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THE IMPACT OF DELIRIUM ON MENTAL STATUS AND PHYSICAL FUNCTIONING OF THE HIP FRACTURE PATIENT ONE TO ONE AND ONE HALF YEARS POST- INJURY

By

Delores L. Arendsen

A THESIS

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ABSTRACT

THE IMPACT OF DELIRIUM ON MENTAL STATUS AND PHYSICAL FUNCTIONING OF THE HIP FRACTURE PATIENT ONE TO ONE AND ONE HALF YEARS POST- INJURY

By

Delores L. Arendsen

Delirium occurs frequently among hospitalized hip fractured elders. The purpose of this study was to examine the impact of a delirious episode on physical and mental status of those patients 12 - 18 months post-injury. This ex post facto correlational study utilized Levine's Conservation Principles as the conceptual framework. The sample consisted of 67 subjects age 60 or older. The Mini-Mental State Examination (MMSE) and Katz Index of Activities of Daily Living (ADL) were administered on admission and by telephone at the post-injury interview. The Confusion Assessment Method (CAM) Diagnostic Instrument was used to assess for the syndrome of delirium. Eleven (16%) of the subjects became delirious during the acute hospitalization. Data analysis included Fisher's Exact test, ANCOVA, t-test and paired t-test. Delirium did not have an impact on the mortality rate, ADL score, nor the MMSE scores post-injury. On average, all survivors of hip fracture lost one ADL.

Dedication

To my spouse, Carl, for the inspiration

and encouragement to complete this scholarly effort.

Acknowledgments

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CHAPTER 1

INTRODUCTION

Hip fracture has long been considered a major threat to the aged population. This event often leads to loss of both physical mobility and personal independence. Hip fractures are an acute debilitating injury. Virtually all cases receive immediate medical attention with hospitalization and surgical repair. Fear of breaking a hip more than almost any other hazard of old age, haunts the elderly.

Delirium has become recognized as a common syndrome in hospitalized elderly (Francis, 1992) and is observed within the hip fracture population (Brannstrom, Gustafson, Norberg, & Winbald, 1989). Combined incidence and prevalence estimates for delirium among hospitalized elders in general range between 20% and 33% (Francis, 1992). In the fractured hip population (Gustafson et al., 1988) this range is increased to between 33% and 42%; a significant increase over the general hospitalized elder population. As hospitals serve an increasingly older and more acutely ill population, the prevalence of delirium is likely to increase, magnifying the importance of monitoring cognitive states (Francis, 1992). The more acutely confused the patients become, the more dependent they are on nursing care and treatment (Brannstrom et al., 1989; Williams et al., 1979).

Although considered to be a transient cognitive disorder (Lipowski, 1989) recent data suggest that residual effects of delirium may produce long term sequelae (Murray et al., 1993). According to these authors, physical function decline and a change in cognitive status during hospitalization adversely affected physical functioning up to one year post hospitalization. Cognitive impairment seems to be the most reliable predictor

for patients not regaining independence after a hip fracture surgery (Keene & Anderson, 1982). Patients who display cognitive deficits, whether chronic or acute while hospitalized, experience the poorest recovery during the initial year post-discharge (Magaziner, Simonsick, Kashner, Hebel, & Kenzora, 1990). Failure to address cognitive dysfunction might increase the cost of care by lengthening hospitalization or result in a discharge to a more dependent level of care (Gustafson, Brannstrom, Norberg, Bucht, & Winblad, 1991).

Poor prognosis and mortality are associated with a delirious episode. Delirium is often an early indicator of life-threatening illness in the elderly (Lipowski, 1987). Mortality during hospitalization has been reported at 4.3% (Magaziner, Simonsick, Kashner, Hebel, & Kenzora, 1989) for the hip fracture patient. The one year mortality rates have been reported from 17.6% (Magaziner et al., 1989) to as high as 45.1% (Kyo, Takaoka, & Ono, 1993). The mortality rate appears to be highest in the first year (Magaziner et al., 1989; Clayer & Bauze, 1989) after surgery, but thereafter approaches the rate found in the general population. Mortality rates of patients with delirium are significantly higher than for other hospitalized ailments (Billing, Ahmed, & Kenmore, 1988).

The older patient is prone to a significant decline in functional status as a result of acute illness. Little research has documented functional disability in the hospitalized older patient (Hirsch, Sommers, Olsen, Mullen, & Winograd, 1990). For the survivors of hip fracture, sustained disability and loss of independence may be seen for 26% to 76% of the patients who do not recover their pre-fracture ambulatory status or achieve their previous level of independent living within the year following their fracture (Magaziner et al., 1989). In addition, problems with mobility may contribute to the development of delirium, or decreased mobility may be a symptom once the delirium occurs (Nagley, 1986; Williams, Campbell, Raynor, Musholt, et al., 1985).

The purpose of this study is to examine the changes in physical functioning and mental status of the hospitalized older hip fractured patient over a one year period. A second purpose of this study is to examine the impact of a delirious episode on the physical functioning and mental status of the hospitalized older hip fractured patient one year post-injury.

The question investigated: How does a delirious episode impact the physical functioning and cognitive ability of acute hip fracture patients one year post-injury?

CHAPTER 2

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Conceptual Framework

The unique perspective of nursing necessitates a holistic approach to the measurement of many clinical problems. The multiple dimensions of confusion in the elderly hip patient comprise one of those problems. For this study confusion / delirium was defined as an organic brain syndrome characterized by transient global cognitive impairment of abrupt onset and relatively brief duration, accompanied by diurnal fluctuation of simultaneous disturbances of the sleep-wake cycle, psychomotor behavior, attention, and affect (Foreman, 1986). Utilizing the Conservation Model of Myra E. Levine, the confused patient while displaying this altered state can successfully be cared for. According to this nursing framework, interventions are based on four conservation principles: conservation of energy, conservation of structural integrity, conservation of personal integrity, and conservation of social integrity.

The purpose of the Conservation Theory is to maintain the unity and integrity of the patient while in an altered state of health (Levine, 1967). "The conservation principles do not operate singly or in isolation from each other. They are joined within the individual as a cascade of life events, churning and changing as the environmental challenge is confronted in each individual's unique way" (Levine, 1989, p. 336). Together the four conservation principles provide a framework for the deduction of specific nursing actions from scientific principles (Levine, 1967). There is a focus to maintain wholeness of the patient.

Conservation of energy (Levine, 1973) refers to balancing energy output and energy input to avoid excessive fatigue. Activities include adequate rest, nutrition and

exercise. Nursing interventions to implement this are monitoring adequate dietary intake and providing sufficient rest periods to be able to utilize physical therapy to the utmost. These two will help the patient progress toward independence in activities of daily living. Therefore a balance must be maintained between energy supply and the rate of consumption.

All surgical procedures are designed to restore structural integrity to the whole body. The process of healing is the process of restoration of structural integrity (Levine, 1973, 1990). Nursing interventions related to preserving physiological wholeness are maintaining muscle tone and mass by use of ambulation. The use of pain medication enables the patient to participate with comfort during each mobility activity and curtail a possible delirious episode. Cerebral profusion is also an element of structural integrity (Levine, 1989). Nursing interventions include monitoring the cognitive state, fluid and electrolyte balance, and oxygen saturation levels. The conservation of structural integrity is the necessary defense of anatomical and physiological wholeness and is therefore the basis for a multitude of nursing interventions (Levine, 1973).

The conservation of personal integrity has as its focus the sense of personal identity, self-worth, personal uniqueness, values, beliefs, and goals (Levine, 1967, 1971, 1990). Respect from the nurse is essential to the self-respect of the patient. This is especially important with the confused patient with reorientation to the present situation. Learning must be taken on a slow, self-paced basis and reinforced in a supportive atmosphere. The patient also recognizes the necessity to submit himself / herself to the care of other persons and come to terms with the loss of independence (Levine, 1989). The patient must continue to value herself / himself as a person; this affords continuity of personal integrity.

The fourth conservation principle is social integrity. Because a patient must be viewed within the context of his social existence, the conservation of social integrity is

concerned with the relationships of the individual with the community. The human knows himself / herself in a dynamic relationship with other human beings (Levine, 1967). Nursing interventions deal with the social isolation the acute injury has caused. Family and friends are guided by nursing to help with reality orientation by touch and encouragement of life review (Levine, 1989). Regular visits and communications help the confused to reorient. The patient must be viewed in the context of his / her family. Without concern for them, she / he is not accorded holistic nursing care (Levine, 1973).

Within the framework of Levine's Conservation Model, a delirious episode is defined as a multidimensional adaptive pattern that occurs as a result of an actual or perceived alteration in the environment (Foreman, 1991). The adaptive response does not achieve the best fit (Levine, 1989), therefore, the wholeness of the patient is not conserved. This adaptive process, delirium, is manifested by simultaneous disturbances in attention, thinking, consciousness, memory, perception, the sleep-wake cycle, psychomotor behavior, and orientation (American Psychiatric Association, 1987). The symptoms of confusion usually develop abruptly over a period of an hour to days, and tend to fluctuate diurnally. These manifestations alter the conservation state.

When the adaptive response is not the best fit, as in a delirious episode, the altered state of structural integrity is the main focus. Energy, personal, and social integrity are impacted to a lesser degree. Conservation of energy is unbalanced because during the delirious episode more energy is consumed than is supplied, e.g., the hyper-alert state or sleep-wake cycle disturbances with sleep deprivation. Structural integrity is altered because multiple cognitive functions are altered, e.g., memory impairment or attention span deficit or sequence patterning and retrieval of personal information difficulties. Personal integrity is compromised in loss of self identity. Social integrity is impaired with the inability to recognize friends and family, or life events. Meaningful conversations are rarely carried on during a confused state. Placing the acute confused hip fracture patient into Levine's Conservation Principles

one can evaluate the effects of cognitive changes by focusing on promoting wholeness and conserving integrity.

By implementation of Levine's Conservation Principles, nursing interventions are recognized as strategies to decrease the effects of a delirious state. It is assumed that the utilization of conservation of energy, conservation of social integrity, conservation of structural integrity, and conservation of personal integrity will facilitate the patient's favorable response to the recuperation process to perform the necessary activities of normal daily living. Using these principles as guidelines the hospitalization time will be minimized, physical strength maintained, an altered cognition state minimized, and eventual home discharge achieved. The interventions, supported by the principles, can be measured by observing the outcomes of physical functioning and life survival. Delirium must not be dismissed as part of "old age." Assessment of cognition with maintenance of normalcy aids the elderly in attaining and maintaining functional abilities.

Literature Review

In recent years there has been a dramatic increase in cognitive disorders in the elderly. This has been attributed to the expanding number of elders in the population and the cerebral consequences of both the normal aging process and the insults of acute and chronic illness. Delirium is one of the cognitive disorders that is prominent with the elder patient. Delirium may be among one of the oldest phenomena known to health care (Francis, 1992). It may also be the most common adverse outcome of the hospitalized older patient. Delirium is considered to be a transient disorder and usually results in full recovery, provided it is rapidly diagnosed and treated. Most commonly the term delirium is used to identify agitated forms of the episode, but in reality it displays an agitated side, a quiet form or a mixed presentation. Effective management of delirium requires both prompt treatment of the underlying pathology and

maintenance of a supportive environment (Bross & Tatum, 1994). It is often necessary to prevent the complications of immobility in elderly patients with delirium. Sound geriatric care and a high index of suspicion can minimize the impact of delirium. Delirium has consistently been under-recognized or under-reported by physicians and nurses (Rockwood et al., 1994).

Definition of Delirium

Terms to identify and define delirium have been numerous. In its oldest terms delirium was described as a frenzy or lethargy. Other terms used for delirium were metabolic encephalopathy, toxic psychosis, acute mental status changes, pseudosenility, and acute brain failure. Literature pre-1980 is difficult to review because of the nomenclature. The 1980 publication of the third edition of the American Psychiatric Association's Diagnostic and Statistical Manual (DSM-III) and its recent revision (DMS-III-R) in 1987 introduces standardized terminology and criteria for the diagnosis of delirium.

Delirium is a disorder of attention according to DSM-III-R (1987). Criteria for delirium from DSM-III-R include:

> 1) Reduced ability to maintain attention to external stimuli and to appropriately shift attention to new external stimuli; 2) Disorganized thinking as indicated by rambling, irrelevant, or incoherent speech; 3) At least two of the following: a) Reduced level of consciousness, b) Perceptual disturbances: misinterpretations, illusions or hallucinations, c) Disturbance of sleep-wake cycle with insomnia or daytime sleepiness, d) Increased or decreased psychomotor activity, e) Disorientation to time, place, or person, and f) Memory impairment e.g., new material or past material; 4) Clinical features that develop acutely (hour to days) and fluctuate over the course of a day; 5) Either (1) or (2): 1. Evidence from the history, physical examination, or laboratory tests of an organic

etiology, 2. In absence of such evidence, an etiologic organic factor can be presumed if the disturbance cannot be accounted for by any nonorganic mental disorder (pp. 100-103).

Patients with delirium show a wide variation in clinical presentation. In part, this variability is due to the unpredictable fluctuations in cognition. "In fact, the development of delirium probably involves a complex and interacting web of precipitating factors that act on hosts with varying degrees of vulnerability" (Inouye, Viscoli, Horwitz, Hurst, & Tinetti, 1993, p. 479).

Some problems remain with the DSM-III-R definition of delirium. Certain criteria remain ambiguous, e.g., acute onset is not given a specific time frame. There is also failure to state whether all symptoms need to coexist during a given period of time or if chronic behavioral problems should be counted as symptoms (Francis, 1992). Some criteria may be difficult to asses in severely lethargic or uncooperative patients. Partial delirium syndromes, which meet some but not all of the criteria, may be common, but are not acknowledged in DSM-III-R (Levkoff et al., 1992). Inouye et al. (1990) have stated that the DSM-III-R may be too complex for use by the non-psychiatric clinicians. Simpler, more easily remembered sets of criteria may perform as well as DSM-III-R in medical settings. They have devised the Confusion Assessment Model (CAM) which uses the base criteria of the DSM-III-R in a more user-friendly form.

