



1990

A Study of Falls by Elderly Patients in the Acute Care Setting: Identifying Risk Factors

Gregory J. Horeni
Loyola University Chicago

Follow this and additional works at: https://ecommons.luc.edu/luc_theses

 Part of the [Nursing Commons](#)

Recommended Citation

Horeni, Gregory J., "A Study of Falls by Elderly Patients in the Acute Care Setting: Identifying Risk Factors" (1990). *Master's Theses*. 3625.

https://ecommons.luc.edu/luc_theses/3625

This Thesis is brought to you for free and open access by the Theses and Dissertations at Loyola eCommons. It has been accepted for inclusion in Master's Theses by an authorized administrator of Loyola eCommons. For more information, please contact ecommons@luc.edu.



This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 License](#).
Copyright © 1990 Gregory J. Horeni

THE STUDY OF FALLS BY ELDERLY PATIENTS
IN THE ACUTE CARE SETTING:
IDENTIFYING RISK FACTORS

by

GREGORY J. HORENI

A Thesis Submitted to the Faculty of the Graduate
School of Loyola University of Chicago in Partial
Fulfillment of the Requirements for the Degree of
Master of Science of Nursing

January

1990

ACKNOWLEDGMENT

I wish to express my sincere appreciation to Dr. Hungelmann, Dr. Varricchio, and Dr. Taira for their leadership, assistance and friendship throughout my graduate studies. Their encouragement has helped this investigation be a success.

I wish to thank the nursing department at Foster G. McGraw hospital especially Mr. Simon, Ms. Feltman, Ms. Flores, Dr. Lanuza, and Dr. Mathews, for their advice and assistance with this research project.

I would like to thank my wife and children who were so encouraging, patient, and loving throughout the course of this study.

GJH

Deep appreciation and love are extended to my family to whom this thesis is dedicated.

VITA

The author, Gregory J. Horeni, is the son of Robert Horeni and Arlene (Rehm) Horeni. He was born July 2, 1957, in Chicago, Illinois.

His elementary education was obtained in the parochial school of Chicago, Illinois. His secondary education was completed in 1976 at St. Rita High School, Chicago, Illinois.

In September, 1976, Mr. Horeni entered Loyola University, receiving the degree of Bachelor of Science in Nursing in May, 1982.

In September, 1985, Mr. Horeni began his graduate studies in Nursing. In 1988 while attending Loyola University, he became a member of Sigma Theta Tau, the Honor Society of Nursing. Presently he is active in the Illinois Nurses Association.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	ii
VITA.....	iv
LIST OF TABLES.....	viii
CONTENTS OF APPENDICES.....	ix
Chapter	
I. INTRODUCTION.....	1
Specific Purpose of the Study.....	2
Research Questions.....	2
Assumptions.....	3
Definition of Terms.....	3
Variables.....	4
Limitations.....	4
Conceptual Framework.....	5
II. LITERATURE REVIEW.....	9
Environmental Factors.....	9
Physiological Changes Associated with Aging...10	
Research on Falls.....	13
III. METHODOLOGY.....	20
Setting.....	21
Sample.....	21
Variables and Measurements.....	23
Instrument.....	23
Additional Data.....	24

TABLE OF CONTENTS CONT.

	Page
Procedure.....	25
Data Collection.....	26
Data Analysis.....	26
IV. RESULTS.....	27
Gender.....	27
Age.....	27
Length of Stay.....	27
Environmental Factors.....	28
Time of the Fall.....	28
Miscellaneous Information.....	28
Risk Factors on admission.....	29
Risk Factors on the Fall/Random day.....	32
V. DISCUSSION AND FUTURE RESEARCH.....	35
Length of Stay.....	35
Age.....	36
Gender.....	36
Admission Data.....	37
Fall/Random Day.....	38
Relationship between Variables and Conceptual Framework.....	40
Limitations of the study.....	41
Implications for Nursing.....	41
Recommendations.....	42

TABLE OF CONTENTS CONT.

REFERENCES.....43
APPENDIX A.....46
APPENDIX B.....54

LIST OF TABLES

Table

1.	Raw Means and Standard Deviations for Fall Risk Variables.....	30
2.	Canonical Discriminant Coefficient for Five Variables on Admission.....	31
3.	Canonical Discriminant Coefficient for Six Variables on Fall/Random Day.....	33

CONTENTS OF APPENDICES

APPENDIX A JANKEN, REYNOLDS AND SWIECH CODE BOOK.....46
APPENDIX B PATIENT FALL STUDY CODING MANUAL.....54

CHAPTER I

INTRODUCTION

Falls are one of the most complex problems in the care of the elderly today. Statistics show that accidents, two thirds of which are falls, are the fifth leading cause of death among the elderly (Calkins & Wieman, 1986). When an elderly patient is admitted to the hospital he/she is faced with a strange environment. The unfamiliar setting, his/her illness, change in medications, and diagnostic procedures will predispose the older patient to increased risk of falling.

Today, hospitals are attempting to control the cost of health care. The average length of the patient's stay in the acute care facility is decreasing because of reimbursement factors. Falls are a chronic problem that can increase the patient's stay or add to the total cost of health care. Falls can become a liability issue for the institution.

In the hospital, a nurse is responsible for the patient twenty-four hours a day. The nurse is capable of assessing and reporting changes in the patient's condition. The nurse can assess a risk, then plan and implement procedures to prevent a patient from falling. Therefore, prevention of patient falls may be related to the nurse's ability to assess factors that place the individual at risk for injury.

Specific Purpose of the Study

This study is a replication of the work of Janken, Reynolds and Swiech (1986). It will attempt to determine if there is a relationship between patient falls and the characteristics of vertigo, substance abuse, decreased mobility of the lower extremities, confusion, general weakness as described by Janken, Reynolds and Swiech (1986). If nurses can assess the characteristics associated with falls then the patient who is at a risk for falling can be identified, and safety techniques can be initiated to prevent the accidental fall.

Research Questions

1. Do the characteristics identified by Janken et al. (1986) discriminate between those patients who fall, and those patients who do not fall, at the time of admission?
2. Do the characteristics identified by Janken et al. (1986) discriminate between those patients who fall, and those patients who do not fall, at the time of the fall?
3. What are the demographic characteristics of the group who fall?
4. What are the demographic characteristics of the group who do not fall?

Assumptions

1. The registered nurse is responsible for assessing and implementing safety mechanisms to prevent the elderly patient from falling.

2. In the acute care center falls make up a significant proportion of all incident reports.

3. Identification of risk factors is necessary in order to develop specific nursing interventions to reduce the frequency of falls (Llewellyn, Martin, Shekleton & Firlit, 1988).

4. Nursing Diagnosis is the most adequate means for the nurse to describe human response to actual and potential health problems (Halloran & Kiley, 1984), and identify the critical signs and symptoms that the patient is exhibiting.

Definition of Terms

A fall is a sudden, unexpected change in position in which the static and fixation mechanisms fail and voluntary or reflex responses for correcting imbalances are inadequate (Sehested & Severin-Nielsen, 1977). Webster (cited in Merriam, 1981) defines the word fall as "the leaving of an erect position suddenly and involuntarily".

Nursing Diagnosis is the label of an actual or potential health problem accepted by the North American Nursing Diagnosis Association.

Defining characteristics were defined as observable signs and symptoms present in the client with the health problem (Kim & Moritz, 1982).

Variables

Patient falls were documented by obtaining incident reports written by the nurses taking care of these patients at the time of the fall. Risk factors were identified by using the tool developed by Janken et al. (1986) which was based on the Nursing Diagnostic labels of the North American Nursing Diagnosis Association (NANDA) (1982) see Appendix A. The tool was developed by identifying a total of twenty-four dichotomous, independent variables, documented by nurses on fifty charts that represented signs and symptoms of the NANDA characteristics. Demographic data for each patient included age, sex, employment, and nursing care unit. Other data collected were admission date, patient's day of stay since admission, length of stay, time of fall, location of fall, activity order, admitting diagnosis, restraint order, history of falls, prior medication within six hours, and the hospital medical service managing the patient's care.

Limitations

The study is limited geographically to the eight units that are part of the study. Information from the study can only be generalized to general medical and surgical units similar to those used in the study. The study is also limited by the accuracy of the documentation by nurses in

the patient record and on the incident report of all critical signs and symptoms that the patient exhibits.

