REDUCING INPATIENT FALLS:
IMPLEMENTING AN INPATIENT FALL PREVENTION PILOT PROGRAM

by

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STATEMENT BY AUTHOR

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SIGNED:_____________________________________________________

APPROVAL BY PROJECT DIRECTOR

This project has been approved on the date shown below:

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Date
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To my chairperson and advisor, Judith Effken, PhD, RN, words simply cannot express my gratitude. You have had endless patience, encouragement and support for me. When I was ready to throw in the towel, you gave me words of wisdom and encouraged me to persevere. Your expertise and guidance through this long and wearing process was invaluable. You are a true scholar and I have the deepest admiration for you.

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DEDICATION

I dedicate this paper to my Mom. You have always encouraged me to be the best I could be. From grade school through grad school, you always made sure I knew how proud you were of me and that you were always there for me. I could not have completed this without you.

To the men in my life, my husband, Art and my Dad, I know I could always count on you. You encouraged me to not lose focus on the important things in life, like taking time to go to the park on a sunny day.

To my girls, Jessica and Caitlin, you gave me the incentive to be a better person and role model. Thank you for giving me the most beautiful smiles and giggles just when I needed them.
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ABSTRACT

Patient falls are a major safety concern for healthcare facilities because patients can sustain severe, debilitating injuries--or even die. In addition, hospitals may incur increased costs due to extended patient lengths of stay, added diagnostic procedures and/or surgery, and the increased need for follow-up care. Considerable research exists focusing on identifying risk factors for falls, developing fall prevention tools and programs, and evaluating the effectiveness of those tools and programs. This project began with a review of the literature on fall prevention, compared three well-known programs, selected one for implementation on a pilot medical unit and developed an implementation and evaluation plan.
CHAPTER ONE

Introduction

In Chapter 1, I will discuss the significance of the problem of inpatient falls and national initiatives to reduce falls. I will then describe the purpose of this project and the setting for the proposed patient fall reduction initiative. Baseline fall data for the proposed pilot unit, compared with national benchmarks, are also provided. Finally, I describe the current fall prevention program at the hospital and identify its deficits for this particular unit.

Background

A fall is defined as “any event when the participant unexpectedly comes to rest on the ground, floor or another lower level” (Haines et al., 2004). This definition is consistent throughout the literature. For example, a fall is defined by Agostini (2001) as “unintentionally coming to rest on the ground, floor or other lower level, but not as a result of syncope or overwhelming external force.”

Inpatient falls are a major safety concern for healthcare facilities (McConnell, 1998). The rate of inpatient falls has been reported between 2.9 and 13 falls per 1,000 bed days (Oliver et al., 2004); and those falls involve between 13% and 32% of admitted patients (Haines et al., 2004).

Patient falls have been identified as one of the largest liabilities for health care facilities. It has been estimated that falls account for at least 40% of all accidents in the hospital setting (Papaioannou et al., 2004). From the hospital’s perspective, patient falls extend lengths of stay by up to 6.4 days (Hsu et al., 2004), add diagnostic procedures
and/or surgery, increase health care costs and increase the need for follow up care (Haine et al., 2004; McFarlane-Kolb, 2004). Reports have shown that patients who fall once during their hospital stay are more likely to fall again (Eagle et al., 1999).

For patients, the negative consequences of falls can be physical, psychological, or economic. For example, severe physical injuries such as lacerations, fractures or even death may occur. Possible psychological outcomes can include fear, anxiety, depression and loss of confidence. Negative economic impacts may include longer duration of hospital stay; increased health care costs; and potential rehabilitation needs after discharge (Oliver et al., 2004; Haines et al., 2004).

As our population continues to age, falls among the elderly are of particular concern. In 1999, about 10,000 people over age 65 died due to injury incurred by a fall (Tinetti, 2003). Greater than one third of persons 65 years or older experience a fall each year and half of these falls are recurrent (i.e., an individual falls more than once).

Recognizing the significance of patient falls, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) identified “reducing the risk for patient harm resulting from falls” as one of its 12 national safety goals for 2005 (Joint Commission on Accreditation of Healthcare Organizations, 2005). JCAHO recommends “assessing and periodically reassessing each patient’s risk of falling, including the potential risk associated with the patient’s medication regimen, and taking action to address any identified risks.” They further recommend that hospitals implement a fall reduction program and evaluate its effectiveness.
Purpose

The purpose of this project is to develop a comprehensive, evidence-based patient fall prevention program that includes a valid screening tool and interventions. In addition, a proposal will be presented for a theoretically-based plan to implement this program and evaluate its results on a pilot unit at a hospital in Arizona.

Description of the Problem

The 2004 quarterly Quality Improvement Department reports on patient falls in one large Arizona hospital indicates there is room for improvement. The 2004 data on reported patient falls for the entire targeted hospital demonstrates a gradual upward trend from 2.20 to 3.30 (Fig. 1). There were four different categories for inpatient units created for the 2005 fall reports: medical, surgical, step-down, and critical care. This was done so benchmarks and goals could be established for each of the different areas. For the six units categorized as medical units by the Quality Improvement Department, the reported falls per 1000 patient days ranged from 0 to 7.3. It is noteworthy that psychiatric, obstetric, and pediatric units were classified as medical units. According to the National Data of Nursing Quality Indicators, the benchmark for in-patient falls on medical units is 4.7. The goal established by the Clinical Practice Committee at the targeted hospital is 2.0. The clinical practice committee reports that the first quarter of 2005 was the first quarter to show a decline in the total number of falls. The targeted pilot unit met the benchmark of 4.7, but was well above the goal of 2.0 (Fig. 2).
Figure 1. Targeted Hospital’s 2004 Fall Report

Figure 2. Targeted Pilot Unit’s Data on Inpatient Falls
Overview of Targeted Hospital’s Fall Prevention Protocol

The majority of patient falls occurs within the first week of hospitalization (Papaioannou et al., 2004); therefore, it is imperative that all patients are assessed and re-assessed on an on going basis for the potential of risk of falling. The targeted hospital has established a fall prevention program to ensure the safety of patients during their hospital stays. The hospital’s patient fall prevention protocol is instituted throughout the facility anywhere patients are admitted to an in-patient status. The protocol was originally implemented in February 1993 and has been reviewed and/or revised every two to three years and as needed, with the latest revision completed in December 2004. The current protocol dictates that all patients are screened for high risk factors upon admission to the hospital, re-assessed each shift and whenever any change in the patient’s condition occurs that affects the risk factors of falls, after a fall has occurred, and upon transfer from one unit to another within the facility.

