UNIVERSITY OF ALBERTA

AN ASSESSMENT OF FUNCTIONAL STATUS IN GERIATRIC REHABILITATION

by

SARAH ELIZABETH SCHWAB

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled **AN ASSESSMENT OF FUNCTIONAL STATUS IN GERIATRIC REHABILITATION** submitted by **SARAH ELIZABETH SCHWAB** in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE**.

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To my husband Shaun because he believes in me.

ABSTRACT

As the Canadian population ages and the prevalence of disability increases, health care expenditures are continually coming under scrutiny. It is imperative to demonstrate that health care programs currently in place are effective. This study examines the effectiveness of a geriatric rehabilitation program by determining the change, if any, in functional status on admission, discharge and follow-up of clients from a geriatric rehabilitation hospital (n=40). The clients' self-reported functional status and the functional status as objectively assessed by an occupational therapist are also compared. Finally, the relationships between functional status, cognitive status, life satisfaction and qualitative themes are examined. The instruments used are the Functional Independence Measure (FIM), the Mini Mental State Examination (MMSE), the Satisfaction with Life Scale (SWLS) and content analysis. The total admission and discharge FIM results are significantly different ($p \leq .001$) with improvement noted across each of the items measured with the exception of toileting and bowel management. Of the 18 individual FIM items, toileting ($r^2 = .54$), stairs ($r^2 = .20$) and bladder management ($r^2 = .11$) are the best predictors of improvement from admission to discharge. Of the cognitive and motor dimensions of the FIM, the motor component was the best predictor of improvement from admission to discharge ($r^2 = .96$). Of the 6 FIM subscales self care ($r^2 = .80$) and mobility ($r^2 = .08$) are the best predictors of improvement from admission to discharge. Although there is no significant

difference in the discharge FIM scores according to diagnostic grouping, there is a significant difference when the sample is divided by age. Younger participants in the sample show greater improvement while in hospital and maintain that improvement following discharge home. There is a positive correlation (Pearson $r=.62$) between functional status and cognitive status with the admission MMSE score predicting follow-up FIM scores ($r^2=.31$). When the MMSE results are compared to established norms, the sample is considered representative of the cognitive abilities of the population according to age and educational level. There is little relationship between functional status and satisfaction with life (Pearson $r=.035$). The SWLS results are in apparent contradiction to the themes of the qualitative analysis.

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CHAPTER I
INTRODUCTION

The Elderly Population and Rehabilitation

The number of persons in the 65 years and over age group grew by 17.5% between 1986 and 1991 (Statistics Canada, 1992). The Health and Activity Limitation Survey (HALS) conducted by Statistics Canada in 1986-87 (Statistics Canada, 1990) surveyed persons with disabilities and demonstrated that disability increases with age. Over one third of all disabled persons in Canada are 65 years of age or older and approximately 46% have some form of disability. Approximately 84% of those persons with disabilities live in households and the remaining 16% reside in institutions. With the aging population and the incidence of disability increasing, medical rehabilitation will most certainly continue to assume a strong role in health care (Colvez & Blanchet, 1981).

The mission of rehabilitation is the restoration of performance ability for individuals with limitations in function. The onset of disability and subsequent impairment diminishes a person's life functions (e.g., self care, mobility, communication, vocation/education, and independent living), therefore, a functional approach to assessing disability is advised. Through functional assessment, the rehabilitation team can "... prevent disability through earlier identification of functional loss [and ensure that] the program of care addresses the issues most likely to maximize the quality of life for the patient..." (Granger,

Hamilton, Keith, Zielenzny & Sherwin, 1986, p. 60). The overall goal of rehabilitation programs is to increase clients' functional skills with the objective of maintaining or [illegible]erformance so that by discharge a certain level of functional performance has been reached. The clients' retention of that level of function is the primary issue.

In a society whose population is living longer than previous generations, the use of rehabilitation services is certain to increase, for it is preferable for older adults to remain at their optimal level of function for as long as they are able. Given the current escalating health care costs and financial restraint, it is of primary concern to determine the effectiveness of rehabilitation programs for the aging population.

The purpose of this study was to determine the change, if any, in functional status on admission and following discharge from a geriatric rehabilitation hospital. This was accomplished by using a measure of functional independence to determine overall functional status of clients on admission, at discharge and on follow-up post discharge. The clients' self-reported functional status and the functional status as objectively assessed by an occupational therapist in the clients' homes was also compared. The instrument used to measure functional status was the Functional Independence Measure (FIM). Finally, the relationships between cognitive status, life satisfaction, qualitative analysis and functional status were examined.

Overall an adequate measure of disability is important to determine compensation, predict prognosis, plan placement, estimate care requirements, chose types of specific care and indicate changes in status (Heinemann, et al., 1991). If geriatric rehabilitation programs are found to be effective, then the justification to maintain such programs will be supported not only by the maintenance of functional independence, but by an enhancement of the quality of life of the geriatric population.