Conceptual Framework

Elderly Risk for Falls Models

Two models were used as a guide for this study. Each model focuses on the environment and the physiological capabilities of the person. The first model was developed by Robinson and Conard (1986) and the second model by Lawton (cited in Hogue, 1984)

Environment and Postural Competence.

According to Robinson and Conard's model (1986) falls are defined as the interrelationship between the environmental demands and the person's ability to meet the demands of the environment through postural competence. Postural competence, a continuous variable that must exceed environmental demands, is defined as the quality which allows the maintenance of a stable upright position. Postural competence is dependent on normal physiological gait and balance.

Environmental demand is a continuous variable that is determined by the person's behavior and the assistive or destructive impact of the environment. The individual is at risk for falling when postural competence is impaired or when certain environmental factors create extraordinary demands on the individual. If postural competence is impaired, the environment should be modified to reduce the

demand needed for postural competence through the use of assistive devices for walking.

Personal Competence, Environment and Adaptive Behavior.

The second model by Lawton (cited in Hogue, 1984) focuses on the personal competence, the environment and the range of adaptive behaviors that can influence these two factors. Lawton's model is an adaptation model similar to those of Roy (1986) and Lazarus (1974). This model states that the person with higher competence is more capable of adapting to environmental changes than the person with a diminished competence. The person with a higher competence, according to Lawton, is able to evaluate the situation by cognitive appraisal of the event and in turn use coping techniques to adapt.

Lawton defines personal competence as the individual's upper limit of capacity to function in the areas of biological health, sensation, perception, motor behavior, cognitive and ego strength. The term biological health is the absence of disease, whereas, functional health is a behavioral outcome resulting from the interaction of personal and environmental factors. Coping techniques are seen as adaptive behaviors that are influenced by the environmental stimuli and personal competence (ego strength). Personal competence and environmental factors in turn will then affect the person's coping and adaptation processes (cited in Hogue, 1984).

Lawton's model demonstrates the interaction among the variables of cognitive appraisal, coping and adaptive behaviors in relation to functional health. Mobility is seen as a behavior of functional health in an individual. Limitations in the persons' ability to be mobile increase their risks for falls and fractures (Hogue 1984).

Both of the previous models focus on the individual and the environment. The model proposed by Robinson and Conard (1986) does not demonstrate the person's ability to interact with the environmental demands. Rather, the focus is on changing the environment to decrease the risks for falling. Lawton's model is an interactive model in which the person's cognitive awareness is necessary to evaluate the situation. By using past coping skills to adapt to the change, or by changing the environment, the older person improves his or her functional health.

In accordance with both models the characteristics observed to predict if a patient will fall were assessed by the tool developed by Janken et al (1986). The tool developed by Janken et al. based on nursing diagnoses reflected the cognitive, physiological and functional abilities of the individual within the hospital environment. These characteristics then were used to analyze the risk for falling since they are the most important in determining both functional and cognitive abilities of the older individual (Hogue, 1984; Robinson & Conard 1986). The change

in any one of these characteristics increases the persons risk for falling. Therefore, this tool assesses the presence of the major components of the Robinson and Conard model and the Lawton model.

CHAPTER II

LITERATURE REVIEW

The major causes of falls by the elderly are related to environmental factors or physiological changes that occur with aging. Falls are the most frequent cause of accidental death for persons above seventy (Calkins, & Wieman, 1986).

Environmental Factors

Environmental factors which increase the risk for falls are slippery or smooth floors; throw rugs; carpet edges; stairs without railings or lights; poor lighting; a room cluttered with personal objects, chairs or beds; toilets of inappropriate height; and spills on the floor (Calkins & Wieman, 1986; Robinson & Conard, 1986 and Rodstein, 1964).

In the hospital, additional environmental factors that can cause falls are equipment such as intravenous poles, wheel chair used as a walker, unlocked wheels on beds or wheelchairs, poor lighting in an unfamiliar environment, bedrails which force the individual to crawl around or over to get out of bed, and inappropriate foot wear. It has been shown that environmental factors are the leading cause of 40-50% of the falls in the elderly (Rubenstein & Robbins, 1984). The other causes of falls in the elderly are thought

to be the result of physiological changes.

Physiological Changes Associated with Aging

The aging process can alter every major physiological system in the older adult. Changes in the physiological systems that contribute to falls are in the central nervous system, cardiovascular, metabolic, musculoskeletal, and sensory systems (Calkins & Wieman, 1986).

Central Nervous System Changes.

Alterations resulting from aging in the central nervous system may lead to swaying, slower performance, and delayed reaction time. Most elderly individuals experience some degree of proprioception loss and decreased postural response to position changes (Calkins & Wieman, 1986). An elderly person may develop an abnormal gait such as a wide base and a short step for men, or a narrow base and a waddle effect for women (Robinson & Conard, 1986). Remembering, concentration and awareness may become more difficult with age.

Diseases of the central nervous system which predispose the elderly to falls are: the dementias, parkinsonism, strokes, tumors, seizures, and cerebellar disorders. These diseases affect the gait and balance in the individual. It has been documented that demented patients fall more frequently because of poor judgment, inattention, depression, or specific psychomotor responses (Calkins & Wieman, 1986; Robinson & Conard, 1986).

Cardiovascular Changes.

The cardiovascular changes that can precipitate a fall include anemia, arrhythmias, carotid stenosis, valvular diseases, orthostasis, congestive heart failure and premature ventricular contractions (Calkins & Wieman, 1986), (Rubenstein & Robbins, 1984). These abnormalities which become more frequent in the elderly can cause episodes of intermittent syncope (sudden loss of consciousness).

Metabolic Changes.

Metabolic changes most commonly associated with falls are: dehydration, hypoglycemia and hypokalemia (Calkins & Wieman, 1986). Dehydration results from diarrhea, fever and inadequate oral intake of fluids or the excessive use of diuretics. Hypoglycemic reactions occur as a result of poor dietary habits or poorly controlled blood glucose levels. Hypokalemia can result from diuretic therapy and inadequate potassium supplements.

Musculoskeletal Changes

Musculoskeletal changes that occur with aging include muscle weakness in the lower extremities. A study of muscle fibers (Cheshire & Cumming, 1985) showed a change in the length-tension relationship of the quadriceps in the elderly. This change interferes with the ability to stand erect (Calkins & Wieman, 1986). Osteoporosis and rheumatoid arthritis limit mobility in the elderly. General muscle strength and tone are diminished, resulting in early

fatigue. These changes contribute to reduced mobility in the elderly.

Sensory Changes

Sensory changes associated with aging include a decrease in visual acuity and peripheral fields (Robinson & Conard, 1986). The elderly are more sensitive to bright lights and glare. Medical problems which decrease visual acuity include cataracts and glaucoma.

Vestibular Changes.

Vestibular functions of the inner ear are important for the reflex responses of balance and coordination. Vestibular neurological sensory input changes with aging leading to a decrease in the excitability of the nerve. Other degenerative changes in the inner ear result from vascular changes in the small vessels, resulting in a decrease in hearing (Mills, 1985). These changes decrease the person's ability to respond to sudden body changes. Diseases which affect the vestibular input include acute labyrinthitis, Meniere's disease and benign positional vertigo (Robinson & Conard, 1986). According to Robinson and Conard (1986) vertigo is the hallucination of movement. This effect results from a lack of coordination of information from the visual, vestibular and proprioceptive systems to the brain. Persons are more prone to episodes of such vertigo as the aging process progresses (Robinson & Conard, 1986).

Changes in Sensitivity to Medications

The elderly are more sensitive to the effects of medications because normal aging changes in the absorption, metabolism and elimination of the drug. Drugs that have been related to falls are diuretics, anticholinergic agents, nitrates, hypnotics, and antihypertensive medications (Calkins & Wieman, 1986). Polypharmacy by multiple physicians, and by the use of over-the-counter medications increases the risk for drug interactions and side effects which can precipitate a fall.

Research on Falls

Research on patient falls has identified the following risk factors: age, the time of the fall, the characteristics of the faller, sex and medications (Morse, Tylko, & Dixon, 1987). The only variable that is significantly correlated to falls is age. The literature reports conflicting results for other risk factors (Jancken et al., 1986 and Morse, J., Tylko, S., & Dixon, H., 1987).