Problems still exist in today's literature but more and more research is conforming to selection criteria. Cole and Primeau (1993) have suggested using criteria to include monitoring prognostic factors, elimination of confounding factors of dementia, setting a follow-up period of a minimum of 6 months, and measuring cognition daily. Other criteria determined necessary by Cole and Primeau were outcome categories defined with the length of stay, rates of institutional care, activities of daily living (ADL) levels, and mortality rates. Also procedures of delirium detection and management need to be recorded in detail.

In addition to the definition of delirium, documentation and assessment are also problems encountered with delirium studies. Gustafson et al. (1991) and Williams, Campbell, Raynor, Mlynarczyk, and Ward (1985) have made the observation that delirium was not documented or assessed consistently. Gustafson et al. (1991) compared two prospective samples and two earlier retrospective samples. Their study was specifically undertaken to determine the accuracy of diagnosis and documentation of delirium in the medical records of patients with hip fracture. The results of the clinical study were compared with the findings of a medical record study on the same individuals and on the same care occasion. The patients' medical records were studied in order to find the noted incidence and treatment of delirium. Records were analyzed and patients were classified by two of the authors acting independently. There was 89% agreement between the authors. All cases of disagreement were subject to diagnostic discussions that ended up in full agreement on the diagnosis. It was found that delirium was unsatisfactorily diagnosed and poorly documented in the medical record materials as compared with the results of the clinical studies. The nurses and physicians together documented delirium in 48 of 111 cases (43.2%) in the medical record review. But in the clinical study 68 of 111 cases (61.3%) were diagnosed with delirium using the DSM-III criteria ($p < 0.01$). Other relevant findings from Gustafson et al. (1991) were: 1) no systematic mental test in use, 2) no documentation of any effort to treat the delirium, and 3) physicians and nurses often used vague and inconsistent terminology to describe the patients' mental state. Both documentation and assessment are necessary for proper medical and nursing care and for the rehabilitation program to proceed.

Other findings in recent literature (Francis & Kapoor, 1992; Murray et al., 1993) bring into question the reversibility of this syndrome as currently defined. Both of these investigations found the results of a delirious episode during hospitalization to be nontransient with permanent consequences. This then invites a reexamination of the

definition of delirium from one of an acute, reversible syndrome to one of acute onset with long-term sequelae (Murray et al., 1993). Francis and Kapoor (1992) refer to this issue as more than life or death, but one involving quality of life, since patients with delirium are at substantial risk for loss of independent living.

Delirium and Functional Ability

Significant functional deterioration associated with acute hospitalization of the elderly has been well described (Hirsch, Sommers, Olsen, Mullen, & Winograd, 1990; Lamont, Sampson, Matthias, & Kane, 1983) but the cause of the loss of function has not been elucidated. The relationship between change in cognitive status during hospitalization and loss of function was examined by Murray et al. (1993). The goal was to determine whether delirium, an acute change in cognitive function, was associated with long-term loss of physical function, as measured by the ability to perform Activities of Daily Living (ADLs) (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963). Basic self-care activities such as bathing, dressing, toileting, transferring, continence, and feeding are assessed by the Katz Index of ADL. The Murray et al. (1993) prospective study of 325 hospitalized community and nursing home elderly looked at the effects of in-hospital delirium on subsequent physical functioning. The incidence of delirium during hospitalization was 31.3%. The diagnosis of delirium was made based on the DSM-III criteria; the Delirium Symptom Interview, a structured interview used daily; an interview with the primary nurse; and daily chart audit for documentation of delirium symptoms. The Katz Index for ADL performance was assessed on admission, at 3 months and again at 6 months after hospital discharge.

The mean physical dysfunction scores (PDS) by delirium diagnosis are described in Table 1. Only subjects with no missing data on admission and at 3 and 6 months after hospital discharge were included. The higher score indicates a more dependent subject.

Table 1. Mean Physical Dysfunction Scores by Delirium Diagnosis

	Community		Nursing Home	
	Controls *N* = 130	Delirious *N* = 31	Controls *N* = 35	Delirious *N* = 34
	Mean *SD*	*Mean* *SD*	*Mean* *SD*	*Mean* *SD*
Admission	1.13 1.59	3.45 2.31	3.74 2.19	4.03 1.68
3-month	1.45 1.72	4.39 1.93	3.63 1.61	4.97 1.61
6-month	1.50 1.93	4.42 2.16	3.83 2.31	4.97 1.80

Note. From "Acute Delirium and Functional Decline in the Hospitalized Elderly Patient," by A. M. Murray et al., 1993, Journals of Gerontology, 48 (5)p. M183. Copyright © The Gerontological Society of America. Reprinted with permission. (Appendix A)

Results revealed the mean number of ADL dependencies was significantly higher in the delirious than the nondelirious subjects in the community on admission ($p < .0001$) and in both the community and nursing home groups at 3 and 6 months after discharge ($p < .0001$ for 3-month and 6-month PDS in the community sample, and $p < .006$, $p < .025$ respectively, for the 3- and 6- month PDS in the nursing home) (p. M183). In addition, mean PDS in both the community and nursing home delirious groups increased significantly at 3 months and then stabilized, but did not improve. In contrast, among the nondelirious patients at both sites there was no significant change in mean PDS over the 6-month observation period. Despite a high level of pre-existing functional dependency in both the community and nursing home samples, subjects who developed delirium in the hospital experienced a significant loss of function subsequent to their delirious episode, which persisted for 6 months after discharge. The mean loss

of function in the delirious group was .942 in the community sample, or losing the ability to perform almost one ADL, and .84 in the nursing home.

With functional decline detectable as soon as 3 months after hospital discharge and no improvement over a 6 month observation period, such loss of function has important clinical and prognostic implications for elderly patients. Functional decline with delirium leads to dependency on caregivers, increased health care costs and nursing home placement. Delirium was the sole predictor of loss of function. This is perhaps the strongest statement for the significant role delirium plays in affecting long-term physical functioning (Murray et al., 1993).

Limitations in this study were the use of medical record data for the diagnosis of preexisting dementia and illness which could lead to a misclassification bias. Another limitation was the absence of an assessment for the possible occurrence of another illness in the intervening period between the delirious episode and 3 month evaluation that might be associated with loss of function. This study does recommend that elderly patients be assessed on admission and during the hospital stay for the presence of delirium. This assessment would improve the prevention of delirium and functional decline. It would also take into consideration appropriate discharge planning.

Francis, Martin, and Kapoor's (1990) prospective study of 229 patients found no difference in decline of ADL function 6 months after hospital discharge among delirious compared to non-delirious hospitalized patients. But in a two year follow-up study of these same patients Francis and Kapoor (1992) found that there was a doubling of two year mortality in patients who had experienced delirium. In these studies the diagnosis of delirium was determined by use of the DSM-III-R criteria. Delirium criteria were met by 50 patients (22%) during some point in their hospital stay. All patients underwent a standardized chart review, brief interview, and administration of the Mini-Mental State Examination (MMSE). Baseline physical function was assessed by questioning the

patient or caregivers about ability to perform ADLs prior to the onset of acute illness using the Katz Index of ADL.

In the two year follow-up study (Francis & Kapoor, 1992), mortality, estimated by the Kaplan-Meier method, was 39% for cases (delirium) and 23% for controls (non-delirium) (p = .03). Follow-up testing for cognition was completed by using the telephone version of the MMSE. Because of losses to death, institutionalization, or inability to use the telephone, only 11 delirium cases and 81 controls were tested for cognitive status. At the time of follow-up, performance on the cognitive testing had declined among cases but not among controls using a two-way analysis of variance (delirium x time of test, F = 5.36, df = 1, p = .023). This incidence was attributable to underlying functional and cognitive impairment. The authors suggest that long term prognosis for physical and cognitive function after an episode of delirium reflects the natural history of the underlying brain disease, accounting for the progressive decline.

There were 34 delirium cases and 146 controls whose base-line ADL was either fully independent or required assistance in only one task. After two years, 14 cases and 31 controls had died (41% vs 21%, p = 0.02). Of the surviving delirium cases, eight were institutionalized or dependent in one of four basic ADLs (bathing, dressing, transfer, eating) equaling 40%. These cases are compared to 21 out of 115 surviving controls (18%). This is a significant difference in proportions (p = 0.03). The entire original sample was independent and community dwelling. Of these only 12 cases (35%) and 94 controls (64%) remained alive, community-dwelling, and ADL independent after 2 years (p = .004). When analyzing univariate associations with independent community living; the presence of delirium had a relative risk factor of 1.82 with a 95% confidence interval ranging from 1.31 to 2.53. Among those who had little or no functional impairment at baseline, delirium appeared to identify patients at risk of losing the ability to live independently in the community.

Limitations in this study were seen in the use of proxy or subjective reporting of ADL functioning. Shorter intervals between data collection would have allowed for better estimations of time to functional failure. And finally the observations about cognitive decline are limited by the small sample size and the manner in which cognition was tested. Because this convenience sample was seen on the general medical service, it may differ from the hip fracture patient population.

These studies suggest that delirium may have multiple long-term sequelae and emphasize the need to improve efforts in the prevention of delirium in the hospitalized elderly. Delirium not only influences the acute illness but influences the long-term prognosis of older patients. Patients who experience delirium should be watched for future functional decline (Francis & Kapoor, 1992).

Delirium and Functional Ability in the Hip Fracture Patient

Confusion in the orthopaedic patient has been studied by Gustafson, Berggen et al., 1988. In this study the nonconfused patients regained independent walking ability and returned to home while the confused patient had a longer rehabilitation period and poorer prognosis for returning home or regaining walking ability. This study considered risk factors for delirium and the mechanism involved in the development of delirium. All 111 consecutive patients operated on for fractured neck of the femur were tested on admission assessment using the DSM-III criteria for dementia. Daily observations during hospitalization were made for diagnosis of delirium utilizing the DSM-III standards. All patients or their caregivers were interviewed 6 months after surgery and the patients' living conditions and walking ability were recorded. Prefracture mental state was assessed by means of interviews with relatives or caregivers. The mean age of the patients was 79.3 years with eight patients older than 90 years.

The incidence of delirium was 61% (n = 68) during hospitalization. The week before the fracture 4 of the 19 (21%) nonconfused subjects used some kind of aid to

walk (measure of mobility). Eight of the 13 (61.5%) who were confused used an aid to walk. The use of some kind of walking aid at 6 months had increased to 31.5% for the nonconfused and 82% for the confused patients. As for living conditions, 30% of the nonconfused were in institutional care and 58% of the confused were institutionalized at six months.

Multiple linear regression using age, dementia, drugs with anticholinergic effect, depression, cerebrovascular diseases and cardiovascular diseases as independent variables and delirium as the dependent variable was performed. The best predictors for confusion were old age and dementia. Regular use of drugs with anticholinergic effect, depression and previous stroke approached significance in their association with the development of delirium.

Limitations of this study include the generalizability of the findings because of the high proportion of patients being treated with anticholinergic drugs. Given the advanced age of the sample, physical limitations may be inherent to the age factor.

Japan has also contributed to the literature on patients with a femoral neck fracture and ambulating prognosis (Kyo, Takaoka, & Ono, 1993). Using a sample of 427 elderly patients, a retrospective study was conducted to identify factors for life expectancy and functional prognosis. Mental status was evaluated by use of the Hasegawa's dementia test. Predictive factors were evaluated to determine three month and one year survival rates and functional prognosis. The most important factors affecting life expectancy were ADL, electroencephalogram, electrocardiograph, and cognitive function score. The electroencephalogram and electrocardiograph were used to subdivide the subjects based on the evidence of ischemic changes and the severity of arrhythmia. Pre-fracture ADL was a crucial factor in determining post-operative walking ability.

Post-operative ambulating was regained by 64.9% of the patients who were independent or used an aid (cane or walker) prior to fracture and had no cognitive

change during hospitalization. For those with a cognitive change only 28.6% regained ambulation. The results show that recovery of walking ability may be related to cerebral function. A comparison between the time before fracture and three months after surgery showed that in more than half of all the patients, ADL dropped by one rank of measurement.

The mortality rate was higher during the first six post-operative months and then gradually declined for all subjects in the study. The mean one-year survival rate was 55.9%. The survival rate was greater for the nondelirious group than the delirious.

A suggestion from this study is to relate prefracture parameters with the type of fracture and post operative rehabilitation programs. Some types of fractures and repair may prolong immobility and reduce the chance to regain walking ability. A cognitive screening scale similar to the MMSE (Hasegawa Score) was used to be culturally specific for the Japanese. This can be viewed as positive or negative for generalizability of the cognitive screening tool. The mean patient age in the study was almost equal to the life expectancy of the Japanese population therefore the mortality rates may be skewed as well as the cognitive function scores.

In a study by Williams, Campbell, Raynor, Mlynarczyk, and Ward (1985), a nursing intervention was carried out to reduce the incidence of acute confusional states in patients with hip fractures. This quasi-experimental study was carried out with 227 patients (170 = nonintervention sample, 57 = intervention sample) recruited from orthopaedic units in four acute care hospitals for the nonintervention phase. Three of those same hospitals were used for the intervention phase. Project staff collected all data in the nonintervention phase. Data collection utilized the Short Portable Mental Status Questionnaire (SPMSQ), clinical data, demographic information, and confusion status observation from admission through the fifth postoperative day. During the intervention phase, project staff recorded background and clinical progress data from the subject's record while nursing staff administered the admission interview and

SPMSQ. End-of-shift observations were recorded on two flow sheets. One sheet contained the clinical observations, the second record contained the absence or presence of confusional behaviors and the nursing activities used to prevent or improve confusion.

The clinical observations mirrored the four behaviors of confusion found in the initial study (Williams, Holloway et al., 1979). Confusion behaviors were operationalized as (a) verbal or nonverbal manifestations of disorientation to time, place, or persons in the environment; (b) inappropriate or unusual communication, e.g., nonsensical speech, calling out, yelling, swearing, and / or unusual silence; (c) inappropriate or unusual behavior such as attempting to get out of bed, pulling at tubes, dressings, and / or picking at bedclothes; and (d) illusions or hallucinations. The definition used for delirium was: "A transient or prolonged disturbance in mental process incorporating impaired memory, thinking, attention, and orientation to time and place. Misperceptions of persons and objects, hallucinations, hyper- or hypoactivity, and emotional changes may also be present" (Williams, Campbell, Raynor, Mlynarczyk, & Ward, 1985, p. 332). The six major factors thought to contribute to confusion were: strange environment, altered sensory input, loss of control and independence, disruption in life pattern, immobility and pain, and disrupted pattern of elimination.