The risk factors outlined in the protocol include: (a) alterations in mobility (gait disturbances, disorders of postural balance, lower extremity weakness, and neuromuscular diseases); (b) alterations in mentation/sensation (disorientation, dementia, confusion, cognitive impairment, visual or auditory impairment and seizures); (c) elimination needs (incontinence, diarrhea, frequency, or urgency); (d) prior fall history (defined as patients who had experienced a fall within the last six months); (e) medications (patients receiving sedatives, hypnotics, antidepressants, benzodiazepines, diuretics, narcotic infusions, or poly-pharmaceuticals especially pain medications, antiarrhythmics, and digoxin); and (f) postural hypotension (defined as either a drop in
systolic blood pressure of 20 mm or more when going from lying to standing, or a systolic pressure less than 90 mm Hg on standing). If any of the above criteria are met, the patient is placed on fall precautions and the protocol is implemented.

The following fall prevention measures are listed in the protocol and can be categorized into three sets of interventions: clinical, environmental, and patient.

**Clinical Interventions**

- Complete the fall prevention flow sheet in the medical record
- Write “fall prevention” at the top of the kardex and place a blue dot on the kardex
- Place a blue dot on the front census board, to the left of the patient’s name
- Place a blue arm band on the patient
- Complete the plan of care “outcomes” section to include “patient will be free of falls or injury”
- Initial and date the protocol for Fall Prevention
- Place the “Please Call, Don’t Fall” sign in the patient’s room
- Maintain close supervision, checking at least every two hours and as needed
- Communicate that fall precautions have been implemented to all applicable personnel (i.e. Charge nurse, assigned nurse, patient care technician, transporters)

**Environmental Interventions**

- Keep the bed in a low position
- Keep at least one side rail down
- Keep the brakes locked on the bed at all times
- Keep a dim light on in the evening and at night
• Check the patient’s elimination needs every two hours with scheduled and supervised elimination
• Keep the call light and personal items within the patient’s reach at all times
• Arrange furniture and objects in the room so that they do not create obstacles
• Assist the patient out of bed and remain with the patient while transferring or ambulating
• Ensure that patients wear shoes/slippers with non-skid surfaces
• Provide a bedside commode for patients with frequent elimination needs
• Do not leave patient unattended while on bedside commode or in the bathroom
• Personal items will be placed within the patient’s reach
• Consider physical therapy consult to assess the need for assist devices for ambulation
• When patients have orthostatic hypotension, instruct them to wear elastic stockings, arise slowly, and dangle before standing
• Place patient in a bed with a bed alarm and initiate the alarm system
• Place confused patients in area where they can be observed easily
• Implement the protocol for Confused/Agitated Patient as appropriate
• Consider the use of a patient sitter when appropriate and discuss with physician/licensed practitioner
• Use physical restraints ONLY when other measures to prevent falls have proven ineffective—follow the restraint policy and procedure
Patient Interventions

- Inform the patient/family when the patient is at high risk for falls and why
- Instruct patient/family in fall prevent strategies they can implement
- Educate the patient/family in fall prevention strategies that the staff will implement
- Encourage the patient to ask for assistance when moving
- Discuss with the patient/family which current/discharge medications may increase the risk for falls/injury

Many organizations devise their own assessment methods intuitively rather than through the initiation of evidence-based practice (Morse, 1993). Although the present protocol was actually based on a brief review of the research literature, it does not include a valid screening tool. According to the current protocol, if one criterion is met in the screening process, then the patient is automatically placed on fall precautions. All patients are treated with a “blanket” intervention plan, thereby making the interventions less effective because there is no method to target the best interventions for specific patients and their needs. Furthermore, with no tool to measure the patient’s risk of falling, a number of patients are placed on fall prevention simply because they meet a single criterion.

Some argue that it is more effective to identify the patients most at risk (degrees of risk, if you will) and implement interventions accordingly (e.g., Morse, 1997). A fall risk-screening tool can help ensure that prevention interventions are targeted to those individuals who would benefit most from it (McFarlane-Kolb, 2004; Coker et al., 2003).
For example, a confused elderly patient would likely be assigned to a high-risk category; while a lucid young patient, who has impaired mobility due to surgery, would be assigned to a low risk category.

Each risk category (high, medium, low, etc.) should be assigned different interventions, and those interventions should be tailored to meet a patient’s specific needs (Morse, 1997). Although one of the criterions for placing a patient on fall precautions in the current protocol is medications (sedatives, hypnotics etc.); there is no set of interventions outlined to address this problem in the interventions. Other fall prevention programs utilize pharmacists to screen patient medication regimens and recommend changes (Morse, 1997).

Another deficit identified with the present fall prevention program is the lack of documentation specific to the assessment and reassessment of the patient’s fall risk. The protocol states that the patient should be assessed upon admission to the hospital, then re-assessed each shift, whenever there is a change in the patient’s condition, after a fall has occurred, and upon transfer from one unit to another within the facility. The current computerized documentation system allows the nurse to note that the patient is on or off fall precautions and what interventions were completed. However, the system does not have a designated area for reassessing the patient risk for falling on an ongoing basis. For that reason, when an otherwise lucid, ambulatory patient who was not on fall precautions on the day shift becomes confused and agitated on the night shift, thereby posing a higher probability for a fall, this change in risk status may not be documented.
Also the computer documentation system does not allow the nurse to create individualized interventions based on the patient’s needs.