Age

Age has been identified by Walshe and Rosen (1979), Morse et al. (1987), and Sehested and Severin-Nielsen (1977) as significantly associated with falls. Walshe and Rosen (1979) conducted a retrospective study on patients falling from bed in a 300 bed community hospital. The hospital has approximately 11,000 admissions a year of which 22% of the patients are sixty five years or older. A total of 106

patient falls occurred during the study period. A random sample was chosen by selecting every other fall for a total of 53 incidents. Walshe and Rosen (1979) found that 83% (44) of falls were by persons who were over the age of sixty-five.

Morse et al. (1987) conducted a retrospective study on falls in a 1200 bed urban hospital. The hospital represented essentially a geriatric male population with the ages ranging from 60-100 years, the mean age being 76 years. The total sample consisted of 100 patients who fell and a control group of 100 randomly selected patients. Of the patients who fell 58% were between the age of 65 and 89 but only 34% of the control group were in this range ($p < .001$).

Sehested and Severin-Nielsen (1977) in their retrospective audit of patient falls also found age to be significant. A total of 511 patients participated in the study. Of the 134 patients who fell, 87% (116) were 65 years of age or older.

Time of the Fall

There is little agreement among studies concerning the significance of the time of the fall. Walshe and Rosen (1979) stated that 83% of falls occurred between three in the afternoon and seven in the morning. Brown and Kiss (1978), through a retrospective chart audit and a review of incident reports of 40 patient falls, observed that 45% (18)

of the falls occurred during the day, 20% (8) occurred during the evening and 35% (14) occurred during the night.

Gender of the Faller.

Brown and Kiss (1978) reported in a sample of forty patients who fell that 60% were males and 40% were females. In contrast Morris et al. (1981) found that in a sample of 236 patients who fell, 64% were female and 36% were male; however, when this finding was compared with the population at risk, falls occurred with equal frequency in males and females. Morse et al. (1987) stated that investigators found sex not to be a significant variable.

Falls related to Medications.

Sehested and Severin-Nielsen (1977) reported that, in 264 falls by 134 patients, 42% (111) of the patients had been given a barbiturate. However, Walshe and Rosen (1979) found diuretics in 50.9% (27) of their sample of fifty-three falls to be more significantly related to fall incidence than sedatives.

Primary Medical Diagnosis.

Little has been done to analyze all the major medical problems of the patient who fell except for the primary diagnosis. Walshe and Rosen (1979) cited cardiovascular disease as a characteristic of patients who fall in 39.6% (21), of fifty-three falls. Morse, Prowse, Morrow, and Federspeil (1985), in a sample of 774 falls, observed in 122 randomly selected charts, report that trauma (21%) and

nervous system disease (20.4%) were the most common primary diagnoses of the fall group. However, Morse et al.(1985) did recognize that cardiovascular disease (68.8%) was a predominant secondary diagnosis relevant to patient falls.

Multiple Factors Related to Falls.

These studies of patient falls demonstrate the conflicting findings reported in the literature. Past studies selected combinations of patient characteristics, medical diagnosis, medications and environmental factors to identify risks for falls. Janken, Reynolds, and Swiech (1986) did a retrospective chart review of 631 hospitalized patients sixty years and older. The characteristics selected to identify the fall prone patient were based on the North American Nursing Diagnoses Association nursing diagnoses as modified by Janken et al.(1986), (appendix A).

Environmental factors (e.g., slippery floors, poor lighting) were deleted since previous studies combined and selected both patient and environmental characteristics. Janken et al. (1986) state that there is no rationale for studying a combination of particular variables but, rather it is important to address the question of whether all the patient characteristics associated with falls have been identified and examined.

Janken et al. (1986) studied 631 patients aged 60 and older; 331 fell during the hospital stay and 300 did not fall. Incident reports were used to identify the group who

fell. A random sample from the hospital data system identified the sample of patients 60 and older who were hospitalized during the study period but did not fall.

In this retrospective review, admitting data for both groups were collected from the chart. For the fall group, data were collected for the twenty-four hour period preceding the fall. For the non-fall group, a random day for data collection from the chart was chosen by selecting the first number on a random table that was within the length of stay range. This day was then reviewed and data similar to that for the fall group were collected.

Data were analyzed by utilizing chi square and multiple regression analysis. Chi square analysis was calculated for all independent variables. Multiple regression was done on those variables identified as risk factors for falling.

Janken et al. (1986) proposed eleven fall/random day variables ($p < .001$) as risk factors related to falling: general weakness, decreased mobility of the lower extremities, sleeplessness, incontinence, confusion, depression, substance abuse, assessed for posey, agitation, decreased mobility of the upper extremities, vertigo. Five additional characteristics (e.g. age, service, employment, room type and nursing unit) were also included. Multiple regression was done on these sixteen variables to determine which were predictors of falling. Ten variables were identified as predictors of falls with an R square of .307.

These ten variables were compared with twelve standard risk factors (e.g., decreased mobility of the lower extremities, decreased mobility of the upper extremities, general weakness, posey restraint, fall history, impaired hearing, impaired vision, vertigo, substance abuse, confusion, hypnotic taken and narcotic taken) cited in the literature reviewed by Janken et al. (1986). By using multiple regression techniques the twelve standard variables were compared with the fall/random day data. Of the twelve variables only confusion, decreased mobility of the lower extremity, general weakness, vertigo, and substance abuse were significant at R square of .219 (Janken, 1986).

Two limitations of the study were identified. The first limitation was that the study did not control for the patient's length of stay. The study showed that the mean day for a fall to occur was on day 14.2. However, the mean stay for the non-fall group was 8.3 days. The mean length of stay for the aged sixty and older hospitalized during the study period was 12.57 days. This finding demonstrated a difference in the total of hospital stay days between the non-fall group, fall group and the mean length of stay for all patients. However, the patients who fell would have had a longer stay regardless of the fall since they tended to be in poorer health, were at a higher risk for falling, and therefore would have required a longer length of stay (Janken et al., 1986).

The second limitation was the sample size when measuring many characteristics by a retrospective design. Retrospective studies are weak in determining causal relationships. "Many characteristics this study sought to examine occurred so infrequently that it would have been impossible with a reasonable sample size to obtain a sufficient number of cases with the trait, consequently these traits were collapsed into one variable such as confusion. Results should be used with discretion" (Janke et al. 1986).

Characteristics which identify patients at risk for falls is complicated by the lack of consensus among researchers. By replicating the Janke et al.(1986) study, risk factors can be further validated in an effort to increase generalizability to similar populations.

CHAPTER III

METHODOLOGY

In order to determine if nurses can identify characteristics of the patient at risk for falling and if there is a relationship between these characteristics and a fall. A retrospective chart review of patients who fell and those patients who did not fall was conducted. The principal data collection method was the chart review.

The current study replicated the Janken, Reynolds, and Swiech study in order to determine if the patient characteristics associated with increased risk for falling can be identified in patients at admission. The study examined the presence of these characteristics on the day of admission and then on the day of the fall.

The study also measured the characteristic of shortness of breath on admission and on the fall or random day. This characteristic which Janken et al. (1986), found to be insignificant in the patient population they analyzed was one this investigator identified as being specific in this study. Shortness of breath was frequently documented in the medical record reviewed in the study. Therefore, this characteristic and those identified by Janken et al. (1986) were used to measure patient falls.

All environmental characteristics were excluded in this study since Perry (1982) identified that these characteristics are important for the younger and healthier elderly; whereas, for the older infirmed elderly, the physiological factors were more important.

Setting

The study was conducted in a large midwestern acute care hospital. In this setting each patient is assigned to a registered nurse for care. Patient care aides assist patients with activities of daily living. The nurse assesses each patient on admission and identifies potential and actual problems according to nursing diagnosis classification. The nurse formulates a care plan and revises it as the patient's condition changes.

Sample

The sample consisted of 100 charts of patients aged 60 years and older: fifty patients who had fallen and a control group of fifty patients 65 and above who had not fallen. The control group was selected to determine those characteristics that specifically pertain to the fall group. The sample was taken from eight adult acute medical and surgical units. No critical care units were used.

Fall Group:

The fall group was identified by incident reports. Incident reports are a descriptive account of the facts that are written by the nurse and the physician after the event

occurred. The sample was a convenience sample of charts from those individuals 65 years of age and older who fall. The incident reports of falls for patients were collected until a total of fifty records of falls were obtained.

Non-Fall Group:

The non-fall group was determined by selecting three patients discharged from each unit the first month of the study, and two patients discharged on each unit for the next two months. A random selection was made by using the discharge log on the unit. This log records the names and medical record numbers of the patients chronologically.