Nursing interventions were operationalized in different ways during the intervention phase. When specific measures were incorporated into the nursing care of 57 patients (intervention sample), the overall incidence of confusion dropped from 51.5% to 43.9%. Nursing activities implemented most frequently were: weaving orientation information into the conversation; informing patients about procedures and rationale for testing; and correcting sensory deficits (hearing aids in place, wearing glasses). Other interventions utilized were: using consistent care-givers; encouraging family members to visit; and empowering the patient. These nursing measures were not difficult to implement and could be incorporated easily into care.

In all cases, the confused patients were compared with the patients who did not show any confusion. The risk scores were adjusted and a logistic regression model was fit in which both groups were required to have the same slope for the function score, but different intercepts allowed for the levels of confusion. The combined (mild, moderate / severe confusion) intervention sample showed a significantly lower level of confusion than the nonintervention sample (one tailed p = .013 and associated Z = -2.22). Figure 1 depicts a comparison of patients with confusion in the intervention and nonintervention groups by day in hospital.

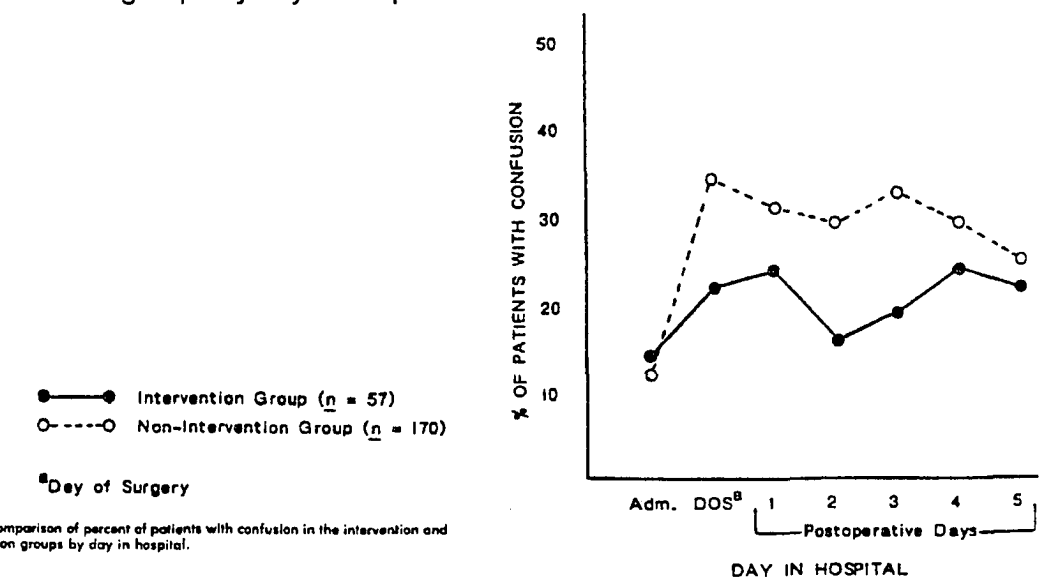

Figure 1. Comparison of percent of patients with confusion in the intervention and nonintervention groups by day in hospital.

Figure 1. Comparison of percent of patients with confusion in the intervention and nonintervention groups by day in hospital (Williams, Campbell, Raynor, Mlynarczyk, & Ward, 1985, p. 334).

Note. From "Reducing Acute Confusional States in Elderly Patients with Hip Fracture," by M. A. Williams, E. B. Campbell, W. J. Raynor, S. M. Mlynarczyk, and S. E. Ward, 1985, Research in Nursing & Health, 8, p. 334. Copyright 1985 Wiley. Reprinted by permission of John Wiley & Sons, Inc. (Appendix A)

. Strengths for the study were: 1) staffing remained fairly consistent over the study period, 2) the ethos of accurate reporting was not seen as an issue, and 3) the

level of chronic illness was generally similar between the two groups. Limitations of prediction models are that only major recurrent risk factors emerge and the infrequent appearing factors that may be clinically significant for an individual are lost to the major factors. Approaches in interventions were individualized particularly the interpersonal ones. This can be viewed as a strength in that the delirium was recognized promptly and treated. It can also be viewed a weakness with inconsistent interventions utilized.

The incidence of confusion in elderly orthopaedic patients, who have no history of chronic mental impairment but who suffer sudden injury and rapid hospitalization, can be reduced by conscious attention to interpersonal and environmental nursing approaches. The two studies by Williams et al. (1979, 1985) have demonstrated that the frequency of acute confusional states could be reduced and outcomes improved by nursing interventions. A careful admission assessment of mental status followed by a program to a) maintain mobility, b) correct hearing deficits, c) assist in re-orientation, and d) maintain toileting are key to reduce the intensity and incidence of delirium.

Delirium and Hospitalized Elderly

Acute confusion is most likely to develop during the initial period of hospitalization or early in the post operative phase (Foreman, 1990). The more severely ill an elder, the more common and severe is the acute confusion (Foreman, 1989). Foreman used the Folstien Mini-Mental State Exam and Vermeersch's Assessment of Confusion to look at the diagnostic value of orientation, cognition, motor behavior and memory with 238 elderly medical patients. Forty-seven and one-half percent met the DSM-III criteria for confusion (Foreman, 1990). Attention and concentration had a diagnostic accuracy of 90% in discriminating acutely confused from nonconfused patients. Foreman (1990) suggests the first step in treating acute confusion is to eliminate and / or correct underlying pathophysiological conditions, e.g., fluid and electrolyte imbalances, low oxygen saturation levels. The second step is to

provide symptomatic and supportive measures to promote a sense of control, relieve pain and promote physical and mental activity.

Foreman and Grabowski (1992) found that assessment of the cognitive abilities of elderly individuals is essential to their well-being. The recommendation is made that cognition status be assessed routinely, thereby any change in functioning can be detected promptly. They recommend that each evaluation be systematic so that every assessment is performed similarly, ensuring that changes reflect the patient's status and not a difference in the nurses performing the assessment. A comprehensive assessment encompassing all aspects of cognition should be completed, thereby providing information for determining the exact condition. The use of a mental status questionnaire and a behavioral rating is also recommended (Foreman, 1989). Foreman (1987) concludes that it is not so much which instrument is used in defining characteristics of delirium but that one is used routinely.

Physical Functioning and Hospitalized Elderly

The most striking find in a study by Wanich, Sullivan-Marx, Gottleib, and Johnson (1992) of a nursing intervention was the improved functional status outcomes in the intervention group. This study (N = 235) was a multidisciplinary, quasi-experimental trial of a nursing intervention and its effects on hospitalized elderly medical patients with and without delirium. All intervention group patients (n = 135) were on one medical unit and the control group (n = 100) was hospitalized on two other medical units. The intervention consisted of nursing staff orientation, patient orientation and communication, mobilization, environmental modifications, caregiver education and consultation, medication management and discharge planning. Nursing staff education consisted of an inservice program to the nursing staff caring for the intervention subjects. Orientation and communication was provided by the geriatric nurse specialist each day for the subjects regarding acquaintance with day of the week, current events, a discussion of their condition and information about upcoming

diagnostic or therapeutic measures. Mobilization was accomplished by getting subjects out of bed each day, ambulating them daily, ambulating from the room at least daily, and interactions with physical and occupational therapy. The environment was modified to meet the needs of hearing or vision impaired subjects. Also available for use were updated calendars, stimulation via radio or television and proper lighting. Caregiver education and family consultation was accomplished by requesting families to call daily and bring in photos and personal mementos from home to assist in orientation and personalizing the environment. Medication management via use of only critical medications was implemented by daily review of the subject's medications with the nursing staff, physicians and the geriatric nurse specialists. Discharge planning was a family care conference with the discharge planning team. The activities were aimed at maintaining normalcy through mobilization, social interaction and prevention of hazards. As a result of these, the subjects had improved abilities to perform self-care activities.

All intervention group subjects were assessed daily by one of two geriatric clinical nurse specialists who directed the nursing intervention detailed above. Specific components of the nursing intervention were not examined in this study. Thus it is difficult to determine which elements of the intervention were most important in explaining the improvements in physical functioning. Only the presence or absence of the intervention was found to be significant (adjusted odds ratio 3.29, 95 % confidence interval 1.26 - 8.17). Therefore subjects exposed to the intervention were three times as likely to improve in functional status in the hospital compared to subjects unexposed to the intervention.

In this study delirium was not reduced or prevented but the nursing intervention was successful in improving functional status (Wanich et al., 1992). Twenty percent of the patients developed delirium sometime during the hospital stay. The MMSE was

used to screen for cognitive deficits. The DSM-III criteria were used for delirium diagnosis. The Katz Index of ADL was used to assess the physical functioning status.

Limitations in the methods and design may have influenced the study. The close geographic proximity of the units may have resulted in staff carry-over into the control group. It could result in the effects for the control group looking worse. The study was not blinded for the measurement of functional status. Also patients in the intervention group had more acute conditions which may have caused bias. But this bias would tend to cause poorer outcomes in the intervention group.

Summary

Confusion is a significant health problem for acutely ill elders. Essential in the treatment of delirium is identification of the organic causes and initiation of appropriate intervention. The most common mistake in the management of the delirious patient is to neglect environmental and psychological interventions. Attention to these areas can make an enormous difference in the symptomatic treatment of the elderly delirious patient. Research about delirium is needed to better understand its pathophysiology, clinical course, and treatment, and to appreciate its relationship with other organic mental and functional disorders. This seldom mentioned clinical entity must increasingly come to the awareness of physicians and nurses who care for the aged, since early recognition and intervention can prolong the survival of elderly patients and improve their physical functioning.

From the limitations cited in the recent research many facets of delirium still require clarification. Criteria for data collection, e.g., screening for dementia on admission assessment, would prevent sole reliance on medical records. The determination of another illness or hospitalization occurring between the initial injury and subsequent follow-up data collection could impact physical functioning. Gathering data by self-report as frequently as possible and not by proxy will generate a more accurate self appraisal of physical functioning. Using more frequent data collection

intervals post-injury would create a more accurate time to functional failure. Employing a cognitive screening tool creates consistency. Nursing interventions need to be defined accurately, implemented consistently, and documented carefully. Finally, a more accurate system of reporting delirium using similar terminology to make data collection easier needs to be developed.

Hypothesis

The hypothesis proposed for this study is: An acute confusional state / delirium occurring during hospitalization will alter the functional outcome of the acute hip fracture patient one year post- injury. Specifically, delirium leads to an increase in mortality and a decrease in physical and cognitive functions.

Definition of Terms

Delirium: An episode that has a multidimensional adaptive pattern occurring as a result of an actual or perceived alteration in the environment (Foreman, 1991). The best fit is not achieved, therefore wholeness is not conserved (Levine, 1989). This adaptive process is manifested by simultaneous disturbances in attention, thinking, consciousness, memory, perception, the sleep-wake cycle, psychomotor behavior, and orientation (American Psychiatric Association, 1987).

Physical Functioning: An alteration in the conservation of personal and social integrity manifested in the ability to bathe, dress, toilet, transfer, feed oneself (Katz et al., 1963) or walk across a small room (Jette & Branch, 1981).

Acute Fractured Hip Patient: An alteration in structural integrity diagnosed as a fracture of the femur that causes a hospitalization whether or not surgery is performed.

Post-injury: Time measurement from the occurrence of a hip fracture to and including 12 to 18 months post-injury.

CHAPTER 3

METHODOLOGY

Research Design

This study is ex post facto, correlational in design. It is a descriptive follow-up on patients involved in an initial study to identify the incidence of delirium in the elderly hospitalized hip fractured patient. This study follows the patient from time of injury, through hospitalization and including 12 to 18 months post-injury to determine the impact of a delirious episode on physical functioning.

Sample

Subjects were all patients admitted to a teaching metropolitan hospital during February through August 1993 who met the study criteria. These criteria were a) initial diagnosis of an acute hip fracture, b) an age of 60 or greater, c) ability to speak and understand English, and d) willingness to participate in the study. Patients were deemed ineligible if they a) sustained a fracture during the course of their hospitalization, b) were admitted with multiple trauma including a hip fracture, and c) were patients admitted to floors other than orthopaedics. Sixty-eight subjects met these criteria. One subject was admitted with a fractured hip diagnosis but in reality had a fractured pubic rami. This subject was dropped from the study. The initial patient study comprised 67 subjects. Once enrolled, no subject requested to withdraw. However, one subject died while hospitalized for the acute fractured hip.

Medical diagnosis ranged from one comorbid condition to several with multiple systems involved. Age ranged from 61 to 94 with a mean age of 79.7. Fifty-three (79%) were female and 14 (21%) were male. Forty-nine percent had sight problems while 45% had some hearing deficit. Fifty-eight percent (n = 39) were widowed while

33% (n = 22) had living spouses, and 9% (n = 6) were single. Sixty percent could independently care for themselves. Four subjects were nonambulatory and did not undergo surgical repair. All subjects were evaluated for mental depression during the admission assessment in the initial study. No patients were eliminated for mental or substance abuse reasons.

Instruments

Several instruments were used in this study. These included the Confusion Assessment Method (CAM) Diagnostic Instrument, the Mini-Mental State Examination (MMSE), and the Katz Index of Activities of Daily Living (ADL).

Confusion Assessment Method

The CAM (Appendix B) uses the Diagnostic and Statistical Manual of the American Psychiatric Association Revised (DSM-III-R) criteria as a basis for the diagnosis of delirium (Inouye et al., 1990). The CAM instrument can be completed in less than five minutes and consists of nine operationalized criteria from the DSM-III-R. Four criteria were used to determine the presence of delirium: a) acute onset and fluctuating course, b) inattention, c) disorganized thinking, and d) altered level of consciousness (Inouye et al., 1990). The CAM algorithm for diagnosis of delirium requires the presence of both the first and second criteria and either the third or fourth criterion. Data were collected on the remaining DSM-III-R criteria also; disorientation, memory impairment, perceptual disturbances, increased or decreased psychomotor activity and disturbances in the sleep-wake cycle. The original authors demonstrated that the CAM has convergent agreement with four other mental status tests, including the Mini-Mental State Examination. The inter-observer reliability of the CAM was high (kappa = .81-1.0) in their study (Inouye et al., 1990). The CAM was developed and validated to be a new standardized confusion assessment method with sensitivity, specificity, reliability and ease of use. The CAM was developed specifically for the

nonpsychiatrically trained clinician to identify delirium quickly and accurately in both the clinical and research settings (Inouye et al., 1990).