Summary

This chapter described the scope and significance of the patient fall problem in the United States, as well as national initiatives to reduce falls by JCAHO. The problem of falls was then outlined for the medical units in one hospital and the organization’s fall prevention program was analyzed. The purpose of this master’s project was described: The project will develop a comprehensive, evidence-based patient fall prevention program that includes a valid screening tool and interventions. In addition, a proposal will be presented for a theoretically-based implementation and evaluation plan that could be enacted on a pilot medical unit at an Arizona hospital.
CHAPTER TWO

Introduction

In Chapter Two, I will present the conceptual framework for this project, including a brief overview of the models from which it was derived. In addition, I will review relevant literature on patient falls and fall prevention programs, organizing the literature review within the four constructs of the conceptual model: environmental characteristics, patient characteristics, fall prevention interventions, and outcomes of fall prevention programs.

Conceptual Framework

The conceptual framework used to guide the literature review will be an adaptation of the Systems Research Organizing (SRO) Model (Fig.3) (Doyle & McEwen, 2002; Doyle & Effken, 2002). The SRO model is a second-generation version of the Academy of Nursing Model (Mitchell, Ferketich & Jennings 1998), which was developed to serve as an organizing framework for nursing systems research. Donabedian’s (1966) Structure-Process-Outcomes model served as the foundation for the Academy Model. The Academy Model extended Donabedian’s model to show the nonlinear, reciprocal dynamics among the four components: system, client, intervention, and outcome. In the SRO model, the term “system” was changed to “context” because the entire model was viewed as the relevant “system.”
For the purpose of this project, context is operationalized as environmental characteristics. These characteristics would include examples such as: room lighting, furniture arrangements, handrails, safe equipment, non-skid footwear, etc. The construct of client is operationalized as patient characteristics, since the project’s focus is on inpatient falls. Examples of patient characteristics include: age, mobility status, cognitive status, history of previous fall, and use of an assistive device. Intervention is operationalized as fall prevention tools, for example, the Morse, STRATIFY, and ADAPT fall scales. All of these elements impact the outcome component, which is represented by the number of patient falls (Fig. 4).
Figure 4. Conceptual Model for Fall Prevention Project
Literature Review

Patient falls are extremely complex phenomena to study because of the diverse and numerous variables involved (Morse, 1997). Some studies have examined environmental, clinical, and patient variables for the purposes of risk identification and development of fall risk assessment tools. Others have focused on prevention strategies for fall reduction. These investigations have taken place in a variety of settings ranging from in-patient acute care to long-term rehabilitation or community dwelling. Each setting offers a unique set of challenges.

Patient falls were once considered an unavoidable problem or an accepted consequence of illness, disability, or advanced aging (Morse, 1997). However, research now shows that many patient falls can be predicted, and thus prevented.

In order to predict a patient fall, one must first understand the etiology of a fall. Fall causation can be either intrinsic (factors that are related to the person’s condition, i.e., mobility, age, cognitive status, syncope) or extrinsic (factors that are related to the environment such as broken equipment, wet floors, poor lighting) (Morse, 2002).

Morse describes three categories of falls: accidental, unanticipated physiological, and anticipated physiological. Accidental falls occur when a patient falls unintentionally from tripping, slipping, or due to broken equipment. These patients cannot be identified prior to the fall nor would they be scored as “at risk for falling” on a predictive instrument. Most fall prevention strategies are targeted toward this type of fall, although it is estimated that only about 14% of all falls are accidental (Morse, 2002).
Unanticipated physiologic falls take place when a patient experiences a physical condition that was undetectable prior to the fall, such as, fainting, seizure, or pathological fracture of the hip. This type of fall constitutes 8% of all falls in the hospital (Morse, 2002).

Anticipated physiologic falls occur in patients who have been identified as at risk for falling according to a scale. These patients are expected to fall. This type of fall accounts for the largest percentage (78%) of falls in the hospital (Morse, 2002).

*Environmental Characteristics*

Ensuring a safe environment can prevent accidental falls and a presumed large number of anticipated physiological falls. Morse (1997) asserts that the hospital environment is not advantageous to the patient’s mobility needs; rather, it is designed to facilitate staff needs for moving large equipment into rooms and through the hallways. In a hospital room, the furniture can be either sparse, therefore not allowing the patient, with a disturbed gait, to use the furniture as support, or it may be too close together, thereby creating a tripping hazard. Morse suggests that furniture should be strategically placed to provide support for the patient’s ambulation to and from the bathroom to bed, because this is the area where most patient falls occurs. Up to 76% of patient falls occur in the bathroom and 20% occur while the patient is walking to the toilet/bathroom (Hsu et al., 2004). Research suggests that side-rails should not be used as a fall prevention strategy because they increase the risk and severity of injuries (Morse, 1997; Oliver et al., 2000; Walker, 2004).
Chairs that are difficult to rise up from pose a risk for falls because they alter the patient’s center of gravity (Walker, 2004). Ambulatory aids also increase the risk of falling if not used properly (e.g., many patients carry a walker instead of using it as a supportive devise) (Morse, 1997).

Most hospitals use a high gloss floor finish because it appears clean and hygienic; however, these floor coverings pose a potential risk for patients (Morse, 1997). The glare from the floor when light is shining on it can impair a patient’s vision; and a high gloss floor tends to be slippery, especially when wet.

Poor lighting, lack of bathroom safety equipment (i.e. hand-rails, raised toilets), and broken equipment are all environmental factors that are sited as increasing the patient’s risk for falling (American Geriatrics Society (AGS), 2001).

Research shows that falls occur mostly on night shifts (47.5%), followed by evening (32.7%) and day (19.6%) shifts (Hsu et al., 2004). The peak time for falls is between 3 pm and 7am.

**Patient Characteristics**

The literature has identified numerous risk factors that are associated with increasing patients’ risks of falling during their hospitalization. In an article that reviewed 16 studies that examined risk factors, eleven of the most common risk factors were identified as: muscle weakness; history of falls; gait deficit; balance deficit; use of assistive device; visual deficit; arthritis; impaired activities of daily living; depression; cognitive impairment; and age greater than 80 years old (American Geriatrics Society, 2001). The need for frequent toileting or other urination problems have been identified
as significant risk factors for patient falls (Oliver et al., 1997; Browne et al., 2003). Age, mental status, muscle tone, and the use of ambulatory devices were fall risk factors reported in another article (Shan-Shan et al., 2004). Research findings have repeatedly emphasized prior history of falls, gait deficit, use of assistive device, mental status and age as predictive factors for falls. Gender was shown to have no significant impact on the risk of falls.