A discharged patient from the unit was selected by using the first occurring number chosen on a random number table. The randomly chosen number was used to select the discharged patient by counting in chronological order from the first day of the month until reaching the number in the discharge log. If the randomly selected patient was not 65 years of age or older or the chart was unavailable, then another patient's chart was selected by the same process.

Confidentiality was maintained by conducting chart audits and removing all identifying information from the study tool. Data was collected only by the principal investigator. The medical record number and the patient's name were removed and a code number was assigned in sequential order for both groups. These code numbers were kept in a file accessible only to the principal

investigator.

Variables and Measurements

Descriptive information was obtained by assessing five variables that are associated with the characteristics predicting a fall. The tool used was the Janken et al.'s (1986) nursing diagnosis tool for patient falls (appendix A).

The additional characteristic of shortness of breath which was derived from nursing diagnosis by Janken et al. (1986) but was found to be insignificant in her patient population at the time of the study was measured in this study. Janken et al. (1986) found shortness of breath to be insignificant on admission in 48.9% (331) ($p < .024$) of cases and on the fall day in 33.5% (331) ($p < .220$). In the patient population of this study nurses' documentation in the chart and on the care plan frequently cited the presence of shortness of breath; therefore, the characteristic of shortness of breath was included. The frequency of this finding may be attributed to the fact that the population examined had a high acuity level, tended to have cardiac or cancer related illnesses and had more complex medical needs because of the nature of the institution.

Instrumentation

The tool by Janken et al. was based on nursing diagnoses as cited in Kim and Moritz (1982) but excluded the environmental factors. Using the remaining defining

characteristics, the tool was developed from the review of fifty patient charts that were not in the original sample group of the study. Each patient chart was reviewed to determine: 1) the types of documentation of the presence of nursing diagnoses characteristics, 2) those characteristics that were not exclusive and needed to be consolidated into one category, and 3) those characteristics that were infrequently used or not reliably documented so that they could be eliminated in the study. This process resulted in the final Janken et al. tool (see Appendix A) which identified twenty-four dichotomous nominal independent variables. Three registered nurses, using computer sheets, had an inter-coder reliability of 88% on the coding of the initial seventy-five charts at the beginning of the study.

The tool that was developed by Janken et al. was not tested for reliability or validity. However, since the tool was based on nursing diagnoses which are being tested for validity and these are the labels that nurses use in their daily practice to determine signs and symptoms, it was assumed that the tool does measure patient characteristics as identified by Janken et al.

Additional Data

Information such as: age, sex, employment, hospital medical service, admission data, patient's length of stay, patient's day of stay, nursing unit, time of the fall, location of the fall, activity order, admitting diagnosis,

restraint order, history of falls, and prior medication within six hours prior to the fall will be obtained by chart audit.

Procedure

Permission to conduct the study was obtained from the Investigational Review Board and Nursing Administration. After being approved, the head nurse on each of the eight units that participated in the study was informed about the study. Incident reports that related to falls on the specified units for a six month period were obtained from risk management.

Fall Group:

Patients who fell were identified by the documentation on an incident report. A fall was defined as the event when the patient had lost control of balance and come to rest on the floor without the staff lowering the patient to the floor. Falls were witnessed or unwitnessed. The Janken et al. tool and additional selected information was completed by review of the chart and the incident report for data from the day of admission and for twenty-four hours preceding the fall. If the patient fell more than once during the period of that hospitalization, data preceding the first fall was collected. If the patient fell on the first day he/she was admitted they were not included in the study.

Non-Fall Group:

The non-fall group data for Janken's tool and

additional selected demographic information was collected by review of the chart for admission data and one day of the hospitalized period. The day of admission and the day of discharge were excluded from analysis since they are not full days. Only patients admitted to a specific nursing unit and discharged from that same unit were included.

Data Collection

The Janken's tool and additional information were completed by the principal investigator. Each patient was identified on a separate code list by name, medical record number, and the assigned sequential study code number. This code list was available only to the principal investigator to locate patients and was destroyed after the study was completed.

The tool did not have information that exposed the patient's identity. Information was coded for computer processing according to the categories of the Janken et al. (1986) tool (see Appendix A), and selected demographic information.

Data Analysis

Data were analyzed using discriminant analysis to determine group membership between the fall and the no fall group with the five characteristics as identified by Janken et al. (1986). Demographic characteristics were analyzed by means and percentages for both groups.

CHAPTER IV

RESULTS

In order to determine: 1) the demographic characteristics of the fall group and the non-fall group, and 2) if the characteristics as identified by Janken et al. (1986) discriminate between those patients who fall, and those patients who do not fall, at the time of admission and at the time of the fall, summary statistics (means, frequencies, and percentages) and discriminate analysis were used to compare both groups. These findings are summarized as follows:

Gender

Gender of the fall group (n=50) during the study period was 46% (22) male and 56% (28) female. The no-fall group (n=50) was 46% (23) male and 54% (27) female.

Age

The mean age of the fall group (n=50) was 72.4 (SD 7.442). The non-fall group (n=50) mean age was 73.94 (SD 7.229). Both groups were equivalent according to age.

Length of Stay

The mean day of the fall was on day 8.16 (SD 7.388). The mean day of obtaining information from the non-fall group was 3.74 (SD 2.448). The mean for the total length of stay of the fall group was 17.4 (SD 14.620). The range of the fall group was 3-86 days. The mean for the total length

of stay for the no-fall group was 8.18 (SD 6.886). The range of the no-fall group was 3-40 days. The mean for the total length of stay for all patients during the six month study period was 8.18. The difference between the length of stay for each group could be related to the fall group's tendency to have more complicated illness than the no-fall group and therefore could be expect to have a longer length of stay.

Environmental Factors

Most patients in both groups were in semi-private rooms (89% n=100). The location of the fall tended to be near the bed 74% (37), near the bathroom 14% (7), and outside of the room 8% (4). There was no documentation of location for 4% (2).

Time of the Fall

Most falls (50% (25)) occurred on the night shift from 2300 to 0700. The fall rate for days and evenings was equivalent, with 24% (12) occurring on days and 26% (13) on evenings. The time with the most frequent occurrence of falls (12% (6)) was between 0300 and 0400.

Miscellaneous Information

Medication showed no significant relationship to falling. The falls were evenly dispersed between the general medical and surgical units. There was no difference in group membership related to which medical care service the patient was assigned.

Risk Factors on Admission

Discriminant analysis was performed on each of the six variables: decreased mobility of the lower extremities, confusion, substance abuse, vertigo, general weakness and shortness of breath. These analyses were performed for the time of admission and for the fall or random day. The method of minimizing Wilks' lambda was used for the inclusion of variables, the criterion was set at $p < .001$. SPSS statistical package for discriminant analysis was chosen. All scores were analyzed for significance at the level of $p < .01$. Classification analyses were evaluated for determining group membership. In order to aid in interpreting results the raw means and the standard deviation scores on the six variables on admission and on the fall or random day are presented in Table (1).

The Wilks' lambda of .8517, eigenvalue of .1742, with approximate chi square (5, $n=100$) = 15.34, $p < .01$ suggests that the following five variables: decreased mobility of the lower extremity, general weakness, vertigo, shortness of breath and confusion were significant on admission. Substance abuse did not enter into the equation since it failed the tolerance test. The canonical coefficients and discriminant equation for the variables significant on admission are presented in Table (2).

Table 1
 Raw Means and Standard Deviations
 for Fall Risk Variables

Risk Variable	Fall Group N=50		No Fall Group N=50	
	M	SD	M	SD
<u>Admission data</u>				
Immobile low ext.	1.74	.443	1.48	.505
General weakness	1.50	.505	1.44	.501
Vertigo	1.22	.418	1.08	.274
Short of breath	1.54	.503	1.34	.479
Substance Abuse	1.0	.000	1.0	.000
Confusion	1.18	.388	1.04	.198
<u>Fall/Random Day</u>				
Immobile low ext.	1.82	.388	1.46	.503
General weakness	1.40	.492	1.22	.418
Vertigo	1.12	.327	1.02	.141
Short of breath	1.12	.327	1.04	.198
Substance Abuse	1.01	.100	1.0	.000
Confusion	1.15	.359	1.08	.274

Table 2
Canonical Discriminant Coefficient
for Five Variables on Admission

<u>Variable</u>	<u>Coefficient</u>
Confusion	.52891
Decrease mobility of the lower extremity	.51127
Vertigo	.42381
Shortness of breath	.41296
General Weakness	-.25058
Substance abuse	constant

Discriminant Equation

$$D_i = .51127x_1 + .42381x_2 + .41296x_3 + .52891x_4 - .25058x_5$$

The Wilks' lambda demonstrating the adequacy of the discrimination between the two groups (with a lambda of 1.0 indicating zero discrimination and a lambda of 0.0 indicating high difference) was .8517. The actual percent of cases on admission with the significant characteristics that had been correctly classified were 68% with 72% (36) from the no-fall group and 64% (32) from the fall group.