Mini-Mental State Examination

The Mini-Mental State Examination (Appendix C) is one of the most frequently used mental status questionnaires (Folstein, Folstein, & McHugh, 1975). The short standardized form was devised for serial testing of the cognitive mental state in patients. It was initially developed for hospitalized elderly patients. It is an 11 question general purpose cognitive screening examination requiring only 5 to 10 minutes to administer. The areas under consideration for screening are: orientation, registration, attention and calculation, recall and language. The score is determined by summing the 11 questions, with 30 the maximum score. A score of less than 24 indicates global cognitive impairment. With this cut-off score of 23 / 24 the MMSE had a sensitivity of 87% and a specificity of 82% when judged against a research psychiatrist's standardized clinical diagnosis of delirium or dementia (Anthony, Le Resche, Niaz, Von Korff, & Folstein, 1982). Test-retest reliability ranged from .56 to .98 (Folstein et al., 1975). Foreman (1987) investigated three mental status questionnaires (SPMSQ, MMSE, & Cognitive Capacity Screening Examination) and found the MMSE to be a better instrument for individuals with limited cognitive abilities.

Although the MMSE is adversely influenced by low educational levels (Cockrell & Folstein, 1988) it has been found to provide a specific and sensitive measure of mental status for elderly persons, some of whom may have limited formal education. It has been suggested that a median MMSE score for persons over 65 is 27.6 (Warshaw, 1990).

In order to successfully complete the instrument, clients must be able to see well enough to read and copy a figure, hear well enough to understand directions, and have sufficient musculoskeletal function to hold a pencil or pen and write. Since many aged persons suffer from multiple chronic conditions, disabilities and sensory-perceptual

conditions, inability to complete certain items should be carefully evaluated to confirm existence of physical disability or sensory perceptual deficit, rather than cognitive impairment (Dellasega & Morris, 1993).

Validation of a telephone version of the MMSE (Roccaforte, Burke, Bayer, & Wengel, 1992) was performed by comparing a telephone version of MMSE to a face-to-face evaluation done several days later. The modified version of the MMSE was administered by eliminating those questions requiring face-to-face contact. These questions include the 3-stage command, sentence writing, and drawing a figure. The telephone version has a maximum possible score of 23. This was adjusted to make it comparable with the face-to-face MMSE by multiplying by 1.304 (30 divided by 23). Test scores of the two MMSE versions (Roccaforte et al., 1992) correlated strongly for all subjects (Pearson's r = .85, p = .001). Comparison of the two versions equivalent 23 items revealed no significant difference for scores of all subjects (p = .07) but with a trend toward higher scores in the original version. Diminished hearing, reported either by the subject or by the significant other was associated with lower scores on the telephone version. A good test-retest reliability (Pearson's r = .94) was established by Brandt, Spencer, and Folstein (1988) using the MMSE telephone version. Francis and Kapoor (1992) validated the telephone MMSE on a subsample (n = 20) within their study by comparing scores obtained by telephone with scores obtained by face-to-face testing during a home visit within 48 hours (median MMSE = 25, range 13-30). Interclass correlation between the two tests was .82 which was comparable to the test-retest reliability reported in the original MMSE by Folstein, Folstein, and McHugh (1975).

The original MMSE was used on admission during face-to-face contact. Sixty-four of the 67 subjects completed the admission MMSE. The telephone version of the MMSE was used for the 12 to 18 month follow-up study.

Index of ADL

The Index of ADL (Katz et al., 1963) was developed more than 30 years ago to study the results of treatment and prognosis in the elderly (asterisk item in Appendix D). It is based on functional ability. It was originally derived from observations of elderly with a fracture of the hip. Items of the index summarize over all performance in bathing, dressing, toileting, transferring, continence, and feeding. These six activities are measured on a dichotomous scale of independent or dependent. Continence was not evaluated in this study. Incontinence is an important component of functioning in the older population. But incontinence has a diverse etiology and may be present in persons who have no major physical limitations and who are otherwise in very good health and can independently manage their needs (Guralnik & Simonsick, 1993).

In many applications, the standard practice of counting ADL deficits may be adequate (Travis & McAuley, 1990). To score the Katz Index of ADL, the number of activities in which the individual is dependent are summed. This results in a score from 0 - 5 to calculate the ADL dependencies. The higher score indicating more dependencies and poorer function.

Many evaluations have been completed with the Katz Index of ADL as a survey instrument. It is used as an objective guide, as a tool for studying the aging process, and as an aid in rehabilitation teaching. Of interest is the observation that the order of recovery of ADL functions in disabled patients is remarkably similar to the order of development of primary functions in children. This suggests that the Katz Index of ADL is based on primary biological and psycho-social function, and reflects the adequacy of organized neurological and locomotor response (Katz et al., 1963).

Remarkably little evidence for the validity of the scale is available. Katz, Downs, Cash, and Grots (1970) applied the Index and other indices to 270 patients at discharge from a hospital for the chronically ill. The Index scores were found to correlate with a mobility scale ($r = .50$) and with a house confinement scale ($r = .39$).

Kane and Kane (1981) have reported that the scale is highly reproducible with coefficients of reproducibility of .948 for patients in their Worcester Home Care Study and .976 for their Fall River Sheltered Housing sample. The Katz Index of ADL was put to a hierarchical test (Lazaridis, Rudberg, Furner, & Cassel, 1994) to determine if ADLs fit into a single hierarchical structure. The results were that the Katz hierarchy does satisfy the traditional requirements for scalability, but many other ADL hierarchies also satisfy these criterion. The Katz Index of ADL has become a nearly universal measurement tool for long-term care research and practice. It is a simple, pervasive, and well-accepted instrument for research.

A limitation of the scale is in its development in and for clinical settings. It may then be less applicable to elderly living at home. The Katz Index of ADL views data on the lowest level of reported impairment with an increase in score equaling a more dependent status. But the behaviors are encountered and familiar to all patients, therefore, it is easy to elicit patient response. Functional status information can be obtained with minimal questioning.

Mobility or ambulation ability is considered to be another basic component of self care. It has been incorporated into some instruments as an ADL measure (Jette & Branch, 1981) and has been so incorporated in this study. The United States Department of Health and Human Services uses walking as one of its functional attributes for data collection on elders in the National Health Interview Survey (National Center for Health Statistics, 1992). The ambulation disability incurred by the acute event of a hip fracture is a reversible condition. It is important to evaluate the impact of this disability (Guralnik & Simonsick, 1993) therefore, it is the sixth component of the physical functioning status information for this study. Return to premorbid levels of functioning is usually associated with good pre-fracture mental status and physical function (Marottoli, Berkman, & Coonney, 1992; Magaziner et al., 1990; Katz et al., 1993).

Procedures

This study is a follow-up to a study undertaken to determine the incidence of delirium in the hip fracture population within the affiliated institution. The original study's emphasis was on the hospitalization period and contained the admission assessment data as well as the determination of delirium. Because training and data collection procedures in the original study affect this follow-up they will be described briefly here.

Original Delirium Study

Training procedures. The nursing staff was oriented to the data collection procedure by use of a self-learning packet and an inservice. The Self Learning Module - Delirium Study contained the reason for the study, objectives, definitions, inclusion criteria, and the patient consent letter. Samples and explanations for administration of the screening tests were included. Of the tests included in the original study the CAM and the MMSE were relevant for the present study. A demographic information tool (Appendix E) was also in each packet. This was used to gather basic subject profile information.

The self-learning packet had been distributed to all staff who were interested in collecting data for the study. Each nurse who desired to participate in the study was encouraged to read the packet information before attending an inservice by one of the contributing committee members. This packet was to be a personal reference source to be used during the data collection period. Several copies were available on the unit for ready reference. Only those nurses who had completed the self-learning module and attended the informational sessions collected data and assessed patients.

At the time of inservice, a nurse research committee member conducted the orientation session. The nurse committee member explained the study, answered questions, and reinforced documentation procedures. The individual learning packets contained a recording tool for the CAM (Appendix B). Orientation for the use of the

CAM was completed in a general session. Each criterion was elaborated upon to insure complete understanding of the definitions. It was stressed that the assessment be completed each shift and recorded on the data collection form. Additional space was provided for a narrative to describe specifics of client behavior when delirium was suspected. Observations were based on patient behavior or statements any time there was contact with the patient. Accurate recording of behavior was requested.

CAM definitions were reinforced through use of a video. This short video of dramatized vignettes of symptoms of delirium was presented to familiarize the staff with possible live situations. The tape could be stopped between each dramatization. The nurse research member asked for the symptom displayed and an explanation of why this particular symptom was chosen. All vignettes were discussed and the appropriate symptom was clarified. Research nurse members were readily available for questions and clarification of symptoms throughout the study. The video was available on the unit for review.

After this initial training a practice use of the instrument was not implemented. Two issues have resulted from this. Inter-rater reliability of the instruments was not established with these data collectors. Because of the length of time between inservicing and subject identification, definitions of CAM items were difficult to remember. A definition list (Appendix F) was placed inside each collection packet's front page for easy reference. Due to the large number of nurse observers accurate data collection and compliance with all observation times was encouraged but not guaranteed.

Orientation to administration of the MMSE (Appendix C) was also carried out during the general orientation session. The MMSE is an ideal instrument for standard screening. Items are easily remembered and can be rapidly administered by the nurse without special forms or props. The MMSE is a self-explanatory assessment with cues in each of the five areas for cognitive recognition. A review of each defining

characteristic was followed according to the printed material presented. Staff was cautioned not to lead the patient into a response. Recording of accurate data was again emphasized.

Base-line data collection. Data collection packets were placed on both the emergency care center and orthopaedic unit for easy access by the nursing staff. In the original study patients were admitted to the emergency care center. Nurses in the emergency care center began collecting the base-line data. An information / consent letter (Appendix G) was presented to the patient and family and refusal to participate was honored. Patients were assessed for existing depression, confusion, and dementia and were not excluded from the study. If the study information could not be obtained or completed in the emergency room, the orthopaedic staff was notified and they continued to collect base-line data on the orthopaedic unit. All packets were coded for confidentiality with a number code. These packets remained with the patient's chart during the hospital stay and observations were recorded each shift.

Information for the CAM was collected each shift and recorded on the appropriate collection tool. Additional comments were noted about behaviors displayed by the subjects to clarify observations. The MMSE was used as the cognitive function screening tool to elicit changes in mental behavior. Only nursing staff oriented to the delirium study collected the information necessary to complete the assessment. In the event the nurse caregiver had not completed the orientation module and inservice, a qualified nurse was assigned to assess the subject and record the information in the subject's packet. The assessment and data documentation continued for the duration of the patient's stay. Subject risk was determined to be the repeated assessment of mental status (which may have proved tedious or mundane to some patients) and confidentiality. To manage these risks assessments were carried out as efficiently as possible with awareness of client condition and all data were coded with numbers

rather than names. Upon discharge of the subject, the profile information was reviewed and the demographic information completed.

The nursing data base ADL section (asterisk item Appendix D) was the base for the ADL score recorded on the original study demographic tool (Appendix E). This recorded information was used as the subject's ADL index for coding purposes. The collection of ADL data normally occurs upon admission to the orthopaedic unit (in this hospital) using the standard nursing admission assessment data base (asterisk item Appendix D) . This is a familiar area for assessment and further orientation for data collection of ADLs was deemed unnecessary. The nursing assessment does not include transfer and toileting, therefore, only 3 of the 5 included tasks in Katz Index of ADL were assessed on this admission assessment. Transfer was determined by this researcher to be an independent function if the patient had been up and about pre-injury. It was dependent if the patient was wheelchair or bedbound pre-injury. Toileting was also assessed in the same fashion. A modified form of Katz Index of ADL was used; bathing, dressing, toileting, transfer, and feeding. Ambulatory status was gathered from the nursing data base and the physician's history and physical examination as the sixth task for ADLs.

Data were collected each shift by the primary nurse if she had completed the inservice process or by an assigned nurse who had completed the inservice process. Staff was cautioned to record accurate observations to keep the experimenter effects to a minimum. As time continued some observations were affected by familiarity with the delirium symptoms and more accurate diagnosis was made. When changes in cognition were noted a committee researcher was notified and validated the delirious state. The researcher also informed the subject's physician of the condition.

Some data were lost when the patients transferred off the unit. This was solved by orienting a staff nurse on the receiving unit to continue the data collection. On those patients who were transferred off the orthopaedic unit before the off-unit nurse was

oriented, chart audit was completed to determine if delirium occurred during this time period. This retrieved information was added to the data collection records. Patient transfer off the unit occurred with five subjects.

One-year follow-up data collection

The one year follow-up study data were collected by telephone with the surviving subjects, family members or primary care givers. Information was obtained directly from the subjects whenever possible. Otherwise, the primary informant identified during the initial hospitalization was contacted to provide follow-up information for the ADL portion. The MMSE information was gathered only from the subject. The follow-up questionnaire (Appendix H) contains the following areas of inquiry: living arrangements, method of ambulating, ADL activity, ability to walk across a small room or outside the home, illness since the hip fracture, and a telephone version of the MMSE. Locating the participants was handled by using the last known address and telephone number listed with the hospital, rehabilitation center, or extended care facility noted in the discharge disposition note from the hospital. The name and telephone number of the secondary informant was also gathered to assure that follow-up contact could be made and the subject's functioning status ascertained. A telephone call to the rehabilitation or extended care facility was used to determine survival status / death date. Confirmation of a discharge residence address and secondary informant information was also secured when possible.

A letter of introduction (Appendix I) was sent to all known living participants about two weeks before telephone contact. This gave time for mail to be returned if the residence had changed or other follow-up contact measures were needed. The letter of introduction served as a consent for further information gathering. In the event a subject could not give consent due to cognitive impairment, the letter of introduction was sent to the guardian so named on the hospital record or extended care facility record. The letter also served to alert the patients of the interest in their post-injury

condition and physical well-being. Information areas of interest were stated in the letter, this served to decrease the anxiety level. Telephone time involvement was kept to about 10 minutes; more if the patient so desired. All follow-up data were collected by this researcher. Confidentiality was maintained by using the identification number presented on the initial data collection information. A prepared script was used for continuity and consistency during the telephone interview (Appendix J).