Research has shown that the risk of falling dramatically increases as the number of risk factors increases (American Geriatric Society, 2001). One study of community-dwelling elderly persons demonstrated an increase from 27% for those with zero or one risk factor to 78% for those with four or more risk factors (Tinetti et al., 1988). Another study reported that the percentage of community-living persons with recurrent falls increased from 10% to 69% as the number of risk factors increased from one to four or more (Nevitt et al., 1989). However, some of the factors associated with fall risk in the community-dwelling may differ from those in the hospital setting (Agostini et al., 2001). For example, the onset of acute illness leading to hospitalization may increase a patient’s fall risk due to immobility, deconditioning or addition/alteration of a medication regimen.

**Interventions**

A successful fall prevention program should promote identification of patients at high risk of falling; use medical and therapy interventions to modify or treat conditions that increase risk; and make the physical environment safe (Oliver et al., 2000). Several researchers have argued for not using the same interventions for all patients (McFarlane-Kolb, 2004; Morse, 1997; Morse, 2002). Instead, each patient should be assessed and
intervention strategies used should be tailored to the patient’s specific needs. Many interventions to prevent falls are described in the literature. In the following sections, I will describe three fall prevention programs that have been tested empirically:

The Morse Fall Prevention Program. The Morse Fall Prevention Program has been successfully implemented in three different settings: acute care, long term care, and rehabilitation care (Morse, 1997). The program includes suggestions on how to implement and evaluate a fall prevention program, as well as suggestions for interventions based on the nurses’ assessment findings. The program stresses that fall prevention strategies must be individually planned for each patient.

The Morse Fall Scale (Figure 5) was created from research data that identified the significant variables that differentiated fallers from non-fallers. The items that were strongly associated with fallers were history of falling, secondary diagnosis, ambulatory aids, intravenous therapy, gait, and mental status. Age was also a significant variable; however, it was not included in the scale because the other items were frequently associated with age and therefore age was accounted for in the other variables.
<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Scale</th>
<th>Score</th>
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<tbody>
<tr>
<td>History of Falls</td>
<td>Yes</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Secondary Diagnosis</td>
<td>Yes</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Ambulatory Aid</td>
<td>Furniture</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Crutches/ Cane/ Walker</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>None/Bed Rest/ Wheel Chair/Nurse</td>
<td>0</td>
</tr>
<tr>
<td>IV/ Heparin Lock</td>
<td>Yes</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Gait/ Transferring</td>
<td>Impaired</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Weak</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Normal/ Bed Rest/ Immobility</td>
<td>0</td>
</tr>
<tr>
<td>Mental Status</td>
<td>Forgets Limitations</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Oriented to Own Ability</td>
<td>0</td>
</tr>
</tbody>
</table>

*Figure 5. Morse Fall Risk Scale (National Center for Patient Safety, 2004)*

The Morse Fall Risk Scale has established inter-rater reliability ($r = .98$) (Morse, 1997). Validation of this tool was done by prospective testing of the scale in three types of clinical settings: acute care, long-term care and rehabilitation. The integrity of the scale’s sensitivity and specificity was maintained when calibration of the high-risk score threshold was based on the patient population. The sensitivity of the scale has been reported as 78% and the specificity as 83%.

*ADAPT Fall Tool.* The Methodist Healthcare System (MHS) of San Antonio developed the ADAPT Fall Assessment tool in response to documentation deficiencies and lack of appreciable decreases in falls and injuries despite the use of a modified version of the Hendrich tool (Browne et al., 2004). ADAPT is an acronym standing for Assess: Disorientation, Activity, Post-medication and Toileting.

This innovative process began by comparing MHS fall data to the current recommendations in the literature. The most frequently cited fall risk factors were
identified and placed on a grid. These factors were then compared to the MHS identified fall risk factors, and 13 predominant risk factors emerged. From these thirteen risk factors, four broad categories were created: activity, disorientation, post-medication and toileting (Fig.6). This allowed the MHS Fall Committee to develop specific goals, protocols and interventions for each category.

In an effort to improve documentation, the fall risk indicators were embedded into the computerized shift assessment. “As the nurse completes a shift assessment, a fall risk score calculates automatically ‘behind the scenes’” (Browne et al., 2004, p.220). A fall risk assessment score is displayed at the end of each shift. This solution ensured that documentation of shift assessments was complete and risk assessment scores were based on current assessments. Documentation was also noted to be less time consuming.

A validation study revealed that the ADAPT tool had a 0.96 correlation with the Hendrich tool. Reliability of this tool was not reported.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Disorientation</th>
<th>Postmedication</th>
<th>Toileting</th>
</tr>
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<td>Age &gt; 70</td>
<td>Decreased mentation</td>
<td>Medication</td>
<td>Incontinence</td>
</tr>
<tr>
<td>Hearing/vision</td>
<td>Cognitive impairment</td>
<td>Age &gt; 70</td>
<td>Urination problems</td>
</tr>
<tr>
<td>Assistive device</td>
<td>Age &gt; 70</td>
<td>Pain</td>
<td>Hearing/vision</td>
</tr>
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<td>Altered activity</td>
<td>Medication</td>
<td>Altered Activity</td>
<td>IV or saline lock</td>
</tr>
<tr>
<td>Altered mobility</td>
<td>Hearing/vision</td>
<td>Altered mobility</td>
<td>Constipation</td>
</tr>
</tbody>
</table>

*Figure 6. ADAPT fall risk indicators by fall category (Brown et al., 2004)*
**STRATIFY Fall Tool.** The STRATIFY (St. Thomas Risk Assessment Tool In Falling Elderly Inpatients) tool is a simple 5-point scale designed to predict inpatient falls in a geriatric and rehabilitation unit. Inpatient falls are common in the geriatric population; therefore, a specialized tool to predict falls was developed for this population (Oliver et al., 1997). As with the other tools described above, the initial step was to review the literature to find which risk factors were significantly associated with the falls occurring in the Elderly Care Unit at St. Thomas’s Hospital. The researchers’ objective was to find identifying risk factors that could be easily assessed by the nurses as part of the routine nursing assessment. The five significant risk factors identified were: history of a fall, agitation, impaired vision, frequent toileting and mobility/transfer deficit (Fig. 7).