Not classified correctly on admission were 32% of the cases. 36% (18) of the patients that fell were not classified as a risk for falling and 28% (14) of the no-fall were erroneously classified at a risk for falling.

Risk Factors on the Fall/Random Day

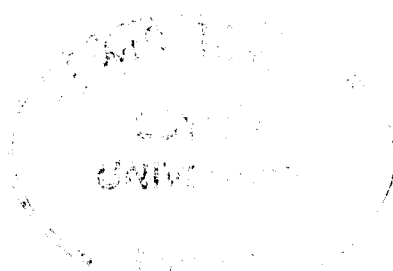
All variables: decreased mobility of the lower extremity, confusion, substance abuse, vertigo, shortness of breath, and general weakness, entered into the equation on the fall or random day to discriminate between the fall or the no-fall group. The following canonical coefficients were derived and the discriminant equation are present in Table (3). The eigenvalue of .4683, Wilks' lambda of .6811 with approximate chi square (6, n=100)= 36.489 suggests that all variables are significant at $p < .01$ level. Cases on the fall or random day with the significant characteristics that had been correctly classified were 73% with 78% (39) from the non-fall group and 68% (34) from the fall group.

Table 3
 Canonical Discriminant Coefficient
 for Six Variables on Fall/Random Day

<u>Variable</u>	<u>Coefficient</u>
Vertigo	.63306
General Weakness	.46420
Decrease mobility of the lower extremity	.44498
Shortness of breath	.35079
Confusion	.12416
Substance abuse	.02236

Discriminant Equation

$$D_i = .44498x_1 + .46420x_2 + .63306x_3 + .35079x_4 + .02236x_5 + .12416x_6$$



Twenty-seven percent were classified incorrectly on the fall or random day of which 32% (16) of the fall patients would not be classified at a risk for falling and 22% (11) would be classified erroneously at a risk for falling.

Discriminate analysis demonstrated that the variables identified in this study can predict group membership between the fall group and the non-fall group both on admission and during the patients stay.

CHAPTER V

DISCUSSION AND FUTURE RESEARCH

This study was designed to replicate the findings of Janken et al. (1986) that the five risk factors can determine which patients are at a risk for falling. Discriminant analysis determined group predictability utilizing the six variables on admission and on the fall or random day. The major findings, implications for health care and recommendations for future research are discussed in this section.

Length of Stay

Janken et al. (1986) found characteristics that predicted the membership in the fall group and the non-fall group. In the Janken et al. (1986) study the mean length of stay for patients 60 years and older during the study period was 12.57 days. In this study the mean length of stay for all patients was 12.8. The mean fall day was 8.16 (SD 7.388) and the mean day for obtaining data for the no-fall group was 3.74 (SD 2.448). The total length of stay for the fall group had a mean of 17.4 (SD 14.626) and the no-fall group had a mean of 8.18 (SD 6.886). These findings may be explained by the increase in the severity of illness in an acute care hospital and the decrease in the length of stay. Therefore patients are receiving more invasive treatments and are being discharged earlier.

A factor not accounted for in the Janken et al. (1986) study is the effects of the Diagnostic Related Group Reimbursement by Medicare.

Previous studies did not control for the length of stay however they did report that falls occurred during the first week of admission (Sehested & Severin-Nielson, 1977 and Walshe & Rosen, 1979).

Age

Age in this study was not a significant predictor of group membership (fall group ($M = 72.4$) and the non-fall group ($M = 73.94$)). This finding is not supported in the literature (Janken et al., 1986, Walshe & Rosen, 1979, and Issacs, 1985). To the contrary, age, according to Walshe and Rosen (1979), is significantly associated with falls. Janken et al. (1986) also identified age as being significant. Further research needs to be done to evaluate this finding.

Gender

Sex was not a factor in determining group membership in this study. This is similar to the Janken et al. (1986) findings. Time of the fall was significant in the current study with 50% of the falls occurring on the night shift. This finding is supported in the literature (Brown & Kiss, 1979; Walshe and Rosen, 1979). Other demographics showed no significant differences.

This study primarily focused on six variables: decreased mobility of the lower extremity, substance abuse, shortness of breath, confusion, vertigo, and general weakness as predictors of fall status. Results from the discriminant analyses showed that there is a difference between groups and that a patient can be identified as being at risk on admission. However, the patient must be assessed daily since his/her condition will change.

Admission Data

On admission confusion (r of .52892) and decreased mobility of the lower extremity (r of .51127) were highly significant and identified as the greatest risk factors for falling. This finding is similar to Janken et al. (1986) and Hendrich (1988).

Vertigo (r of .42381) and shortness of breath (r of .41296) were the next two most significant characteristics on admission in predicting patients at risk for falling. Witte (1979) and Janken et al. (1986) identified vertigo as a characteristic contributing to falls. Janken et al. (1986) did not find shortness of breath to be an admission risk characteristic; however, in the patient population in this study, a strong emphasis is on cardiology and cardiovascular surgery. Therefore, it is understandable that shortness of breath would be a significant characteristic of the fall group.

General weakness was inversely related to falls on admission (r of $- .25058$). This result indicates that patients are not admitted with the characteristic of general weakness but with prolonged hospitalization, procedures, worsening condition or bedrest their muscles atrophy and thus can increase their risk for falling (r of $.46420$) on the fall day. Janken et al. (1986) found general weakness as the highest predictor on admission and the sixth most significant predictor of falls on the fall day.

Substance abuse was not significant on the admission day. However, Janken et al. found this variable to be significant (r of $.076$) on admission and when compared with standard risk factor (r of $.077$). This finding was not seen in this study or by other investigators (Hendrich, 1988; Morse et al., 1987).

Fall/Random Day

On the fall or random day vertigo was the most weighted risk factor (r of $.63306$) for predicting falls. The value in predicting a fall increased substantially. General weakness was inversely related to falls on admission; however, it is the second most predictive characteristic in identifying the patient for falling. These two risk factors on the fall day demonstrate how the interaction of characteristics such as vertigo and weakness together increase the risk for falls by the patient.

Decreased mobility of the lower extremity (r of .44498) and shortness of breath (r of .35079) remained unchanged in their value to identify patients for falls.

Confusion (r of .12416) was not as strong a predictor as on admission. This result can be explained by the increase in the deterioration of the patients' condition with prolonged hospitalization and the disease process. Therefore, in the analysis, physical attributes were weighted higher than confusion.

Substance abuse did enter into the discriminate equation on the fall day. However, the r of .02236 is not a strong predictor in determining a patient at risk for falling.

Each risk factor on admission and prior to the fall was given a weight similar to the beta weights in multiple regression analysis. This weight describes the relationship between the risk factor and how strong this risk factor will identify the fall and non-fall group.

The 36% of error in classification on admission of the fall group and the 32% misclassification of the fall group on the random day can be accounted for by accidental falls. These patients most likely were not at risk for falling since they did not demonstrate these risk factors. These patients could have fallen because of environmental factors which are unpredictable circumstances. Other characteristics such as additional nursing diagnoses should

be evaluated to see if they are significant in discriminating between patients who fall and patients who do not fall.

Relationship between Variables and Conceptual Framework

Lawton's model (Hogue, 1984) and the model by Robinson and Conard (1986) focus on the environment and the persons physiological or cognitive health in their ability to adapt to change. This study did not address the environment but focused on the person's physiological or cognitive ability in regards to identifying those characteristics that place the individual at an risk for falling. The characteristics of decreased mobility of the lower extremity, shortness of breath, confusion, vertigo, substance abuse, and general weakness alter the persons ability to meet the demands of the environment because of the effects these conditions place on the person. Therefore, according to Robinson and Conard (1986), the environmental demand would have to be reduced by assistive devices or physically altering the environment.