There are situations which preclude the use of face-to-face interviews. Community surveys are often the only available means of collecting data on general health status of local populations. Telephone versus in-person surveys were analyzed by Aneshensel, Frerichs, Clark, and Yokopenic (1982). These researchers found no statistically significant differences between the two interview methods for overall assessment of health status. Many elderly have limited mobility due to cognitive, medical, or transportation difficulties. In addition subjects often move away from the study area making the longitudinal assessment difficult. Therefore this study used the telephone method as the primary source to gather information. Recommendations for interviewing elders by telephone (Worth & Tierney, 1993) were incorporated into the introduction letter and the follow-up data collection tool.

As was cited earlier in limitations of the MMSE, hearing impairment will adversely affect the research outcome. In the event a patient or caregiver could not successfully use the telephone the researcher attempted to visit the place of residence. Fifteen subjects were contacted in person by this researcher to obtain the follow-up data in a face-to-face interview.

CHAPTER 4

RESULTS AND DATA ANALYSIS

Telephone or face-to-face interviews were conducted during July and August of 1994. Of the 67 subjects in the original delirium study, one died during hospitalization, an additional thirteen died within the first year, and two subjects refused the follow-up interview. Therefore, 51 subjects participated in the follow-up ADL data collection (ADL sample). Two subjects wished to stop the telephone interview after the ADL portion was obtained and three families refused to have the subject interviewed for cognitive status. Thus, MMSE data were collected on 46 of the original 67 subjects (MMSE sample). Data analysis is based on an alpha of .05. Characteristics of those subjects who died or refused the follow-up interview were not examined to determine the effect of their omission on the follow-up data comparisons of statistics across the original sample (n = 67) and subsamples (n = 51 and 46) based on completed follow-up data that are notably similar.

Subject Characteristics

The length of surgical stay averaged seven days. Eight subjects returned to their own home or an adult foster care facility upon discharge. Fifty-eight (89%) were discharged to a rehabilitation facility or a nursing home. Twenty-two subjects (33%) had mental status changes during hospitalization, but only 11 (16%) met DSM-III-R criteria for delirium.

These 11 subjects included 8 who became delirious during their hospitalization without any known physiological cause or prior history. The remaining 3 subjects had a know substance abuse history which may have been related to the cause of delirium. Information from the CAM assessment tool was utilized to determine the delirious

event. All 11 subjects were included in this study for data analysis. Eight subjects who had a delirious episode initially survived for the one year follow-up study interviews and analysis.

The living arrangements did not change drastically from pre-injury status to post-injury status. Those subjects living independently comprised 54% of the sample pre and post-injury. Subjects living with some type of supervision pre-injury comprised 23% of the group compared to 30% post-injury. Prior to injury, 24% of the subjects came from nursing homes and 17% remained in nursing homes at the time of follow-up data collection.

The initial sample was predominantly female with a mean age of 79.7 years. The majority were widowed (48%) and 33% were married. Education level varied with 43% having attended some high school or graduated from high school. About half of the subjects had sight and hearing deficits. Subject demographic characteristics for the initial data collection and the follow-up study are summarized in Table 2. While the sample diminished in size from original to follow-up study, the distribution of characteristics remained similar. The follow-up sample appears representative of the original sample.

Survival Experience

Death date was obtained from the institution or contacted family member and counted as the number of days from the injury date to the day of death. Fourteen subjects (21%) died in the first year. Five of these subjects (8%) died within the first two months after injury. Another group of four (6%) died at about the one year mark. The remaining five deaths occurred between six and eleven months post-injury. Of those subjects who did not undergo surgery, two died within three weeks of injury and two were alive at the time of data collection but were totally dependent for care.

Fisher's exact test was used to determine if the survival status was related to a delirious episode. The data analysis failed to show that there was a statistically

Table 2

Characteristics of Original and Follow-up Samples

Characteristics	Original (n = 67) n (%)	ADL (n = 51) n (%)	MMSE (n = 46) n (%)
Gender			
Male	14 (21)	10 (20)	10 (22)
Female	53 (79)	41 (81)	36 (78)
Age (years)	mean = 79.7	mean = 79	mean = 78.8
60 - 70	9 (13)	8 (16)	8 (17)
71 - 80	22 (33)	19 (37)	18 (39)
81 - 90	31 (46)	20 (39)	16 (35)
91 plus	5 (7)	4 (8)	4 (9)
Marital status			
single	6 (9)	5 (10)	5 (11)
married	22 (33)	17 (33)	16 (35)
widowed	39 (58)	29 (57)	25 (54)
Education (years)			
< 8	19 (29)	13 (25)	12 (26)
9 - 12	29 (43)	23 (45)	20 (44)
> 12	8 (12)	8 (16)	7 (15)
unknown	11 (16)	7 (14)	7 (15)
Sensory deficit			
sight	32 (48)	25 (49)	21 (46)
hearing	29 (44)	23 (45)	20 (43)

significant association between a delirious episode and survival (p = .686). Table 3 depicts the observed frequency and conditional probability estimate of mortality for the two groups.

Table 3

Delirious Episode vs. Mortality Post-Injury (conditional probability)

Delirious	Living		Dead		Total
	n	%	n	%	
No	45	(80%)	11	(20%)	56
Yes	8	(73%)	3	(27%)	11
Total	53	(79%)	14	(21%)	67

Chi-square test = .324 (p = .569) Fisher's Exact test = .837 (p = .686)

Cognitive Status

A *t*-test failed to show a significant difference between nondelirious and delirious subjects on admission MMSE scores (t = .52, df = 62, p = .606). Table 4 shows the summary statistics.

Table 4

Admission MMSE Scores for Nondelirious and Delirious Subsamples

Group	Number of cases	Mean	Standard Deviation
Nondelirious	53	20.7547	8.946
Delirious	11	19.1818	10.177

Note: Three subjects did not complete the admission MMSE

The telephone version of the MMSE was used to obtain the cognitive score for the 46 subjects in the follow-up study. Table 5 summarizes the data of admission and one year follow-up scores obtained for the MMSE. There was no statistically significant difference between the admission MMSE mean and the telephone MMSE mean using a paired *t* test (t = .97, df = *45*, p = .34). This implies that the subjects' cognitive status remained the same during the recovery year.

Table 5

Paired Difference MMSE Admission and Post-Injury Scores

Group	Number of cases	Mean	Standard deviation
Admission MMSE	46	23.1522	7.033
One Year MMSE	46	22.3696	8.155
Difference	46	.7826	5.477

An analysis of covariance was also performed to examine the difference between the delirious and nondelirious groups on post-injury MMSE scores after adjusting for the effects of the admission MMSE scores. See Table 6 for the relevant information concerning the delirious and nondelirious groups. The original mean MMSE score for the delirious group was 23.714 (n = 7) and the nondelirious group mean was 23.10 (n = 39). The follow-up mean score on the MMSE for the delirious group was 21.571 (n = 7) and the nondelirious group mean was 25.0 (n =39). Adjusted MMSE mean scores at post-injury evaluation were 21.947 for the delirious subjects (n = 7) and 24.315 for the nondelirious subjects (n = 39) with a p-value = .1801. Considering the small sample size of the delirious group, the p-value of 0.181 supports further investigation with a larger sample.

Observing the overall change in cognitive function, 14 (30%) scored better on the follow-up test, nine (20%) remained at the same score, and 23 (50%) scored lower than the original score. Of the 12 subjects who scored 20 or below on the admission MMSE 10 died in the first year. These deaths represent 72% of the 14 deaths that occurred during the year.

Table 6

ANCOVA for MMSE Scores of Nondelirious and Delirious Subgroups Post-Injury

Source of variation	df	MS	F	P
Between groups	2	681.426/2	19.32	.0001
Group	1	32.83	1.86	.1801
Covariate	1	634.905	36.00	.0001
Within groups	42	705.365		

Note: Five subjects refused to complete the MMSE post-injury

ADL Functioning

The majority of the subjects were highly functional initially. Seventy percent (47 of the original 67) were completely independent in ADLs at admission. The one year follow-up data showed a decrease in independence. Discounting deaths and those who refused the follow-up interview, 58.8% (30 of the 51 ADL subsample) were independent post-injury.

It is of interest that those subjects with a high level of dependency in ADLs were also the most likely to die. Ten subjects had an ADL score of 10 or greater (scoring scale Appendix D) . Seven of these subjects died within the year and the remaining three were totally dependent in care at the follow-up evaluation. Overall 65% (n = 33) of the ADL post-injury subsample (n = 51) had stayed at the same level of

dependence, 8% (n = 4) had improved, and 28% (n =14) had lost in ADL functional ability.

At admission 62.5% (n = 5) of the delirious group who were eveluated at follow-up were independent and 77% (n = 33) of the nondelirious subjects who were evaluated at follow-up were independent. At post-injury these percentages were 50% (n = 4) independent for the delirious group (difficult to evaluate because of small n) and 61% (n = 26) for the nondelirious group. The remaining subjects had one or more dependencies.

A t-test failed to show a significant difference between nondelirious and delirious subjects on admission ADL scores ($t = 1.13$, $df = 61$). Table 7 shows the summary statistics.

Table 7

Admission ADL Scores for Nondelirious and Delirious Subgroups

Group	Number of cases	Mean	Standard Deviation
Nondelirious	55	6.909	2.180
Delirious	8	7.875	2.850

Paired *t* test analysis of the admission ADL and post-injury ADL mean scores was statistically significant ($t = 2.64$, $df = 50$ p = .011). Table 8 represents the relevant paired *t* test data obtained on the ADL scores. The higher score implies that the subjects lost about one level of independence.

An analysis of covariance was also conducted to see if there was a difference between the delirious and nondelirious subsample on post-injury ADL scores after adjusting for the effects of the admission ADL scores. The original mean ADL score for the delirious group was 7.0 and the nondelirious group mean was 6.674. Adjusted

Table 8

Paired Difference of ADL Scores Admission and Post-Injury

Variable	Number of cases	Mean	Standard deviation
Admission ADL	51	6.7255	2.050
One Year ADL	51	7.4314	2.988
Difference	51	.7059	1.911

ADL mean scores on the post-injury status were 7.422 for the delirious subjects and 7.551 for the nondelirious subjects with a p = .8624. See Table 9 for the relevant information concerning the delirious and nondelirious groups. This analysis shows that there is not a significant difference between the nondelirious and delirious groups' one year post-injury scores. Note that the n is very small for the delirious group.

Table 9

ANCOVA for ADL Scores of Nondelirious and Delirious Subgroups Post-Injury

Source of variation	df	MS	F	P
Between groups	2	132.954	36.01	.0001
Group	1	.112	.03	.8624
Covariate	1	264.137	71.54	.0001
Within	49	3.692		

A comparison of physical functioning at admission and one year is contained in Table 10. The activities of bathing, dressing, toileting, transfer and feeding remained

about the same. Of interest is the decrease in ambulating independence and the need for some type of aid for mobility. While 46% of the original 67 subjects and 51% of the

Table 10

ADL Comparisons Admission to Post-Injury

		Admission		Post-Injury
		Original	ADL	ADL
		(n = 67)	(n = 51)	(n = 51)
Task	Activity level	n (%)	n (%)	n (%)
bathing	independent	49 (73)	42 (82)	37 (72)
	dependent	18 (27)	9 (18)	14 (18)
dressing	independent	55 (82)	45 (88)	45 (88)
	dependent	12 (18)	6 (12)	6 (12)
toileting	independent	56 (85)	47 (92)	45 (88)
	dependent	10 (15)	4 (8)	6 (12)
transfer	independent	56 (84)	47 (92)	46 (90)
	dependent	10 (15)	4 (8)	5 (10)
feeding	independent	59 (88)	46 (90)	49 (96)
	dependent	8 (12)	5 (10)	2 (4)
ambulation	independent	31 (46)	26 (51)	17 (33)
	cane	11 (16)	9 (18)	10 (20)
	walker	21 (31)	15 (29)	19 (37)
	wheelchair	4 (6)	1 (2)	4 (8)
	bed bound			1 (2)

original ADL subsample of the 51 ADL subjects were independent at admission, only 33% remained independent one year post-injury. No subjects were bedbound at the initial data collection, but 2% were bed bound at one year post-injury. The surviving subjects had a greater dependence on ambulatory aids which indicates some loss of mobility function occurred during the intervening year. One should note that the sample size decreased due to death at follow-up and these subjects are included in the admission sample of 67.

Incidental Results

Physical ability

The survivors of the hip fracture incident remained fairly healthy according to a self report. Mobility was demonstrated by 90% (n = 47) walking across a small room and 85% ambulating outside the home; these were not directly assessed on admission. Thirty-six percent (n = 19) had had an illness during the year of convalescence. The majority of the health problems were a recurrence of pre-fracture conditions, e.g., congestive heart failure, asthma, arthritis, gastro-intestinal disease, myocardial infarction or cancer. Three subjects fell and fractured lower extremity bones. Five had complaints of chronic pain in the fractured hip area. This may limit post-injury ambulatory independence. Two of these subjects received total hip joint replacement. Only two subjects were hospitalized with a deep vein thrombosis. Fifty-three percent (n = 27) reported that they had returned to their pre-injury status. Forty-seven percent (n = 24) felt they had not regained pre-injury health at one year. Sixteen (31%) felt that return to pre-injury status had occurred within the first three months of recuperation, while 5 (10%) stated it took up to six months. At nine months post-injury, 11 (22%) were back to their pre-injury status, and at one year, 19 (38%) felt they had not returned to pre-injury condition.

Cognitive ability

During hospitalization,mental status changes were observed in 10 subjects that did not meet the DSM-III-R criteria. The DSM-III-R may be too stringent in its criteria to capture the total effect of a delirious episode. The DSM-III-R is without criteria for partial syndrome observations. If these subjects had been included in the statistical data the number of delirious subjects would have risen to 21 subjects creating a 32% incidence closer to the reported incidence by Lipowski (1992). It is unlikely that these partial symptoms were from underlying dementia because of the new presentation in the hospital setting. The presentation of partial syndrome symptoms has not been investigated in the research literature presented within this report. Partial clinical symptom presentation is an area of delirium research in need of further investigation.