<table>
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<th>Question</th>
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<th>NO=0</th>
</tr>
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<tbody>
<tr>
<td>1. Did the patient present to the hospital with a fall or has s/he fallen on the ward since admission?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Do you think the patient is agitated?</td>
<td></td>
<td></td>
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<tr>
<td>3. Do you think the patient is visually impaired to the extent that everyday function is affected?</td>
<td></td>
<td></td>
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<tr>
<td>4. Do you think the patient is in need of especially frequent toileting?</td>
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</table>
| 5. Does the patient have a combined transfer and mobility score of 3 or 4? (Transfer score___ + mobility score___ = total ____)
  If total is 3 or 4 (answer is yes) =1
  If total is 0,1,2,5,6 (answer is no) =0 |        |      |

**TOTAL STRATIFY SCORE**
Transfer and mobility score (0-6) by combining the transfer and mobility sections of the Barthel Index

| Transfer Score: (Transfer means from bed to chair and back) |
|-----------------|------------------|
| 0 = Unable- no sitting balance; two people to lift |
| 1 = Major help (one strong/skilled helper or two normal people, physical) can sit |
| 2 = Minor help (one person easily or needs supervision for safety) |
| 3 = Independent (use of aids to be independent is allowed) |

<table>
<thead>
<tr>
<th>Mobility Score:</th>
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<tbody>
<tr>
<td>0 = Immobile</td>
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<tr>
<td>1 = wheelchair independent including corners, etc.</td>
</tr>
<tr>
<td>2 = walks with help of one person (verbal or physical)</td>
</tr>
<tr>
<td>3 = independent (but may use any aid, eg, stick)</td>
</tr>
</tbody>
</table>

Figure 7. The STRATIFY (St. Thomas Risk Assessment Tool in Falling Elderly Inpatients) (Coker & Oliver, 2003).

Several studies report the psychometrics of the STRATIFY tool. The initial study reported sensitivity and specificity scores as 93% and 88%, respectively (Oliver et al., 1997). A subsequent study reported “substantial inter-rater reliability ([kappa] = 0.74)”, but the sensitivity (66%) and specificity (47%) were not as high in this study as in the original study (Coker & Oliver, 2003).

Although a number of hospital fall risk assessment tools have been developed, few have been tested in clinical trials to establish their reliability and validity (Walker, 2004; Morse, 1997). The literature states there is a need for “gold standard” criteria for the use of screening tools. Essentially, the tool should be validated prospectively, using sensitivity and specificity analyses, in more than one population, with good face validity, inter-rater reliability and adherence from staff and simple calculation of the fall risk score (Coker & Oliver, 2003). Because each patient setting or population offers its own unique characteristics, a tool may need to be customized (Hsu et al., 2004). For example, the measurement cut-off points for high-risk and low-risk designation of patients may vary with the clinical setting. The goal of instrument customization is to optimize both the
sensitivity and the specificity of the clinical tool in practice. Here, sensitivity is the ability of the tool to correctly identify people who will fall and specificity is the ability of the tool to identify those who will not fall (Coker & Oliver, 2003).

A comparison of the three tools described above shows there are several similarities (Table 1). All the tools include the risk factors of impaired gait/transferring/mobility and altered mental status/agitation/cognitive impairment/decreased mentation. Morse and ADAPT tools also include ambulatory aids/assistive device and IV/HL. Only ADAPT and STRATIFY include impaired hearing/vision and elimination problems/frequent toileting/incontinence as similar risk factors, while only Morse and STRATIFY include history of falls. All the tools were reported as easy to use and all have reported acceptable validity and reliability except the ADAPT tool, which has no reported reliability.
Table 1. Comparisons of the Morse, ADAPT, and STRATIFY tools.

<table>
<thead>
<tr>
<th></th>
<th>Morse</th>
<th>ADAPT</th>
<th>STRATIFY</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of Falls</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Secondary Diagnosis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambulatory Aids/Assistive device</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IV / HL</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Impaired Gait/Transferring/Mobility</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Mental Status/Agitation/Cognitive Impairment/Decreased mentation</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Age &gt; 70</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Impaired Hearing/Vision</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elimination Problems/Frequent toileting/Incontinence</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Easy to use scale</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Valid</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Reliable</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
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</table>

**Outcomes**

The effectiveness of fall prevention programs is a topic currently under much scrutiny. However, research in this area has been described as methodologically problematic (Oliver, 2004). Researchers need to carefully consider trial design, interventions employed, target populations and outcome data (endpoints). The majority of the published studies have used prospective designs, which can be confounded by secular changes in fall rates, case-mix, and practice. The use of multifaceted intervention programs makes it difficult to determine which intervention offers the greatest benefits. For example, implementation of a complex program may be deferred if two or three interventions were proven to be equally effective and more cost effective. Target populations differ in their profiling of common risk factors for falling; therefore,
interventions used in one population frequently are not transferable to another population. Researchers must be aware that several different endpoints have been used for statistical reports. This makes fall rates difficult to compare because there has not been an established standard for reporting fall statistics (Morse, 1997). Traditionally, the number of falls per 1000 bed days is used. However, some optional statistics that could be used are number of patients at risk of falling, number of patients who fell, the probability of falling, or the number of injuries resulting from falls.

The American Geriatric Society (AGS) Panel on fall prevention reports, “there are no adequate randomized controlled trials of multifactor intervention studies to reduce falls among hospital inpatients” (AGS, 2001, p.668). Others claim that “because hospital studies use small sample sizes and inadequately describe the precise number and standardization of interventions, their generalizability and reproducibility is limited” (Agostini et al, 2001, p.3). A review of the literature on fall prevention in hospitals found no consistent evidence for single or multiple interventions to prevent falls (Oliver et al., 2004), noting that the program trials were too small and poorly controlled. The necessity for well-designed studies is clear.