The characteristics of decreased mobility of the lower extremity, general weakness, vertigo, shortness of breath, and substance abuse would be seen as an alteration in the persons functional health according to Lawton's model (Hogue, 1984). Confusion would be an alteration in the person's cognitive appraisal. Therefore, the person's ability to meet the demands of functional health or an

alteration in cognitive appraisal would increase their risk for falling. The nurse would have to implement interventions to protect the individuals from harming themselves until they are capable of assessing the environmental demands or are at a higher level of functional health. This would be evident by the decrease in the number of risk factors present.

Limitations of the Study

Although this study supported the identification of the risk factors by Janken et al. (1986) the study design was retrospective. Further studies should identify risk factors and substantiate other findings by replication in a prospective design. The sample size (n=50) is small when studying many characteristics traits that occur so infrequently.

The study relied on documentation and incident reports. The reliability of incident reports and documentation must be questioned. The study analyzed the five characteristics that Janken et al. (1986) found significant and shortness of breath. However, all the twenty four variables should be replicated to see if there are any other characteristics that are significant of group membership.

Implications for Nursing

Morse et al. (1987) suggest that a fall scale should be developed to identify the patient at risk for falling. The use of this instrument would enable nurses to target fall

prevention programs for the patients at the greatest risk.

Janken et al. (1986) identified five risk variables. This study demonstrated that shortness of breath is also an indicator of fall status. This information is similar to Morse et al. (1987) who identified impaired mobility as a risk factor. Utilizing these findings an instrument should be developed to assess patients at risk for falls. Then each patient could be assessed and classified daily for the risk factors and measures can be implemented as needed to prevent falling.

Recommendations

1. Replicate the study with an increase in the sample size in order to strengthen the power of the analysis.
2. Investigate additional nursing diagnoses as potential indicators of risk for falling.
3. Replicate this study with an established patient classification system to see if there is a correlation.
4. Explore the potential for newly accepted NANDA nursing diagnoses as indicators to classify patient falls.

REFERENCES

- Aggleton, P., & Chalmers, H. (1984). The Roy adaptation model. Nursing Times, October, 1522-1524.
- Brown, M., & Kiss, M. (1978). A problem focus approach to nursing audit: Patient Falls. Cancer Nursing, 1, (5), 389-391.
- Calkins, E., & Wieman, H. (1986). Falls. In E. Calkins, P. Davis, and A. Ford (Ed.). The practice of geriatrics (pp. 272-280). Philadelphia, Pa. W.B. Saunders.
- Carpenito, L. (1987). Nursing Diagnosis: Application to clinical practice. (2nd ed.). New York. Lippincott.
- Cheshire, C. M. and Cumming, W. (1985). The musculoskeletal system - Skeletal Muscle. In J. C. Brocklehurst (Ed.). Textbook of geriatric medicine and gerontology. (pp. 820-834). New York. Churchill Livingstone.
- Halloran, E.J. & Kiley, M.L. (1984). Case mix management for nurses. Nursing Management, 15, 39-41, 44-45.
- Hendrich, A. L. (1988) An effective unit-base fall prevention plan. Journal of Nursing Quality Assurance, 1, 28-36.
- Hogue, C. (1984). Falls and mobility in late life: An ecological model. Journal of the American Geriatrics Society, 32, 858-861.

- Hurley, M. (Ed.). (1986). Classification of nursing diagnoses: Proceedings of the sixth conference. St. Louis. C.V. Mosby.
- Janken, J., Reynolds, B., & Swiech, K. (1986). Patient falls in the acute care setting: Identifying risk factors. Nursing Research, 35, (4), 215-219.
- Kim, M & Moritz, D. (Eds.). (1982). Classification of nursing diagnoses: Proceedings of the third and fourth conference. Mc Graw Hill Book Co.
- Lazarus, R.S. (1974). Psychological stress and coping in adaptation and illness. International Journal of Psychiatry in Medicine, 5. 321-323.
- Llewellyn, J., Martin, B., Shekleton, M., & Firlit, S. (1988). Analysis of falls in the acute surgical and cardiovascular surgical patient. Applied Nursing Research, 1, (3), 116-121.
- Merriam. (1981). Webster's New Collegiate Dictionary. G & C Merriam Co. Author.
- Mills, R. (1985). The auditory system. In M. S. J. Pathy (Ed.). Principles and practice of geriatric medicine. (pp. 841-856). New York. Wiley and Sons.
- Morris, E., Isaacs, B., & Brislen, W. (1981). Falls in the elderly. Nursing Times, August, 1522-1524.
- Morse, J., Prowse, M., Morrow, N., & Federspeil, G. (1985). A retrospective analysis of patient falls. Canadian Journal of Public Health, 76, 116-118.

- Morse, J., Tylko, S., & Dixon, H. (1987). Characteristics of the fall-prone patient. Gerontologist, 27, (4), 516-522.
- Perry, B. (1982). Falls among the elderly: A review of the methods and conclusion of epidemiologic studies. Journal of the American Geriatrics Society, 30, 367-371.
- Robinson, B. & Conard, C. (1986). Falls and falling. Geriatric Medicine Annual, 198-211.
- Rodstein, M. (1964). Accidents among the aged: Incidence, causes, and prevention. Journal of Chronic Disease, 17, 515-526.
- Roy, C. Sr. (1976). Introduction to Nursing: An adaptation model. Prentice-Hall, Englewood Cliffs.
- Rubenstein, L. & Robbins, A. (1984). Falls in the elderly: A clinical perspective. Geriatrics, 39, (4), 67-68.
- Sehested, P., & Severin-Nielsen, T. (1977). Falls by hospitalized elderly patients: Causes, prevention. Geriatrics, 32, (4), 101-108.
- Walshe, A., & Rosen, N. (1979). A study of patient falls from bed. Journal of Nursing Administration, 9, (5), 31-35.
- Witte, N. S. (1979). Why the Elderly Fall. American Journal of Nursing. 1950-1953.

APPENDIX A

APPENDIX A

CODE BOOK FOR PATIENT FALLS

Developed by Dr. Janken et al.

Variable No.	Variable Name	Description
1.	ID	<u>Patient Code no.</u> xxx = code no.
2.	Card	<u>Card number to ident.</u> 1=card one 2=card two 3=card three
3.	Fall	<u>Fall Status</u> 1=no 2=yes
4.	Sex	<u>Sex</u> 1=male 2=female
5.	Age	<u>Age</u> xx=age
6.	Home	<u>Where patient lives</u> 1=home, alone 2=home, with spouse 3=nursing home 9=missing
7.	Employment	<u>Employment status</u> 1= not employed 2=employed
8.	Adm. day	<u>Adm.day description</u> xx=month xx=day xx=year
9.	patients data day	<u>Fall or non-fall day of hosp. stay.</u> xx=the total number of days since adm. when fall or non-fall day.
10.	Room	<u>Room type.</u> 1=private 2=semi-private
11.	Unit	<u>Unit of faller/random day</u> 1=7N 2=7S 3=6N 4=6S 5=5N 6=5S 7=2N 8=2S

Variable No.	Variable Name	Description
12.	Time	<u>Time of fall.</u> 01=2400-0059 02=0100-0159 03=0200-0259 04=0300-0359 05=0400-0459 06=0500-0559 07=0600-0659 08=0700-0759 09=0800-0859 10=0900-0959 11=1000-1059 12=1100-1159 13=1200-1259 14=1300-1359 15=1400-1459 16=1500-1559 17=1600-1659 18=1700-1759 19=1800-1859 20=1900-1959 21=2000-2059 22=2100-2159 23=2200-2259 24=2300-2359 97=no fall 99=missing data
13.	Location	<u>Location of fall.</u> 1=near bed 2=near bathroom 3=in bathroom 4=outside of room
14-22	Medication	<u>Med 6hr prior to fall.</u> 14 (diuretic) 1=no 15 (cardiac) 2=yes 16 (sedative) 0= did not fall 17 (antibiotic) 18 (analgesic) 19 (anticonvulsive) 20 (antihypertensive) 21 (diabetic agent) 22 (no fall)
23.	length hosp stay.	<u>Length of hosp. stay.</u> xx = total no. of days.