Chapter 5

DISCUSSION AND CONCLUSIONS

The purpose of this study was to examine the changes in the physical functioning and mental status of the hospitalized older hip fractured patient over one year. A second purpose was to examine the impact of a delirious episode on the physical functioning and mental status in the same sample one year post-injury. In this chapter, further discussion of the results of the data analysis will be presented. In addition, limitations of the study, implications for nursing, and suggestions for further research are addressed. In the initial assessment of the MMSE and ADL function, both the delirious and nondelirious groups were assessed as not being statistically different.

Discussion

Survival Experience

The hypothesis proposed that those subjects experiencing delirium during the acute phase of hospitalization would experience a higher mortality rate. The last known place of residence for each subject was contacted to obtain the survival status of that subject. Based on that information all subjects or families were contacted for the follow-up interview. Survival experience for these hip fracture patients was a 21% mortality rate and supports prior research by Francis and Kapoor (1990), Lipowski (1989), and Magaziner et al. (1989) who report a range of 18% to 37%. The mortality rate for the hospitalization period was lower than most reports with only one death; Lipowski (1992) reports an 8% rate. The early demise of five of the subjects also agrees with earlier studies which report that a substantial portion of excess mortality occurs in the first few months following fracture (Magaziner et al., 1989). It may be of value to evaluate subjects who die early in the rehabilitation phase in another study.

There was no difference between subjects with and without delirium with respect to survival experience at the one year follow-up. A mortality comparison to the population at large was not completed to determine if these subjects indeed died earlier than their cohorts of the same age who did not experience a hip fracture.

Cognitive Status

The hypothesis statement proposed that a delirious episode would produce a decline in cognitive function. The cognitive status in the subjects remained relatively unchanged. The initial t-test failed to show any statistical difference between the delirious and nondelirious groups. The intervening year saw a slight decline in overall score, but again it was not significant. The use of the MMSE may not have been as sensitive an instrument to determine the minor changes in cognition that might affect the overall assessment of mental status.

The difference in mental status scores for the delirious and nondelirious subsamples on the MMSE using ANCOVA analysis was beginning to approach significance. If the sample size had been larger these results may indicate that this decrease in cognitive status was indeed significant. In the future a larger sample size is needed for study. The inclusion of partial syndrome subjects into the sample of delirious subjects may also have altered the results. The analysis of partial syndrome subjects was outside the purpose of this study.

Observing the overall change in cognitive function scores, 14 (31% of the MMSE sample) scored better on the follow-up test. This could be attributed to the environmental conditions. During the admission testing the subjects had just encountered a traumatic experience and were in the preliminary phase of adjustment to the event. The subjects were experiencing pain, a new environment, and multiple information stimuli impacting the mental process. This experience in and of itself could decrease the concentration capacity of the subjects. During the second data collection time most had returned to their previous environment and more familiar surroundings

supported them. This change to a familiar environment could have made the difference in a higher score. The subjects were more in control of the situation. It is highly unlikely that there would be any carry over memory from the prior hospitalized testing.

The lower scores for 22 (49% of the MMSE sample), on the other hand, could have occurred as a result of the normal aging process. Since a year had elapsed between scores, this intermission in time could account for some of the normal decline in cognitive acuity. It may also be plausible that the stress of the interview process affected the post-injury score decreasing the concentration ability. Every effort was made to keep anxiety as a low risk factor with the information letter sent prior to the interview. Another explanation could be that the telephone interview was carried out by the researcher and kept as consistent as possible. There were no inadvertent cues given to enhance the scores or a hurried atmosphere to frustrate the subject. Twenty-five percent of the subjects had an education level of eighth grade or below which could have accounted for several points lost in the calculation area. The MMSE was used in this study as a global assessment of cognitive status. It was not intended to detect the specific areas of decline.

Of the 20 subjects with an initial score of 20 or below on the admission MMSE, ten died in the first year. This gives an indication that those subjects with limited cognitive function were at greatest risk. The lack of ability to participate mentally in one's environment seems to indicate a risk for a higher mortality rate. The initial screening then becomes important to determine mortality risk and outcome. It also indicates a need to incorporate cognitive status and ability to participate in care into the discharge plan of the subject. The inability to mentally participate indicates more care needs and creates a greater need for assistive care to maintain life. Another factor is the rehabilitation process. If the subject cannot remember the ambulating sequence, one step cueing or constant cueing is required. This requires more time and care from the care provider. This also has discharge planning implications for greater levels of

care needs. The assessment of cognitive function has a great influence on considerations for discharge disposition.

Physical Functioning

One research objective examined physical functioning at the time of hospitalization and compared it with one year post-injury score. The group of subjects were highly functional initially with both groups (delirious and nondelirious) not significantly different at admission. The number of independent subjects fell from 51% (n = 51) in the admission ADL group to 33% (n = 17) in the post-injury group. This indicates a greater level of dependence. The findings support prior research that physical functioning does decline following a fracture (Murray et al., 1993; Inouye, Acampora, et al., 1993; Marottoli, Berkman, & Cooney, 1992; Lipowski, 1992). This overall ADL status decline saw a mean increase from 6.7255 to 7.4314. This mean increase is a loss of ADL function by almost one level. This was statistically significant with a $t = 2.64$ and $p = .011$.

Death was also a contributing factor. The more dependent subjects were the ones to die during the intervening year. The deaths eliminated the highly ADL dependent subjects, thus leaving those with more independent scores as survivors.

When individual tasks were evaluated the ambulatory ability had the greatest impact on the decline in independence. Aids to ambulation had more prevalent usage at one year post-injury. This practice is explained by the rationale that the subject does not desire to experience the same injury. Therefore the subject becomes more psychologically reliant on a mobility aid. The subject may become accustomed to the mobility device and fear discarding it. There is also a recognized need to support the fractured hip due to a weakened muscloskeletal structure from the deconditioning that occurs. The subject may never fully recover strength thus causing the subject to continue to be physically reliant on the mobility aid.

Also notable is the increasing percentage of the various types of mobility aids. Each type of mobility aid showed an increase, with cane use increasing from 16% (n = 11 of 67) at admission to 20% (n = 10 of 51) at one year. Walker assistance rose from 31% (n = 21 of 67) admission to 37% (n = 19 of 51) at one year. Wheelchair usage remained at the same number of subjects 4, 6% admission and 8% post-injury. Two percent (n = 1) of the subjects were bedbound at post-injury data collection; there were none at the time of admission assessment. These statistics also point to the increased physical or psychological reliance the subjects encountered during the intervening year. The mere fact of growing older may also explain the increased use of mobility aids.

ANCOVA analysis of physical functioning (ADL) indicated there was not a significant difference between the delirious group and the nondelirious group one year post-injury. This supports the Francis and Kapoor (1990) research studies, but contrasts with research by Murray et al. (1993). The sample size of this study (n = 67 with 11 delirious initially; n = 51 with 8 delirious at follow-up) is not large enough to give support confidently to either study. This contrasting opinion indicates the need for more research in this area. A larger sample size is needed for a more decisive conclusion.

Through personal clinical experience and observations of delirious subjects it appears that cognitive energy is being consumed without a productive application to rehabilitation. During the slowed response to rehabilitation muscle deconditioning occurs. The deconditioning process occurs rapidly and takes elder patinets months to recapture their prior physical functioning ability, if they ever can. Delirious subjects have been observed to need one step cueing in order to sequence walking with the walker. What happens to the brain in a delirious episode is not clearly understood but is being investigated. With the MMSE scores not being significantly affected at the one year interval the mental capacity in the long term does not seem to be affected. The delirious episode did not physically impact the subjects either. The delirious group

progressed as well in physical functioning recovery as the nondelirious group. It then appears that a delirious episode influences the acute hospital period more profoundly with extra nursing interventions necessary at that time.

Like those subjects with a low MMSE score, those subjects with a high level of dependency at admission were also most likely to die. Of the 10 who had a score of 10 or greater on the ADL admission score, seven died within the first year post-injury. This indicates that the level of ability to participate physically in one's care reflects the potential to survive a hip fracture. The ADL score must also be taken into consideration with discharge planning and rehabilitation needs. If the subject cannot physically participate in the necessary rehabilitation regime, placement in a more dependent level of care is necessary. A nursing home may be the level of care required.

Most subjects (90%) were doing well navigating a small room. Fewer took advantage of going outside (85%). This may be due to the uneven surfaces encountered and the risk of falling in the outdoor environment. The indoor surroundings feel safer because elders are more familiar with this environment and its limitations.

The health status evaluation was by self report. When a general question "Have you returned to pre-injury health?" was asked, 53% (n = 27 of 51) felt they had while 47% (n = 24) stated they had not. When questioned as to how long it had taken them to return to pre-injury health, 31% (n = 16) stated it was within the first three months following injury. A smaller group (10%) took up to six months to return to the pre-injury state. Twenty-two percent stated it took up to 12 months to recuperate. Thirty-seven percent (n = 19) chose "not there yet" as there level of recuperation from the hip fracture. This discrepancy of 10% between the 47% in the health inquiry question and the 37% from the recuperation time question can be from not understanding the question or the plausibility of thinking this was as good as things

were going to get or not remembering how it was one year ago. It could also be a combination of the above.

Conceptual Framework

Based on prior research by Williams et al. (1979, 1985) and Foreman (1991), it is beneficial to implement nursing interventions early. When a hip fracture is diagnosed or a delirious episode is suspected nursing interventions are implemented to prevent the debilitating effects immobility and / or cognitive decline can cause a hospitalized hip fractured elder. Maintaining physical functioning and early detection of cognitive decline are two essential components for nursing to assess. Early detection of cognitive status changes, as well as physical functioning decline can be addressed with the use of Levine's Four Conservation Principles.

Nursing can identify, create, provide and manage a comprehensive flexible plan of care for elders with discrete problems within the Levine Conservation Model. The elder would be treated as a whole with the now chronic condition (fractured hip) treated separately from the acute event (delirium). Care management would support functional adaptation after the hip fracture. A flexible, creative approach directed to recovery, partial or total, of autonomous function is needed.

The use of Levine's Conservation Principles within the context of the hip fracture whether or not delirium occurs provides a very systematic use of the theory. During the delirious episode (the acute event), cognitive energy is being lost in an unsuccessful adaptive effort to respond to the environment. The integrity of the individual is not conserved. This loss of conservation is probably caused by an inability to adjust to the environmental demands and results in an unsuccessful adaptive response to the chronic condition. This then impacts the "best fit" of care for the subject. Every individual reacts differently to the fractured hip. Some may consider it a normal aging process and adjust easily. You fall, break a hip, recover, and go on with life. For others it may be the event that causes a downward spiral. It may also be the

event that begins the unbalancing of a very fragile environment. That environment may have been kept intact only because of its sameness. The response to the hip fracture event differs physically and psychologically in each individual. Therefore, the adaptive changes that occur are highly individualistic but fit into the four conservation principles. The unbalancing of one's environment (physical or mental) becomes the emphasis point with ramifications on the rehabilitation process of maintaining physical functioning.

A balance of energy production and consumption is mandatory for the preservation of cognitive and physical functioning. Within the hip fracture event the patient does not concentrate on nutritional intake. The sleep-wake cycle may be disturbed and meals may be slept through. This unbalances the conservation of energy. The results are seen in a reduction of the carbohydrate energy needed for physical functioning efforts and the depletion of glucose stores for the mental acuity that is needed to follow exercise regimes.

Structural integrity is maintained by the surgical intervention of repair to the fractured hip. The physical restoration process becomes one of exercise to restore muscle integrity, mass and tone. The use of pain medications augment the process by providing comfort during the first days of therapy. This intervention coupled with adequate nutrition provide support to the patient for the mental capacity to engage in the physical activities providing renewed muscle support for physical functioning. Monitoring cognitive status with frequent assessments, supplemental oxygen, and recounting events defines the hospital environment for recovery. These nursing interventions support the restoration of structural integrity.

Personal integrity is the third conservation principle. The learning process for the patient must be taken at a level paced by the patient. The cueing process may take the form of one cue at a time, as with the delirious patient, or a three stage cue may be implemented for those without the syndrome. The rehabilitation process must be highly individualized, not only for the delirious client but also the cognitively impaired client.

Self esteem is supported with praise and recognition of individual, small accomplishments. Personal integrity is also supported by allowing the patient to accomplish as many ADL tasks as possible without exhausting the energy balance.

The fourth conservation principle is social integrity. The entire social context of the patient is taken into account. The family and significant others assist the delirious patient to evaluate the situation by reality orientation. The familiar faces and voices assist the patient to identify the real world and present environment. Family and friends recount normal occurrences and behaviors. This information is shared with nursing. Nursing interventions support the realistic environment the patient now must adapt to. Supporting normalcy identifies concrete markers within the hospital environment to assist adjustment. Family support during physical exercise or reminders to undertake self exercise to restore mobility augment social integrity.

The fractured hip event alters the conservation state. By incorporating the four conservation principles into the care of the patient a wholisitc view can be maintained. Nursing interventions can be used to prevent debilitating effects of this event. Recognizing early signs of delirium with frequent cognitive assessments assists nursing to implement appropriate strategies from the principles. Incorporating mobility strategies for physical functioning maintenance assures each patient the optimum level of physical functioning. Each principle has a discreet parameter but all principles interact to become a whole thus determining the appropriate strategies best suited for each patient. The four conservation principles become the guideline by which wholeness can be maintained. The individualized care principles become the means by which patients readjust and maintain physical functioning and cognitive ability to assert themselves within the physical and mental environment.

Limitations

Statistical analysis was limited by the size of the sample. In addition the delirious subsample was very small. The survival experience was also based on small

numbers. This sample only included orthopaedic patients. Therefore, limitations for the generalizability of the results to other medical and surgical situations exist.

Another limitation of this study was that only a convenience sample was utilized. The subjects came from a common cultural background. Only one teaching hospital was utilized within the metropolitan area. Biases for use of or within this institution could not be controlled. The initial sample did include all fractured hip subjects across the entire spectrum of cognitive and functional levels. Therefore, no subject was deleted because of prior mental incapacity, dementia, or physical inability.