Conversely, an earlier systematic review of studies in the acute care setting showed a “pooled effect of 25% reduction in the fall rate” (Oliver et al., 2000). In this review, a total of twenty-one papers met the researchers’ inclusion criteria, although only ten contained sufficient data to allow calculation of confidence intervals. Three studies were randomized controlled trials and seven were prospective studies with historical control. The randomized controlled trials failed to demonstrate any significant effect of
fall risk programs. Two of the controlled trials used patients on the same unit for both intervention and control groups; hence, the introduction of the fall prevention program could have altered practice and reduced the fall rate in the control group. These longitudinal studies did not make any adjustment for underlying changes and trends in pre-study fall rate and did not control for changes in the unit or patient characteristics with time so the observed decline in falls may have been a trend that was already occurring. On the other hand, a recent systematic meta-analysis of 40 randomized clinical trails for prevention of falls in older adults showed a reduction in the risk of falling when a multifactor falls risk assessment and management program was instituted (Chang et al., 2004).

Significantly, the data on falls is only as accurate as the fall reports completed. The implementation of a new fall prevention program may raise awareness and cause an incentive to document a higher percentage of falls, thus masking any effect. The Hawthorne effect also needs to be considered. The mere act of performing a study, rather than the intervention, may impact the reduction in fall rates.

Summary

This chapter discussed the conceptual framework for this project as well as the models from which it was derived. The chapter then reviewed existing literature on research related to patient falls organizing the review in terms of the conceptual framework’s constructs: environmental and patient characteristics, fall prevention tools, and outcomes of fall prevention programs.
CHAPTER THREE

Introduction

This chapter will describe an implementation and evaluation plan for a fall prevention program on a pilot medical unit. Rogers’ (1995) Diffusion of Innovation Theory will provide the implementation framework for introducing Janice Morse’s (1997) program to the staff. A plan to evaluate the outcomes of the program will also be presented.

Conceptual Framework for Implementation

As with any change, implementing a new approach to the unit staff’s practice will have its challenges. The framework used to facilitate this change is Everett Rogers’ (1995) Diffusion of Innovation. This theory conceptualizes how innovations or new ideas are diffused and adopted by networks of people.

Rogers defines diffusion as “the process in which an innovation is communicated through certain channels over time among the members of a social system. Diffusion is a special type of communication concerned with the spread of messages that are perceived as new ideas” (Rogers, 1995, p. 5). There are four elements described within the process of diffusion.

1. **Innovation** is “an idea, practice, or object perceived as new by an individual or other unit of adoption”.

2. **Communication Channel** is “the means by which messages get from one individual to another”.

3. **Time** is an element that is impacted by three factors:
• Innovation-decision process (the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to decision to adopt or reject, to implementation of the new idea, and to confirmation of the decision)

• Relative time (time with which an innovation is adopted)

• Innovation’s rate of adoption (relative speed with which an innovation is adopted)

4. Social system is “a set of interrelated units that are engaged in joint problem solving to accomplish a common goal”.

Rogers’ Diffusion of Innovation Theory asserts that new ideas are adopted into use as a result of a process referred to as the innovation-decision process (Rogers, 1995). This process has five phases:

1. Knowledge- the person learns about the innovation and has some idea of how it functions

2. Persuasion- the person develops an attitude (favorable or unfavorable) towards the innovation

3. Decision- the person engages in activities that lead to a decision to adopt or reject the innovation

4. Implementation- the person uses the innovation

5. Confirmation- The person seeks reinforcement of the innovation-decision process already made, or reverses a previous decision to adopt or reject the innovation if exposed to conflicting messages about the innovation.
Figure 8. Adapted from Everett Rogers Model of Innovation Decision Process (Rogers, 1995)

This model would be applied to the introduction of a new and improved fall prevention program at the targeted hospital. According to Rogers (1995), prior to the introduction of a new program there are several components that may impact the innovation-decision process. The nursing staff’s previous practice or past experience with the fall protocol and their perceived needs and problems with current practice can have an effect on the process, as well as their openness to innovations and the norms of the existing social system. The pilot unit’s staff has voiced the need for a better program. The current program is perceived as ineffective. Patients are identified as being at risk of falling, the fall prevention protocol is initiated and interventions are implemented; yet there are still patient fall rates above the threshold. The staff also believes the current protocol overestimates many patients’ risk of falling, as evidenced by a third of the
patient population at any given time being on fall precautions. Historically, the staff on
the target pilot unit is generally accepting and supportive of new protocols.

Rogers (2003) asserts that when one person in a group adopts an innovation then
others from the group are more likely to adopt the innovation too, if they share the same
beliefs, values, status or culture. Therefore, staff that has been supportive of change and
implementing new programs in the past (early adopters) would be encouraged to actively
participate in this change process. These staff members could set the tone for acceptance
of the pilot program.

During the knowledge stage the nursing staff would learn of the new program and
gain an understanding of how the program works. Rogers found that socioeconomic
characteristics, personality variables, and communication behaviors can impact this stage.
The staff would be presented with an overview of the new program, its benefits, and how
the program could resolve the shortcomings of the current program. The threshold goal
established for patient falls would be discussed and data from the previous quarters
would be presented to further support the need for improvement.

In the persuasion stage, the staff would decide if they find the new program
favorable or not. In this stage the staff will consider the advantages, compatibility,
complexity, trialability, and observability of the new program. Implementing this as a
pilot program, will facilitate trialability.

During the decision stage, the staff decides to adopt or reject the pilot program. If
they decide to adopt the innovation they can later decide to discontinue it and likewise if
they reject the program they may later resolve to accept it. Rogers has further broken
down the adoption process into five main functions: awareness, interest, evaluation, trial, and adoption. During the awareness stage, the person has been exposed to the innovation but does not have complete information about it. In the interest stage, the person develops a curiosity about the new idea and seeks further information about it. The person mentally applies the innovation to his situation and makes a decision to try it or not in the evaluation stage. During the trial stage, the person actively uses the new idea and at the adoption stage will decide to continue to use it or reject it.

