and confidentiality. The two research nurses will identify and recruit all the new admissions by visiting the two acute care facility over six months. Patients will be screened within 24 hours of admission during the weekdays, and on the next workday for Saturdays, Sundays, and public holidays. Prior to beginning the study, informed consent will be obtained from all participants and the participants will have the option to remove themselves from the study at any time. The research will also be reviewed and approved by each facility's intuitional review board (IRB) and Langston University's IRB. All information collected and reviewed will be kept confidential. Next, the sample will be randomly assigned to either the experimental or control group by coin tossing. All patients from both facilities will be assessed prior to the study to determine the fall-prone population.

The sample inclusion criteria will include ambulatory participants, 65 years or older, who have at least one of the following fall-related risk factors: impaired gait [score <10 on the gait

subscale (maximum 12) of the Performance Oriented Assessment of Mobility (POAM); impaired balance [score <14 on the POAM balance subscale (maximum of 16)]; history of falling in the previous year; postural hypotension, as indicated by a drop in systolic blood pressure of ≥ 20 mmHg from lying to standing; and use of four or more prescription medications that may affect balance (Choi, Moon, & Song, 2005). Exclusion criteria will include severe dementia (score <20 on the Folstein Mini-Mental State Examination); inability to complete 12 weeks of Tai Chi exercise due to physical illness; current involvement in any type of regular exercise; admittance to the facility before the start of the study; and had fallen before the Morse Fall Scale risk assessment will carried out (Angn, Mordiffi, Wong, Devi, & Evans, 2007).

This study will have 100 participants in each of the control and experimental group. While the experimental group will have the Morse Fall Scale risk assessment performed upon admission and participate in the Tai Chi exercise program three times a week, the control group will not have the Morse Fall Scale risk assessment performed and will maintain their routine activities without participating in any regular exercise classes.

Instruments & Procedures

The first part of the fall prevention program will include the Morse Fall Scale (MFS) assessment, which is used to assess the participant's risk for falls. Along with the MFS assessment, there will also be a fall incident report system to collect data after a fall or fall related injury. The nurses will be trained in relation to the protocol to enhance their knowledge skills and competence with the protocol. Upon admission, participants in the experimental group will have a MFS assessment performed. The Morse Fall Scale (MFS) items will include history of falls, presence of secondary diagnosis, type of gait, use of walking aids, and mental status. The total possible score is 125 (Angn, Mordiffi, Wong, Devik, & Evans, 2007). Based on the

total scores, patients were categorized into having a low (<25), medium (25–50), or high (>51) risk of falling (Angn, Mordiffi, Wong, Devik, & Evans, 2007). The fall incident reports will include the date, time, location, and circumstance of the patients fall, injuries, medications, and risk factors according to the MFS (Angn, Mordiffi, Wong, Devik, & Evans, 2007).

The Tai Chi Exercise program is another part of the fall prevention program. This exercise program will be provided to participants of each facility in the experimental group three times a day for 12 weeks. A certified Tai Chi instructor will lead the participants in the exercises. The Tai Chi exercise program will consist of 10 minutes of warm up exercise, 20 minutes of 12 Tai Chi movements, and 5 minutes of cool down exercise (Choi, Moon, & Song, 2005). The warm-up exercise will consist of walking around with moving hands followed by exercises with two ranges of motion on each joint of the neck, shoulders, trunk, hip, knees, and ankles (Choi, Moon, & Song, 2005). The 12 forms of the Tai Chi movements will involve the bending of knees in wide steps. The cycle of 12 movements will be repeated for 20 minutes while listening to traditional instrumental music in order to maintain slow and continuous movements, as well as to provide a soothing effect. The exercise session will always be completed with a cooling-down exercise involving the stretching of arm and leg muscles and breathing exercises. All falls and fall related injuries will be measured before and after the 12 week time.

Data Collection & Analysis

Data will be collected from the MFS using scores in relation to history of falls (no=0; yes=25), presence of secondary diagnosis (no = 0; yes = 15), type of gait (normal bed rest wheel chair = 0; weak = 10; impaired = 20), use of walking aids (none, bed rest, assistance = 0; cane crutches, walker, = 15; use of furniture = 30), and mental status (alert = 0; forgets limitations = 15) (Angn, Mordiffi, Wong, Devik, & Evans, 2007). Scores will range from 0-125. A score of 45

points or more will indicate the patient at high risk for falls. Data will be collected from 2 forms completed by clinical staff as a routine part of healthcare services (Angn, Mordiffi, Wong, Devik, & Evans, 2007). The first of these will be the patient history and MFS assessment form completed at the time of the patient's admission to the hospital. The second form will be the nursing assessment performed on the nursing shift immediately preceding the shift during which the patient fell. Following patient discharge the MFS forms and intervention protocols will be recorded and analyzed (Angn, Mordiffi, Wong, Devik, & Evans, 2007).

Data will be collected on the number of falls and fall related injuries. A fall is defined as a sudden and unintentional change in position from an upright posture – with or without loss of consciousness – that caused the person to land on the ground (Angn, Mordiffi, Wong, Devik, & Evans, 2007). Participants will be asked to report any fall episode during the previous year, and weekly fall episodes will be closely monitored during the study period.

Data will be analyzed using the SPSS (Windows V10.0, SPSS Inc., Chicago, IL, USA) program. Descriptive statistics will be used for demographic variables. T-tests will analyze data to examine group differences in the independent variables.

After conducting this research, the research findings will be disseminated amongst all acute care setting facilities in hopes to reduce the inpatient falls and fall related injuries through the use of exercise and risk assessments. Falls are a prominent issue in healthcare and finding interventions that reduce this incidence is pertinent.

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