Collection of data began at the time of injury; subjects and / or reporting family members may have had difficulty remembering the ability of the subjects to complete self care. The reliability and validity of the ratings of family or caregivers has not been validated. All of the subjects were hospitalized and not in their normal environment or circumstances. They all had had a major life change prior to the collection of admission data; both of these could have affected the reported MMSE score. Another data collection limitation was the use of medical records for the ADL data pertaining to toileting and transfer.

The initial data were collected by several observers during the hospitalization. Not all of the information was collected in the same manner from all of these participants. Inter-rater reliability was not established before use of the CAM and MMSE, although teaching of the use of the instruments occurred. The one year information was collected in more familiar surroundings and under more normal circumstances with all of the ADL and MMSE information being gathered by the researcher. This would lead to a more standard collection.

Analysis of the initial characteristics of subjects eliminated from follow-up by death or refusal was not completely examined thoroughly as to how they were different from the remaining sample. Some characteristics were considered in the high ADL scores and low MMSE scores. Seven of those 10 subjects who had a high ADL score

died in the first year. Ten of the 21 subjects with low MMSE scores are accounted for by death.

The statistical analysis of the survival experience utilized the Fisher Exact Test. Additional analysis to determine if the death had fallen into the normal life expectancy range was not completed. Comorbid conditions were not evaluated for the impact they may have had on survival. The sample size was too small to merit the additional analysis. Another area of analysis would be to compare survival experience between community dwelling and nursing home subjects. This would examine living arrangement as a risk factor for subjects as has been cited in other studies (Murray et al., 1993; Francis & Kapoor, 1990)

The strengths of this study were the frequent delirium assessments and use of established instruments. The delirium assessment data were collected every eight hour shift. With this frequency a closer watch was kept on the subjects to detect delirium at an earlier occurrence. This frequent observation rate had not been used in other delirium data collection research. On the other hand, the frequent evaluation may have inadvertently caused a decrease in the number of delirious subjects due to early suspicion and intervention. The instruments used in this research all have an established record for reliability and validity.

The MMSE has been researched extensively. Two problematic areas are calculation and language. During the follow-up data collection only the subtraction by serial sevens was used. It has been cited by Schulzer, Calne, Snow, and Mak (1993) that a score gap occurs with spelling "world" backwards due to permutation. Validation as to which was used (serial seven or spelling) in the original data collection could not be determined from computer input information. Hearing was validated at the beginning of the telephone interview.

Nursing Implications

Nurses are in a strategic position to investigate confusion and functional decline in the orthopaedic patient population. They have the most frequent and continuous contact with the patient. They have the opportunity to evaluate the cognitive status during the admission process and can validate information with the caregiver or family at that same time. Using this information as a baseline, nurses can monitor changes in the patient's mental status during the treatment and recuperation period. Foreman (1989) suggests that cognition be assessed routinely and comprehensively.

Observation of the fluctuation of cognitive status can be accomplished with ease and in a non invasive manner, e.g., of the sleep wake cycle or the attention span. With these observations the nurse can then make a prediction about the likelihood that confusion might occur. This prediction allows interventions to occur before the onset of confusion. Therefore, nursing interventions would decrease mortality rates and influence better outcomes for the patients. Williams et al. (1985) have studied this avenue of research. Some physiological factors that are within the scope of nursing care have been determined that influence delirium (Forman & Grabowski, 1992; Francis, Martin, & Kapoor, 1990). These should be treated and removed as underlying causes or factors in the episode of delirium.

Another aspect of nursing treatment and care for the confused patient is the support needed during the acute confusional state. Nurses are the immediate caregivers to influence the physical functioning of the patient. Maintaining an atmosphere of normalcy with use of the commode instead of the bed pan, adequate pain relief, and moving about the hospital environment, would acquaint the patient to the new environment and reinforce the existence of a change. The solicitation of family support to provide familiar voices, faces, and objects from home would create a friendly and normal environment aside from the "sterile" hospital scene. These interventions

and others have been instituted by others (Williams et al., 1985; Wanich et al., 1992; Inouye, Wagner, et al., 1993; Morency, Levkoff, & Dick, 1994).

Within nursing it would be of interest to undertake an educational session of a more rigorous nature to educate staff (physicians and nurses) on the topic of delirium. This then would give a stronger informational base from which treatment can advance. All staff would have baseline delirium information to assess the subjects and give a clearer picture of the true number of delirious subjects. Rockwood et al. (1994) have completed such a study. They determined that this educational intervention has improved recognition of delirium which may then lead to better patient outcomes. Morency, Levkoff and Dick (1994) noted that nurses need more education regarding the assessment of symptoms of delirium especially in the behavioral and perceptual areas.

The MMSE not only provides nursing with a global score of general cognitive abilities, but also indicates specific functional disabilities. Agostinelli, Demers, Garrigan, and Waszynski (1994) have utilized additional assessment within each MMSE area. These additional assessment areas have targeted interventions that the acute care nurse can use to augment the standards of care for the elder. These targeted interventions can produce outcomes to compensate for deficits and reinforce strengths.

Research Implications

The understanding of delirium is still in the beginning stages. More investigation into the cause of delirium and the physiology involved needs to be undertaken. This type of research would lend a neurological basis to the episode. It would further enrich the predictive ability to initiate appropriate measures for those at risk.

Additional studies are needed with larger sample sizes to determine the definitive effects of delirium. There is controversy within the present body of research

as to the effects of a delirious episode. Continuing research on delirium would assist to erase these controversies. Partial syndrome presentation must also be clarified.

The MMSE is a frequently used instrument. The targeted interventions of the MMSE initiated by Agostinelli et al. (1994) are in need of additional research. This would lend validity and reliability to additional applications of the MMSE. This research utilized the MMSE as an overall cognitive discriminator. Research into how each area of the MMSE can be utilized to target nursing interventions is needed.

The analysis of the ability to participate in one's care either physically or mentally is also in need of further investigation. Those subjects who cannot actively participate in their care died earlier. This area needs further investigation.

Research by Francis and Kapoor (1992) has been investigating the placement of subjects once a hip fracture occurs. This research needs to be continued. The research could also indicate where to move these subjects along the rehabilitative road. It may be prudent to have more incremental steps to assist the elder hip fracture patient back into the state of pre-injury functioning. This area of research has not been investigated.

A limited cognitive status in some hip fracture patients may be a predictive indicator to discharge these subjects to nursing home care early. Research in this area has not been carried out. Once the subjects become medically stable, discharge to a supportive environment would decrease acute hospital confinement and afford them a more stable, consistent environment to recover. This community-based care would support the functional recuperation within the mental participation limits.

Summary

Despite the advances in surgical techniques, anesthesia, and post-operative rehabilitation, hip fractures have a dramatic impact on the older individual. Nearly one-fifth of subjects died after the fracture, and the majority of the survivors had a

substantial decline in physical function. This finding is consistent with prior research investigating hip fracture survivors. The importance for routine evaluation and early delirium detection cannot be emphasized enough. The time involved by nursing is small but the benefits are large. Timely referral permits evaluation and initiation of an appropriate treatment plan. The implications are greatest for the overall support of physical functioning. The maintenance of a normal environment would seem to be the logical course to support ADL function. The recommendations by Wanich, Sullivan-Marx, Gottleib and Johnson (1992) appear to be the best documented findings to support restoration of physical mobility. These nursing interventions included nursing staff orientation, patient orientation and communication, mobilization, environmental modifications, caregiver education and consultation, medication management and discharge planning.

APPENDICES

APPENDIX A

Publishers Permission Letters

APPENDIX A

Publishers Permission Letter

September 12, 1995

To:
Ms. Shirley Brown
Permission Editor Journals of Gerontology
The Gerontological Society of America
1275 K St. N.W.
Suite 350
Washington, D. C. 20005 - 4006

From:
Delores L. Arendsen
11391 Valley View Ave.
Allendale, MI 49401

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Delores L. Arendsen, R.N., M.B.A.
M.S.N. Graduate Student

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APPENDIX A

Publishers Permission Letter

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Effective February 1, 1994

APPENDIX A

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April 24, 1995

Delores L. Arendsen, RN
11391 Valley View Avenue
Allendale, MI 49401

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Senior Permissions Assistant
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rs424.2

APPENDIX B

The Confusion Assessment Method (CAM) Diagnostic Instrument

APPENDIX B

The Confusion Assessment Method (CAM) Diagnostic Instrument

DATE									
SHIFT	7-3	3-11	11-7	7-3	3-11	11-7	7-3	3-11	11-7
OBSERVER INITIALS									
1 ACUTE ONSET									
2 INATTENTION									
3 DISORGANIZED THINKING									
4 ALTERED CONSCIOUSNESS									
5 DISORIENTATION									
6 MEMORY IMPAIRMENT									
7 PERCEPTUAL DISTURBANCE									
8 PSYCHOMOTOR AGITATION									
9 PSYCHOMOTOR RETARD.									
10 ALTERED SLEEP WAKE									
DELIRIUM +/- *									

INDICATE "P" WHEN FEATURE IS PRESENT AND "N" WHEN NOT PRESENT
* FOR SCORER'S USE ONLY

COMMENTS: _____

APPENDIX C

Mini-Mental State Examination

APPENDIX C

Mini-Mental State Examination

Mini-Mental State

Maximum Score	Score	
		ORIENTATION
5	( )	What is the (year) (season) (date) (day) (month)?
5	( )	Where are we: (state) (county) (town) (hospital) (floor)?
		REGISTRATION
3	( )	Name 3 objects: 1 second to say each. Then ask the patient all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he learns all 3. Count the trials and record.
		Trials:
		ATTENTION AND CALCULATION
5	( )	Serial 7's. 1 point for each correct. Stop after 5 answers. Alternatively spell "world" backwards.
		RECALL
3	( )	Ask for the 3 objects repeated above. Give 1 point for each.
		LANGUAGE
9	( )	Name a pencil, and watch (2 points) Repeat the following "No ifs, ands or buts." (1 point) Follow a 3-stage command: "Take a paper in your right hand, fold it in half, and put it on the floor." (3 points) Read and obey the following: CLOSE YOUR EYES (1 point) Write a sentence (1 point) Copy a design (1 point)
_____		TOTAL SCORE

ASSESS level of consciousness along a continuum

Alert — Drowsy — Stupor — Coma

APPENDIX C

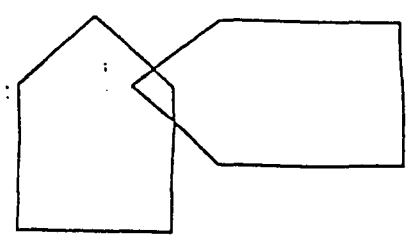
Mini-Mental State Examination

continued from reverse

CLOSE YOUR EYES

WRITE A SENTENCE

COPY DESIGN



APPENDIX D

Activities of Daily Living (asterisk item)

APPENDIX D

Activities of Daily Living (asterisk item)

SAINT MARY'S HEALTH SERVICES
A member of Mercy Health Services

CARE MANAGEMENT DATA BASE

■ **GENERAL INFORMATION**

Admission: Date_____Time_____

Source of Information_____How to be addressed_____

Admitted per: Ambulatory_____W/C_____Stretcher_____Admitted from:_____

Emergency Contact _____Phone_____

Advanced Directives: Y / N Code Status: _____

Religious Affiliation: _____Pastor/Pastoral Care Notified_____

Dr. Notified:_____By_____Time_____

■ **PATIENT AND FAMILY INFORMATION**

Admitting Diagnosis _____

Reason for Admission as Stated by Patient_____

_____

BP_____ T_____ P_____ R_____ WT_____lb/kg HT_____ft/mt

■ **PATIENT HISTORY** (Check): Diabetes____ Cancer____ HTN____ Cardiac____ Renal____

TB____ Stroke____ Seizures____ Anemia____ COPD____ Other _____

Comments _____

_____

Surgery (Include Invasive Devices): _____ _____

_____ _____

_____ _____

Medications (Prescription, Non-Prescription, Recreational)

Medication	Dose	Schedule	Medication	Dose	Schedule

Food/Drug Reactions _____

Reaction_____Allergy Band On_____

Tobacco Use _____Alcohol Use_____

■ **FAMILY HISTORY** (Check): Diabetes_____ Cancer_____ HTN_____

Cardiac_____ Renal_____ TB_____ Stroke_____

Seizures_____ Anemia_____ COPD_____ Other_____

Comments _____

#10276 1/95

APPENDIX D

Activities of Daily Living (asterisk item)

SAINT MARY'S HEALTH SERVICES
A member of Mercy Health Services

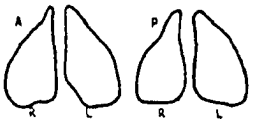
CARE MANAGEMENT DATA BASE
(Page 2 of 4)

■ **GENERAL**
Sleep Habits _____ Sleep Aids _____
PAIN: Location _____ Description _____
Onset _____ Cause _____
Duration _____ Relief Measures _____
How Well Do They Work? _____
Chills_____ Fever_____ Night Sweats_____ Describe _____
_____

■ **ADL**
* Grade by:
0 = Independent, 1 = Needs Equip, 2 = Needs Help, 3 = Needs Help and Equip, 4 = Dependent
Feeding_____ Dressing_____ Bathing_____ Ambulation_____
Equipment Used _____

■ **NEURO** No Significant Findings_____
Altered Sensation_____ Altered Mobility_____ Seizures_____ Fainting_____
Headaches_____ Dizziness_____ Orientation_____
Describe _____
_____

■ **RESPIRATORY** – No Significant Findings_____
Dyspnea_____ Wheezing_____ Cyanosis_____
Cough_____ Orthopnea_____ Congestion_____
Non-Productive_____ Productive_____
Dark Sputum_____ Bloody Sputum_____
Describe _____
_____



■ **CARDIOVASCULAR** – No Significant Findings_____
Chest Pain_____ Palpitation_____ Irregular Pulse_____ Edema_____
Peripheral Pulses _____ Varicose Veins_____
Heart Tones _____
Pacemaker_____ Inserted_____ Rate_____
Describe _____
_____