The process is put into practice as the pilot program in the implementation stage. This is the stage where redefining, restructuring, or clarifying takes place. The program can be “tweaked” and modifications made so the program fits the unit needs of the unit at this time.

During the confirmation stage, the staff evaluates if the program is effective and achieved the outcomes they anticipated. Did this program succeed in lowering the patient fall rate? Did the staff find the program conducive to their needs? Is the documentation on falls in compliance with guidelines? At this point, if the staff feels the program is not meeting their expectations then they may choose to reverse their previous decision and reject the innovative program.

Morse’s Fall Prevention Program

Janice Morse, Professor of Nursing and Behavioral Science, has been studying patient falls and fall prevention measures since 1983. Morse’s (1997) program was selected because it is a complete comprehensive program with a fall scale that has
established validity and reliability. This program has also been proven effective in several patient care settings including the acute care inpatient setting.

Morse states there are six basic steps in establishing a fall prevention program.

<table>
<thead>
<tr>
<th>Step 1. Obtain administrative support</th>
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<tr>
<td>Administrative support is essential to carrying out a successful fall prevention program (Morse, 1997). Nursing administration need to support and budget for adequate staffing, safe and reliable equipment, and possible renovations to the unit (i.e. install additional hand rails, remove high gloss floors).</td>
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<tr>
<th>Step 2. Conduct an environmental safety check</th>
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<tr>
<td>Environmental rounds are done to ensure that every possible factor is evaluated. The unit is systematically evaluated for potential safety hazards such as cluttered hallways, deficiency of handrails, and broken or unsafe equipment to name a few. The report is submitted to the appropriate departments and the hazards are resolved.</td>
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<tr>
<th>Step 3. Obtain baseline data</th>
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<tr>
<td>The statistics on the number of falls prior to the implementation of the program are important to show the degree to which the problem of falls exist and later, the degree to which the program impacted the number of falls after the program was established.</td>
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<tr>
<th>Step 4. Establish a monitoring system</th>
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<tr>
<td>A system for recording all the falls that occur on the unit needs to be created. These records need to include details regarding the circumstances about the fall, because a patient who falls is likely to fall again and under the same circumstances (Morse, 1997). Most institutions opt to create a fall logbook that remains on the unit. In this step,</td>
</tr>
</tbody>
</table>
decisions need to be made about how and when to score each patient for risk of falling and how the scores will be recorded. This is where the unit decides on what score qualifies a patient as “high risk” for falling. It is necessary to calibrate the Morse Fall Scale to each unit it is being used on so the fall prevention strategies are targeted to those most at risk. If the score is too low, the majority of patients will be labeled “high risk”; but if the score is set too high, some fallers will be missed. To determine the cut-off score, each unit needs to score all the patients then examine the distribution of these scores. Most acute care settings use a high-risk cut-off score of 25 while rehabilitation settings use a cut-off score of 45.

Step 5. Prepare staff
The staff must be educated on the new program. Staff in-services that are conducted in small groups are recommended as the method to educate staff. A 10-minute video is available to educate staff on identifying the fall prone patient and use of the Morse Fall Scale. The staff should also be shown the interventions developed specifically for the unit and the system to document the fall score, assessment, and interventions.

Step 6. Establish an interdisciplinary assessment team
The role of this team is to combine the expertise of the members and to provide a forum to present high-risk fall cases and discuss possible strategies to prevent fall and injuries.

Pilot Fall Prevention Program

The fall prevention program for the pilot medical unit will utilize the steps listed in the Morse fall prevention program, but the pilot program will modify the order of the steps as well as include additional steps. The pilot program’s steps will be as follows:
1. Obtain administrative and staff support
2. Form a unit based fall prevention committee
3. Obtain baseline data
4. Conduct an environmental safety check based on the baseline data
5. Establish a monitoring system
6. Educate staff regarding use of new program
7. Establish an interdisciplinary assessment team
8. Evaluate the programs outcomes

Figure 9. Integration of Diffusion of Innovation Model with Fall Prevention Pilot Program

Steps one through three of the pilot project will coincide with the knowledge and persuasion stage in Rogers’ model. During the implementation of these three steps staff
will be presented with the need to improve current program and given information on the innovative program. They will then be convinced to adopt the program or will reject it in the decision stage. If they accept the new program, then steps four through seven will take place in which the program is put into practice in Rogers’ implementation stage. Finally, step eight will take place during the confirmation stage. Once the outcomes are evaluated, the staff will decide whether to continue with the new program or reject it. In the following section, each step is described in greater detail.

Obtain Administrative and Staff Support

The targeted hospital has already agreed to support a fall prevention program and presently has a task force working on the implementation of a program. The hospital has an approved four to one patient-nurse ratio with patient care technician assistance. This staffing ratio helps to ensure there is time to properly monitor high-risk fall patient. They also have a portion of the staffing budget to allow for a patient sitter to be at the patient’s bedside when deemed appropriate. On an annual basis, the patient care managers review staff requests for equipment and add it into the capital budget request. This hospital is also committed to doing renovations as needed to maintain and repair its facility.

Conducting a presentation at a staff meeting that would give an overview of the purposed program will facilitate the staff’s support. This presentation would give an overview of what the literature has reported, thereby allowing the staff to make an informed judgment. The benefits of the new program as well as the anticipated outcomes would be presented. This process would impact the first two stages of the innovation
theory, knowledge and persuasion. By providing the staff this information, they will consider the advantages, compatibility, and complexity of the program.

*Form a Unit Based Fall Prevention Committee*

The pilot program will form a unit based fall prevention committee. This committee will be responsible for over-seeing the implementation and maintenance process of the program. Members of this committee will be considered the unit’s fall experts and will be mentors for the staff. The early adopters will be encouraged to participate on this committee. In congruence with Rogers’ model, the formation of a group who is willing to support the innovation will persuade others to accept it. Also having staff participate on the committee and help make decisions regarding the new program would give the staff a sense of vested interest in the program.