Variable No.	Variable Name	Description
ADMISSION DAY DATA INFORMATION:		
24.	Service	<u>Service</u> 01=Cardiology 02=Dermatology 03=Endocrinology 04=Gastroenterology 05=Hematology 06=Immunology/Rheum. 07=Infectious Control 08=Internal Medicine 09=Oncology 10=Pulmonary Medicine 11=Renal 12=CV surgery 13=Trauma 14=General surgery 15=Neurosurgery 16=Orthopedics 17=Plastic surgery 18=
25.	Activity Q1	<u>Activity order.</u> 1=bedrest 2=up with assistance 3=up ad lib. 4=bathroom privilege with assistance. 5=commode with assistance. 9=missing
26.	Sleep Q2	<u>Sleeplessness, Nocturia, Confusion at night.</u> 1=no 2=yes
27.	L.Ext. Q3	<u>!mobility low extrem. incoordination & balancing, weakness of, 2+ or more edema, pain of.</u> 1=no 2=yes
28.	U. Ext. Q4	<u>!mobility upper ext. weakness of, pain of, edema.</u> 1=no 2=yes
29.	Restraint Q5	<u>Restraint order, posey</u> 1=no 2=yes

Variable No.	Variable Name	Description
30.	Past hx. fall Q6	<u>Past history of fall</u> 1=no 2=yes
31.	Move Q7	<u>Imposed mechanical restriction or movement. (IV, monitor foley)</u> 1=no 2=yes
32.	Tired Q8	<u>Fatigue/weakness, lethargy sign. weight loss.</u> 1=no 2=yes
33.	Fat Q9	<u>Obesity</u> 1=no 2=yes
34.	Pain Q10	<u>Pain: non-extremity</u> 1=no 2=yes
35.	Deaf Q11	<u>Impaired hearing/cannot understand english.</u> 1=no 2=yes
36.	Sight Q12	<u>Impaired vision.</u> 1=no 2=yes
37.	Talk Q13	<u>Impaired speech/cannot speak english.</u> 1=no 2=yes
38.	HIBP Q14	<u>Hypertension(bp>160/95)</u> 1=no 2=yes
39.	Heart Q15	<u>Arrhythmia</u> 1=no 2=yes
40.	Vertigo Q16	<u>Vertigo/syncope/hypotension</u> 1=no 2=yes
41.	SOB Q17	<u>Hypoxia, SOB, dyspnea</u> 1=no 2=yes
42.	BM Q18	<u>Incont.diarrhea, freq.</u> 1=no 2=yes
43.	ETOH Q19	<u>Substance abuse, withdrawal</u> 1=no 2=yes

Variable No.	Variable Name	Description
44.	Depress Q20	<u>Depression/self focus withdrawal.</u> 1=no 2=yes
45.	Confuse Q21	<u>Confusion, change in MS OBS, delusion, hallucination</u> 1=no 2=yes
46.	Agitate Q22	<u>Inappropriate behavior noncompliance, restless agitation, anxiety.</u> 1=no 2=yes
47.	HYP Q23	<u>Hypnotic taken</u> 1=no 2=yes
48.	NARC Q24	<u>Narcotic taken</u> 1=no 2=yes

FALL DAY OR RANDOM DAY DATA

49.	Service	<u>Service</u> 01=Cardiology 02=Dermatology 03=Endocrinology 04=Gastroenterology 05=Hematology 06=Immunology/Rheum. 07=Infectious Control 08=Internal Medicine 09=Oncology 10=Pulmonary Medicine 11=Renal 12=CV surgery 13=Trauma 14=General surgery 15=Neurosurgery 16=Orthopedics 17=Plastic surgery 18=
-----	---------	--

Variable No	Variable Name	Description
50.	Activity Q1 -2	<u>Activity order.</u> 1=bedrest 2=up with assistance 3=up ad lib. 4=bathroom privilege with 5=commode with assistance 9=missing
51.	Sleep Q2 -2	<u>Sleeplessness, Nocturia, Confusion at night.</u> 1=no 2=yes
52.	L. Ext. Q3 -2	<u>!mobility low extrem. incoordination & bal- ancing, weakness of, 2+ or more edema, pain of.</u> 1=no 2=yes
53.	U. Ext. Q4 -2	<u>!mobility upper ext. weakness of, pain of, edema.</u> 1=no 2=yes
54.	Restraint Q5 -2	<u>Restraint order, posey</u> 1=no 2=yes
55.	Move Q7 -2	<u>Imposed mechanical restriction or move- ment. (IV, monitor foley)</u> 1=no 2=yes
56.	Tired Q8 -2	<u>Fatigue/weakness, lethargy sign. weight loss.</u> 1=no 2=yes
57.	Fat Q9 -2	<u>Obesity</u> 1=no 2=yes
58.	Pain Q10 -2	<u>Pain: non-extremity</u> 1=no 2=yes
59.	Deaf Q11 -2	<u>Impaired hearing/cannot understand english.</u> 1=no 2=yes
60.	Sight Q12 -2	<u>Impaired vision.</u> 1=no 2=yes

Variable No.	Variable Name	Description
61.	Talk Q13 -2	<u>Impaired speech/cannot speak english.</u> 1=no 2=yes
62.	HIBP Q14 -2	<u>Hypertension(bp>160/95)</u> 1=no 2=yes
63.	Heart Q15 -2	<u>Arrhythmia</u> 1=no 2=yes
64.	Vertigo Q16 -2	<u>Vertigo/syncope/hypotension</u> 1=no 2=yes
65.	SOB Q17 -2	<u>Hypoxia, SOB, dyspnea</u> 1=no 2=yes
66.	BM Q18 -2	<u>Incont.diarrhea, freq.</u> 1=no 2=yes
67.	ETOH Q19 -2	<u>Substance abuse, withdrawal</u> 1=no 2=yes
68.	Depress Q20 -2	<u>Depression/self focus withdrawal.</u> 1=no 2=yes
69.	Confuse Q21 -2	<u>Confusion, change in MS OBS, delusion, hallucination</u> 1=no 2=yes
70.	Agitate Q22 -2	<u>Inappropriate behavior noncompliance, restless agitation, anxiety.</u> 1=no 2=yes
71.	HYP Q23 -2	<u>Hypnotic taken</u> 1=no 2=yes
72.	NARC Q24 -2	<u>Narcotic taken</u> 1=no 2=yes

APPENDIX B

NURSING DIAGNOSES TOOL
APPENDIX B
PATIENT FALL STUDY CODING MANUAL
Developed by Dr, Janken et al.

BEDREST:

yes=complete bedrest

SLEEPLESSNESS/NOCTURIA/CONFUSION AT NIGHT:SLEEPLESSNESS:

Slept in naps, slept in short naps

Slept for three nights interrupted due to pain

Recently unable to sleep

Slept poorly despite sedative

Cough increases while lying down so wakes often at

night

Slept poorly due to fever and chills

Orthopnea to point of unable to sleep

Shortness of breath, orthopnea, awakens with

nocturnal wheezing

Sleeps poorly at night

Unable to sleep at night

clarification: code as sleepless if less than 4 hours uninterrupted sleep.

Nocturnal Confusion:

Confusion at night

Confused and calling out at night, alert and orientated in am

Periods of confusion on 11-7 shift twice

Nocturia:

Awakens for urinations

Nocturia

Many small voidings at night

clarification: also include bowel movements at night, c/o loose frequent BM's all night after prep.

DECREASED MOBILITY LOWER EXTREMITIES /INCOORDINATION
/BALANCING DIFFICULTIES /WEAKNESS OF LOWER EXTREMITIES, 2+
OR MORE EDEMA, PAIN OF

yes=any condition located from the hip to the foot that makes it difficult for the patient to ambulate

Decreased mobility of the lower extremities:

Knee pain, decreased movement, slight flexion without weight bearing

Prosthetic knee

Able to walk with cane or crutches

Gouty arthritis with frequent leg discomfort

Weakness in either leg

In bucks traction; FX hip

Arthritis in knee. walks with cane

Difficulty with walking, progressive ataxia

Foot drop
 Numbness or weakness of the leg
 Uses a walker
 Progressive weakness R/L leg, now cannot move
 Cannot get out of bed
 Congenital foot defect
 Amputation of foot
 Severe rheumatoid arthritis of the foot, decreased
 sensation

Unable to walk across the room
 CVA, left/right sided weakness

Incoordination/Balancing Difficulties:

Parkinson's Disease, decreased coordination
 Decreased coordination
 Altered coordination
 Quite unsteady even with cane
 Unsteady gait
 Decreased coordination due to tremors
 Wide gait with some unsteadiness
 Sometimes unsteady on feet
 Needs help standing
 Decreased balance

Edema 2+ or greater:

Lower extremity with pitting edema

Pain lower extremity:

Pain in the hip
 Pain in the leg unable to ambulate
 Increased arthralgia in the knee
 Occasional leg pain
 Pain in the foot

DECREASED MOBILITY OF UPPER EXTREMITIES/WEAKNESS
 OF/EDEMA/PAIN OF;

yes=conditions of hand, arm, and shoulder that
 interfere with the ability to use the extremities.