■ **SENSORY** – No Significant Findings_____
Glasses/Contacts_____ Vision Impairment_____
Hearing Deficit _____ RT_____ LT_____ Hearing Aid_____
Language Other Than English_____ Interpreter_____
Nose Bleeds_____ Change in Voice_____
Describe _____
_____

APPENDIX D

Activities of Daily Living (asterisk item)

SAINT MARY'S HEALTH SERVICES

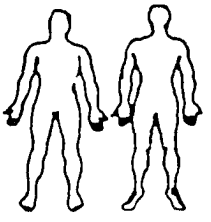
CARE MANAGEMENT DATA BASE
(Page 3 of 4)

■ NUTRITION – No Significant Findings_____
Diet _____ Adherence_____
Appetite: Same_____ Increase_____ Decrease_____ Recent Weight Change _____(#)
Change in Taste: Dentures_____ Anorexia_____ Nausea_____ Vomiting_____
Indigestion_____ Dysphagia_____
Intake Today (Solid or Liquid)_____ Time_____
Describe_____

■ ELIMINATION – No Significant Findings_____
GI: Bowel Habits_____ Laxative Use_____ Last BM_____
Bowel Sounds _____
Constipation_____ Diarrhea_____ Hemorrhoids_____ Incontinence_____
GU: Burning_____ Hematuria_____ Nocturia_____x/night Frequency_____
Dribbling_____ Difficulty Starting Steam_____ Incontinence_____
Catheter _____ Inserted_____
Change in Bowel/Bladder Habits _____
Ostomy/Device _____
Describe_____

■ REPRODUCTIVE – No Significant Findings_____
LMP _____ Regular/Irregular_____ Menopause_____
Pain _____ Gravida_____ Para_____ AB_____
Last PAP Smear_____ Breast Abnormalities _____ BSE_____
Vaginal/Urethral Discharge _____ Prostrate Problems_____
Describe_____

■ INTEGUMENTARY – No Significant Findings_____
Bruises_____ Rashes_____ Scars_____ Sores_____
Decubitus: No, Not At Risk_____ No, But At Risk_____
Describe (Note Location) _____
Petechiae_____ Itching_____ Color_____ Turgor_____
Condition of Mouth and Throat _____
Condition of Nails and Feet_____
Recent Skin/Mole Changes_____
Describe _____


FRONT BACK

■ MUSCULO-SKELETAL – No Significant Findings_____
Decreased ROM_____ Joint Pain_____ Back Pain_____ Muscle Pain_____ Stiffness_____
Fractures _____ Walking Aids_____
Describe_____

APPENDIX D

Activities of Daily Living (asterisk item)

SAINT MARYS HEALTH SERVICES
A member of Mercy Health Services

CARE MANAGEMENT DATA BASE
(Page 4 of 4)

■ PSYCHOSOCIAL/ENVIRONMENTAL

Where do you live? House____ Apartment____ ECF____ Other_____ Stairs to climb? Y / N
With whom do you live?_____Mode of transportation?_____
Do you have someone to assist you after discharge, if necessary? Y / N
If yes, what hours per day is he/she able to help? _____
If yes: (1) Name_____Phone (H)_____(W)_____
(2) Name_____Phone (H)_____(W)_____
Do you currently have home delivered meals? Y / N (Name) _____
Special Equipment used at home:_____Provided by:_____
What arrangements will you need for help at home when you are discharged?_____
_____
Have you used community services (American Red Cross, Hospice, Cancer Society, Church, etc.)? Y / N
If yes, list:_____
Have you used a home health care agency or home care nurse in the past? Y / N
If yes, list:_____
Interdisciplinary Referral Screen initiated? Y / N _____R.N.

■ PATIENT/FAMILY EDUCATION NEEDS

Identified learning needs (Consider Current Illness and Past History) _____
_____
_____
Assessment initiated by:_____R.N.

■ CARE MANAGEMENT PLAN

NURSING DIAGNOSIS	ANTICIPATED OUTCOMES	Date Initiated	Met
1._____	_____		
2._____	_____		
3._____	_____		
4._____	_____		
5._____	_____		
6._____	_____		

(For Additional Space, See Care Management Addendum)

Plan of Care Discussed with Patient and/or Family? Y / N _____R.N.
Signatures _____RN_____RN_____RN
_____RN_____RN_____RN
_____RN_____RN_____RN
_____RN_____RN_____RN

■ ORIENTATION

Call Light_____ Emergency Light_____ Side Rails_____ Visiting_____ TV_____
No Smoking_____ Bed Control_____ Telephone_____ Patient ID Band On_____
PATIENT ARTICLES AT BEDSIDE: Glasses/Contact Lenses_____ Hearing Aid_____
Dentures U / L_____ Walker_____ Cane_____ Crutches_____ Prosthesis_____
Clothing (list) _____
Valuables: Disposition If Not With Patient_____
Signature_____

APPENDIX E

Demographic Information Tool

APPENDIX E

Demographic Information Tool

ID Number _____ (1-7)
Date _____

1. Age (in years) _____ (10-12)

2. Sex
   Male 1 (13)
   Female 2

3. Marital status
   Single 1 (14)
   Married 2
   Divorced 3
   Separated 4
   Widowed 5

4. Primary caregiver
   Self 1 (15)
   Husband 2
   Wife 3
   Son 4
   Daughter 5
   Brother 6
   Sister 7
   Other 8

   Specify:

5. Education
   8th grade or less 1 (16)
   Some high school 2
   High school graduate 3
   Some college 4
   College graduate 5
   Some graduate school 6
   Master's degree 7
   Doctoral degree 8

6. Living arrangements
   Own home 1 (17)
   Own apartment 2
   Supervised apartment 3
   Family member's home 4
   Foster care home 5
   Nursing home 6
   Rehab facility 7
   Other 8

   Specify

APPENDIX E

Demographic Information Tool

7. Method of ambulation prior to hip fracture

Independent	1	(18)
Cane	2	
Walker	3	
Wheelchair	4	
Bed-ridden	5	

8. Activities of daily living

Eating	Independent	1	(19)
	Needs help	2	
	Needs equipment	3	
	Totally dependent	4	
Bathing	Independent	1	(20)
	Needs help	2	
	Needs equipment	3	
	Totally dependent	4	
Dressing	Independent	1	(21)
	Needs help	2	
	Needs equipment	3	
	Totally dependent	4	

9. Sensory deficits

Sight	Yes	1	(22)
	No	2	
Hearing	Yes	1	(23)
	No	2	

10. Admission diagnosis _____

11. Other diagnoses _____

12. Date of admission to ECC _____

13. Hour of admission to ECC _____

14. Date of surgery _____

15. Hour of surgery _____

APPENDIX E

Demographic Information Tool

16. Time elapsed from admission to surgery (in hours and tenths of hours) _____ (24-26))

17. History of stroke or TIA
Yes 1 (27)
No 2

18. List medications taken at home

19. List medications given in ER

20. List medications ordered on admission

21. Discharge date _____

22. Length of stay (in days) _____ (29-30)

23. Discharge living arrangements

Own home	1	(31)
Own apartment	2	
Supervised apartment	3	
Family member's home	4	
Foster home	5	
Nursing home	6	
Rehab facility	7	
Other	8	

Specify:

APPENDIX F

Definition List for the Confusion Assessment Method Instrument

APPENDIX F

Definition List for Confusion Assessment Method Instrument

1. Acute Onset : Clinical features develop over a short period, fluctuate over the day

2. Inattention : Questions must be repeated because attention wanders, repeats answer to previous question

3. Disorganized Thinking : Rambling, irrelevant, or incoherent speech

4. Altered Consciousness : Reduced level (Drowsy, stupor) or Increased level (hyper-alert, easily startles)

5. Disorientation : Time (year, month, day, etc.), Place, Person (i.e., misidentifies family member)

6. Memory Impairment : Does not remember recent past events (surg. etc.), inability to remember new material

7. Perceptual Disturbance : Misinterpretations, illusions (known stimulus for event), hallucinations

8. Psychomotor Agitation : Increased movement, "restless", may try to get out of bed

9. Psychomotor Retardation : Decreased movement, slow movements, etc. (try to notice change)

10. Altered Sleep Wake Cycle : Insomnia and / or day-time sleepiness

APPENDIX G

Information / Consent Letter

APPENDIX G

Information / Consent Letter

SAINT MARY'S
HEALTH SERVICES

Dear Patient and Family:

The staff of 7 North are monitoring adjustment to hospitalization of elderly patients with hip fractures and examining ways to improve care for these injuries. All persons who are 60 years old or older and who are admitted to our unit with hip fractures will benefit from this approach to their care.

You will be helping the staff to identify early problems so that they can be treated appropriately. The benefit to you is that your hospitalization will be monitored by staff more closely. The staff will obtain information from you, your family and medical records. This information includes your age, sex, marital status, prescription drug history, and any previous history of depression.

As is routine with the Medical Record, every effort will be made to maintain your confidentiality. All collection data forms will be coded with a number and your name will never appear. All results and articles will be done in a group format. No individual data will be presented.

The initial assessment will begin in the Emergency Care Center or upon your arrival to the orthopaedic unit. Reassessments will be made every eight hours until time of discharge. An appropriate family member or someone knowledgeable about your behavior will also be asked to participate.

If you or your family have any questions or concerns, please feel free to ask your nurse.

Sincerely,

[redacted]

Ron Duemler, M.D.
Director of the Office of Clinical Investigation
774-6748

RSD/ec
OCIltr

APPENDIX H

Follow-up Questionnaire Form 1994

APPENDIX H

FOLLOW-UP QUESTIONNAIRE FORM 1994

IDnumber_____
Code sheet number_____
Date of interview_____
Date of injury_____
Date of death_____
Last date of record_____

Living arrangements	own home/condo	1
	own apartment	2
	supervised apartment	3
	family member's home	4
	foster care home	5
	nursing home	6
	rehabilitation facility	7
	other(specify)	8
Method of ambulating	no aids	1
	cane	2
	walker	3
	wheelchair	4
	bed bound	5
	roller walker	6
Activities of daily living	eating	
	independent	1
	needs help	2
	dependent	3
	bathing	
	independent	1
	needs help	2
	dependent	3
	dressing	
	independent	1
	needs help	2
	dependent	3
	toileting	
	independent	1
	needs help	2
	dependent	3
	transfer in/out bed chair	
	independent	1
	need help	2
	dependent	3

Walks across small room	yes	1
	no	2
Ambulating outside home	yes	1
	no	2
Return to preinjury health	yes	1
	no	2
Illness since hip fracture	yes (specify)	1
	no	2
How long to get to premorbid condition	3-6 mos..	1
	6-9mos.	2
	9-12mos	3
	not there yet	4

Mini-Mental State

maximum score	score	
		Orientation
5	( )	What is the year season date day month
4	( )	Where are you state county town street address
		Registration
3	( )	Name 3 objects penny apple table 1 second for each. Then ask the patient to name all three. 1 point for each correct.
		Attention and calculation
5	( )	serial 7's 1 point for each correct 100 93 86 79 72 65 or spell world backwards " d l r o w "
		Recall
3	( )	Ask for the three objects repeated above. 1 point for each
		Language
3	( )	Name what do you write with? what do you wear on your wrist?
		Repeat the following: "No ifs, ands or buts."
23	_____	Total Score

APPENDIX I

Introduction / Consent Letter

APPENDIX I

Introduction / Consent Letter

Dear former patient and family,

The staff of 7 North at Saint Mary's Health Services monitored your adjustment to hospitalization after your fractured hip about one year ago. As a follow-up to those observations, we are now looking at the long term effects that hospitalization had on your return to your normal activities. As a participant you are being asked to give permission to the researcher to gather information directly from you, your family member, or care-provider. This information includes a brief assessment of how easily you care for yourself or if you need the help of another. The assessment takes about 10 minutes and requires you to follow a few directions. I will be contacting you within two weeks by phone to gather the additional information.You may withdraw your permission of participation at any time. Should you desire not to participate that decision will not affect your present or future care.

Results from this conversation will be kept confidential. All collection data forms will be coded with a number; your name will never be attached. Any reports, papers, and articles will report findings in group format. Individual data will not be reported. It is anticipated that you will not be harmed in any way by participating in this interview. Some information asked may raise questions. Should this occur, the researcher will be available to answer these questions or refer you to appropriate sources. Neither the researcher (Delores Arendsen), Grand Valley State University, or Saint Mary's Health Services will accept any financial responsibility for these referrals.

The personal and direct benefits to you are limited. The results of this study will help assess the adjustment in physical functioning the hip fracture and hospitalization caused.

This study is being conducted by Delores Arendsen. She is an orthopaedic staff nurse at Saint Mary's Health Services and a graduate student at Grand Valley State University. If you have any questions she can be contacted at the following number 616 895 6968.

Thank you for your assistance and time.

Sincerely,

Delores Arendsen, R.N.

APPENDIX J

Script for Data Collection

Appendix J

SCRIPT FOR DATA COLLECTION

Hello my name is Delores Arendsen. I am the researcher who sent you the letter to gather follow-up information about your recovery from hip fracture. This questionnaire will take about 10 minutes to complete. It concerns your living adjustments since your hip injury. Are you willing to give the requested information? You can stop me at anytime during the interview if you do not wish to continue. Are you able to hear me ?

Where do you now live?

Do you use any kind of aid for walking? e.g. walker or cane

Can you eat and drink without help?

Can you bathe yourself either sponge bath, tub bath or shower?

Do you need assistance dressing or undressing yourself e.g. help with buttons or zippers?

Can you use a normal toilet without help?

Can you rise from bed without help? Can you get seated and lie down by yourself?

Do you walk around your house? How far? Do you get outside your residence to walk?

Have you returned to preinjury health?

Have you had any surgery or hospitalizations since your hip fracture? What?

How long do you think it has taken to get to your preinjury status?

The next set of questions deal with your memory ability. The questions are very simple like
What is the year? season? date? day? month?

Where are you now? state? county? town?

I will state three objects please repeat then when I have given you all three. apple penny table. Repeat the answer until the patient learns all three.

Now take away 7 from 100, then 7 from that number until I tell you to stop. Alternative question spell the word world backwards

Name for me the three objects you learned earlier.

What do you usually write with? What do you wear on your wrist?

Please repeat this phrase, "No ifs, ands, or buts."

This completes my questions. Do you have any questions about the interview?
Thank you so much for your cooperation and time.

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