The committee would ideally be made up of at least four day shift nurses and four night shift nurses with a clinical leader as the chairperson. This mix will allow coverage with a committee member “expert” for the majority of the shifts. These volunteers will commit to meeting on a weekly basis until the program is established and then meet on a monthly basis and as needed.

The initial meeting will be conducted to provide education to the committee members regarding the program. Objectives for the committee will also be established at this meeting. Some objectives recommended for the pilot program committee are as follows:

1. Review quarterly fall incident reports to determine major risk factors for the unit’s population and possible trends to environmental factors.
2. Develop intervention strategies that are tailored to specific patient risk factors.
3. Calibrate the Morse Fall Scale specifically to the pilot medicine unit.

4. Create a fall logbook and incident report sheets that specifically address fall circumstances.

5. Conduct initial staff education on the fall prevention program and provide continuing education an on-going basis.

6. Monitor staff compliance with program and provide feedback to staff.

7. Work with Information System Management to revise current charting system for falls in the computer that would ensure fall reassessment no less then every 12 hours and provide drop down lists of interventions that are created by committee.

8. Integrate fall risk information into care plans, report sheets, audits, and care conferences to create an interdisciplinary communication network.

**Obtain Baseline Data**

The baseline data is important to establish the need for a new program as well as evaluate the success of the program once it has been implemented. The baseline data used for this program will be fall rate, injury from fall rate and incurred cost from falls. These data will impact the knowledge and persuasion stage in that it will demonstrate to staff the need for improvement.

**Conduct an Environmental Safety Check**

The environmental rounds should be based on the data from the fall incident report forms. For example, if the data shows there have been several falls linked to patients using to the bathroom then the bathroom environment needs to be assessed for potential fall hazards (i.e. are the toilets too low, are there adequate number of handrails?). The
unit’s fall committee members would be responsible for conducting these rounds on a quarterly basis when the incident report data are presented. Once a fall hazard has been identified, the committee members need to take the steps necessary to rectify the problem.

*Establish a Monitoring System*

A system for recording all the falls that occur on the unit would be created. A logbook would be instituted that would document all patient falls and the circumstances surrounding the incident. The fall unit committee as well as the staff would use this information to create strategies to prevent other falls. Presently the hospital’s Quality Improvement Department collects incident reports to calculate the patient fall rate. They do not collect data on the factors related to the fall. The fall rates are then presented to the clinical practice committee and the patient care managers.

*Educate Staff Regarding Use of New Program*

The staff will be educated on the new program in small groups of 6 to 8 persons. They will be shown a 10-minute video on the Morse Fall Scale and short PowerPoint presentation on when to screen a patient for falls, how often to reassess, computer documentation guidelines, interventions for high-risk patients and documentation, etc. The unit fall committee will create and present this presentation. A self-learning module will be created for new staff once the initial education phase is completed.

*Establish an Interdisciplinary Assessment Team*

The pilot unit presently conducts discharge rounds on a Monday through Friday basis. The rounds are made up of interdisciplinary team members including a social
worker, nurse case manager, pharmacist, physical therapist, charge nurse, patient care manager, and staff nurses. Fall prevention assessment and interventions could easily be added to the agenda of these rounds.

**Evaluation**

The evaluation component is necessary to determine if the program is satisfactorily achieving what it was meant to achieve (McNamara, 1998). Evaluations produce data that can verify if a program is effective. The approach for the evaluation for this program will be outcomes based. This approach identifies the benefits to the clients. The clients in this case would be the staff and hospital administration.

The initial step is to identify the outcomes that are to be measured. The overall outcome of the program is to decrease the patient fall rate; specifically to less than 2 patient falls per 1000 patient bed days. Decreasing fall injury rate, and incurred cost from falls, as well as, staff satisfaction are outcomes that will be examined.

The method to collect fall data will be collected from the incident report forms. Presently the fall rate for the targeted unit is 4.7 falls per 1,000 patient bed days. The goal set by the hospital’s clinical practice committee is 2.0. The fall rate will be calculated from the initiation of the new fall prevention program over the proceeding three months. There may be an expected increase in reported falls due to the increased awareness stemming from the initiation of the new program. Therefore, a full six-month period may give a truer reflection of the program’s success. Injury fall rate will also be evaluated to determine if the program impacted these variables.
A short informal survey for the nurses to complete would also be an indicator if the program were feasible from the users’ perspective. A quick and easy method to get information from people in a non-threatening way is by taking a survey (McNamara, 1998). This simple survey would give the unit committee basic feedback on the nurse’s perception of the program.

| 1. HOW MANY MINUTES DOES IT TAKE TO COMPLETE THE MORSE FALL SCALE PER PATIENT? |  
| 2. DO YOU FEEL THE NEW FALL PREVENTION PROGRAM HAS POSITIVELY IMPACTED YOUR PRACTICE? | YES  
| 3. DO YOU FEEL THAT THE MORSE FALL SCALE ACCURATELY TARGETS HIGH RISK FALL PATIENTS? | YES  
| 4. DO YOU FEEL THE DOCUMENTATION SYSTEM FOR FALLS IS ADEQUATE FOR WHAT YOU NEED TO DOCUMENT? | YES  
| 5. ARE YOU OVERALL SATISFIED WITH THE NEW FALL PREVENTION PROGRAM? | YES  

Figure 10. Sample survey for nurse satisfaction on fall prevention program

To get more detailed information from the staff, a focus group could be formed. This method allows the investigator an efficient way to get much more range and depth of information in a relatively short period of time (McNamara, 1998).

The unit fall committee will present the results of the data to the staff on a quarterly basis at the schedule staff meeting. The results will be examined and the program will be revised according.

Summary

This chapter presented the process of implementing the new fall prevention program for the targeted pilot medical unit. The chapter described the Theory of Diffusion of Innovation and how it would be used to guide the implementation of
Morse’s fall prevention program. Finally, the process proposed for evaluating the effectiveness of the new program was presented.
REFERENCES