Decreased mobility of the upper extremities/weakness:

FX humerus
 Decreased sensation of finger, grip
 Arm weakness
 Arthritis of the arm, shoulder or hand
 Progressive proximal muscle weakness
 Numbness and weakness of the arm
 Loss of vibratory senses
 Osteoarthritis of the upper extremity
 C-spine stiffness with the muscle strength
 decreased in both shoulders
 CVA either side
 Metastases to the bones in the upper ext.

Edema of the upper Ext.

Shoulder swollen
 Hand swollen
 Swelling of the upper Ext. 2+ or more
 Increased swelling of hands
 Edema in the arm

Pain of the upper extremity.

Pain or numbness in the arm
 Pain in the shoulder

POSEY OR FELT RESTRAINT ORDER:

yes=if the patient has on restraints at any time

Order for posey
 Restraint to keep in bed
 Posey applied
 Restrained for protection

clarification: do not include one wrist restraint for IV protection

HISTORY OF FALLS:

yes=fall(s) occurred prior to hospitalization

Fell, slipped on the floor at home
 Fell at home found by someone
 Frequent falls at home
 Fell, missed the toilet
 Fell, getting out of bed

IMPOSED RESTRICTION OF MOVEMENT:

yes=mechanical equipment applied by health workers that interfere with movement e.g. on monitor, has IV, in traction, foley, feeding tube, O2

GENERAL WEAKNESS/FATIGUE/LETHARGY/SIGNIFICANT WEIGHT LOSS:General Fatigue/Weakness:

Complains of lack of energy
 Decreased energy or strength
 Feeling weak or tired
 Decreased muscle tolerance, muscle strength
 Very weak
 Tired, altered exercise tolerance, alter muscle strength
 Increased fatigue over last few months, decreased exercise tolerance

General weakness
 Fatigue for one month

Significant weight loss:

Weight loss of 10-15 lbs over one month
 Significant weight loss of forty lbs over four months

Cachectic appearing frail
Rapid weight loss

Lethargy:

Very drowsy and difficult to arouse at times
Lethargy
Complains of Malaise
Answers to name but very drowsy

OBESITY:

Obese: if 20% or more above the normal body weight as defined by the Metropolitan weight chart from 1959

NON-EXTREMITY PAIN:

yes=pain of the head or torso. Include incisional pain only if incision is on torso or head

C/O severe stomach aches
Incisional pain
Vague abd. cramping.
RUQ pain
C/O back discomfort from increase abd girth
Chest pain
C/O of pain in lower back
Chest or dorsal spine pain
C/O pain in the inguinal area

IMPAIRED HEARING/CANNOT UNDERSTAND DOMINANT LANGUAGE:

yes=impaired ability to understand verbal instructions given by health care provider. Do not include impaired mental functioning .

Impaired Hearing:

Hearing aide
Almost total deafness in a ear
Very hard of hearing

Cannot understand dominant language:

Understand own language

IMPAIRED VISION:

yes=impaired vision that is not corrected with glasses.

Bilateral cataracts
Decreased vision, slow response to light,
strabismus
Cataract one eye
Poor vision at all times, wears glasses all time
Glaucoma
Blind
Peripheral vision decreased

IMPAIRED SPEECH/VERBALIZES WITH DIFFICULTY/CANNOT SPEAK
DOMINANT LANGUAGE:

yes=impaired ability to communicate needs to the staff. Do not include mental difficulty.

Impaired Speech:

Dysphagia
Slurred, shaky, thick speech
Does not speak verbally

Does Not Speak Dominate Language:

Speaks foreign language only
Non-English speaking

HYPERTENSION:

yes=BP> 160/95

ARRHYTHMIA, CARDIAC OUTPUT ALT. IN DECREASED:

EKG abnormal, 1st heart block, conduction defect
ASHD
AP 92 irregular
EKG shows old MI.
Multifocal PVC's bigeminy, irreg. pulse, EKG

changes

Palpitations, occasional PVC
AP 118-150 tachy
EKG sinus tach
Slow chronic Afib
Sinus bradycardia
RBBB
Afib/flutter

VERTIGO/SYNCOPE/HYPERTENSION:Vertigo:

Complains of dizziness
Lightheadedness, felt dizzy
Dizzy when standing

Syncope:

Syncopal episode
Passed out

Hypotension:

BP<95/60

HYPOXIA/SHORTNESS OF BREATH/DYSPNEA/BREATHING PATTERN
INEFFECTIVE:

Emphysema, abnormal PFTs,
Slight SOB
Resp. rate 22-30 labored
Tachypnea
Rales, wheezing, dyspnea on exertion, SOB

Increased dyspnea on exert, rales, can't walk 20ft without DOE .

SOB at rest increased orthopnea
 Periods of sl. cyanosis, hands anemic
 SOB x 2 days, acute distress, chest retraction

INCONTINENCE/DIARRHEA/FREQUENCY:

yes=any condition that might make the patient feel the need to get to the bathroom frequently and/or urgently.

Diarrhea/Frequent bowel movements:

Enemas till clear
 5 BM's in 16 hours
 Loose watery BM 1-3 days
 C/O loose freq. stool all night after prep

Incontinence:

Inc. loose stool
 Inc. feces
 Inc. of urine
 Dribbling, weak sphincter muscle

Frequency:

Urinary frequency C/O
 Pt received lasix
 12 voidings in 24 hrs
 Many small voiding through the night

SUBSTANCE ABUSE OR WITHDRAWAL:

yes=has been consuming ETOH at an increasingly rate.

Abuses ETOH
 Uses ETOH frequent or moderately

DEPRESSION/SELF FOCUSING/SOCIAL WITHDRAWAL:

yes=internal focus of mental stress with no indication of thought disorder.

Acute depression
 Crying and depresses all night
 Verbalizes fear and depression to illness
 Depression, recent suicide attempt
 Keeps to self.

CONFUSION/CHANGE IN MENTAL STATUE/ORGANIC BRAIN SYNDROME/DELUSIONAL/HALLUCINATIONS:

yes=indication of thought disorder
 Confused
 Unaware of surroundings, calling out at times,
 Disorientated to time, place, or person
 General increased in confused states
 Episodic confusion
 Change in mental status
 Does not recognize signif. persons
 Minor perceptual disturbance, impaired memory

Unable to concentrate or do simple math
 Nightmares with ants or bugs crawling all over
 Border paranoia, confused state
 Mental distortion
 Organic Brain Syndrome, abn. EEG, cerebral vascular

dx.

Cerebral lesion/Alzheimers
 Visual hallucinations
 Increased mental slowness over the last few month.

AGITATION/RESTLESSNESS/ANXIETY/INAPPROPRIATE BEHAVIOR/
 NON-COMPLIANCE:

yes=external focus of mental stress with no
 indication of thought disorder.
 Patient states very nervous, room closing in
 Combative, yelling
 Inappropriate behavior
 Attempting to pull out IV or remove O2
 Does not follow diet, states will not comply
 Does not call for assistance
 Restless and inability to nap
 Agitated
 Stress level high, apprehensive about test or
 procedure.
 Anxious, obsessed with illness
 Nervous and jittery

HYPNOTIC TAKEN:

yes=one or more of the following drugs taken for
 sleep in the past 24 hour of data collection.
 Benadryl
 Chloral hydrate
 Dalmane
 Halcion
 Ativan
 Pentobarbital
 Restoril
 Seconal
 Serax

NARCOTIC TAKEN:

yes=one or more of the following drugs taken for
 pain in the past 24 hours of the data collection.
 Codeine
 Dilaudid
 Demerol
 Morphine
 Percondan, Percocet
 Tylenol #3
 Talwin

APPROVAL SHEET

The thesis submitted by Gregory J. Horeni has been read and approved by the following committee:

Dr. JoAnn Hungelmann, DNSc., RN
Associate Professor, Medical-Surgical Nursing, Loyola

Dr. Frances Taira, MSN, EdD, RNC, CRRN
Associate Professor, Medical-Surgical Nursing, Loyola

Dr. Claudette Varricchio DSN, RN, OCN
Associate Professor, Medical-Surgical Nursing, Loyola

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Science in Nursing.

12/6/89
Date

Jo Ann Hungelmann
Director's Signature