The Edmonton General Hospital

The Edmonton General Hospital (EGH), located in Edmonton, Alberta, Canada, is dedicated solely to the care of the elderly population. The EGH is a geriatric assessment, rehabilitation and long term care hospital serving both inpatients and outpatients. The participants in this study were from four inpatient geriatric assessment and rehabilitation units of the EGH. Patients admitted to these four units are generally 65 years of age or older. They are considered frail and at high risk for permanent loss of function or institutionalization due to the complex interaction of their medical problems, although they have demonstrated rehabilitation potential. They are admitted to the EGH either through emergency (patients at home in crisis situations), direct admission (patients assessed through an outpatient program), or through a waiting list (other institutions, general community referrals). Patients admitted to the four units in this study often

present with a mixture of physical, social and functional disabilities that have made it difficult for them to live independently. Upon admission, each patient goes through an extensive assessment of their physical, emotional, social and functional status. The assessment is completed by an interdisciplinary team including representatives from occupational therapy, physical therapy, speech pathology, audiology, recreation therapy, nursing, medicine, psychology, social work, pharmacy, dietary, pastoral care and medical laboratory technology. The purpose of the assessment is to determine any deficits that are present as well as the potential for rehabilitation. If patients have demonstrated rehabilitation potential, they then progress to an intensive, aggressive treatment program. Rehabilitation treatment is focused on the problem areas identified in the assessment phase and involves all members of the interdisciplinary team. The patients are expected to actively participate in planning and decision making regarding their treatment and family members and friends are also involved in all phases of the patients' care. In summary, the EGH is "committed to the development of a centre of excellence for the care of older people" (Edmonton General Hospital, 1990).

CHAPTER II

RELATED LITERATURE

This chapter presents an overview of research in geriatric assessment, and research pertaining to functional status, cognitive status and life satisfaction. Specifically the Functional Independence Measure (FIM), the Mini Mental State Examination (MMSE), and the Satisfaction With Life Scale (SWLS) will be described as measures of functional status, cognitive status and life satisfaction.

Geriatric Assessment

Functional assessment is essential for a comprehensive evaluation in clinical geriatrics (Ferrucci et al., 1991; Guralnik, Branch, Cummings, & Curb 1989). An outcome evaluation of a geriatric rehabilitation program examined the impact of rehabilitation on functional status (Liem, Chernoff, & Carter 1986). The sample consisted of 190 elderly disabled patients at risk of being institutionalized due to medical problems of a physical and cognitive nature. An improvement in functional status was noted following the rehabilitation program in nearly all patients. Higher functional ratings in the areas of activities of daily living, ambulation, continence and clarity of cognition were associated with better community placement and significantly lower mortality one year post discharge.

The authors associated the rehabilitation program with improved outcome of care (Liem, Chernoff, & Carter 1986).

Davidoff, Keren, Ring and Solzi (1991) examined the long term effects of rehabilitation and maintenance of rehabilitation gain on acute stroke patients. Overall they noted that inpatient rehabilitation with acute stroke patients appeared to be effective and that most patients maintained gains achieved during inpatient rehabilitation through one year follow up. Similar results were noted by Ferrucci et al., (1991) although their results suggested that:

> in stroke patients with severe neural damage further functional improvement occurs even after completion of a rehabilitation program. There is evidence that older patients may be more likely to employ compensatory strategies to overcome some of the neural impairment that remains after stroke. (p. 200)

Mayer-Oakes et al., (1992) examined the use of rehabilitation programs by community dwelling older Americans, noting that additional studies are needed to determine whether rehabilitation is effective in various diagnostic subgroups. The literature suggests that an overall evaluation of physical function is an essential component of research in clinical geriatrics and aging. Functional assessment of the elderly client is advised in the rehabilitation setting to determine efficacy of geriatric rehabilitation programs, although further research into the impact with specific diagnostic groups is still required.

Functional Status

Functional status may be evaluated using the Functional Independence Measure (FIM) (Appendix A). The FIM is a functional rehabilitation approach developed by the American Congress of Rehabilitation Medicine and the American Academy of Physical Medicine and Rehabilitation Task Force. It was developed to establish a national Uniform Data System (UDS) for medical rehabilitation. The goal was to meet a long-standing need to document severity of a patient's disability, measure outcomes of medical rehabilitation, estimate burden of care and provide a uniform way to communicate about disability (Hamilton, Granger, Sherwin, Zielezny, & Tashman, 1987). The conceptual basis of the FIM is that the level of disability should indicate burden of care. The resource cost of care is social, physical and economical; that is human and physical resources will substitute for the person's absence of function. The purpose of the FIM was to develop a scale of common and useful functional assessment items and a rating scale that would be quickly and uniformly administered, valid and reliable, discipline free and acceptable to clinicians (Granger & Hamilton, 1992; Hamilton, Laughlin, Granger & Kayton, 1991).

The FIM does not measure all basic life activities, rather it is a selected measure of key activities. The number of items rated was deliberately kept small so that it would be practical to use in a wide range of rehabilitation settings. The FIM is comprised of 6 categories with a total of 18 items assessed. The six

categories are further divided into 2 sub-scales: motor and cognitive. The six categories are: self care (eating, grooming, bathing, dressing-upper body, dressing-lower body, and toileting), sphincter management (bladder and bowel management), mobility (transfers to bed/chair/wheelchair, toilet, tub/shower), locomotion (walk/wheelchair, stairs), communication (comprehension and expression) and social cognition (social interaction, problem solving and memory).

The motor component is made up of the self care, sphincter control, mobility and locomotion items, and the cognitive component is made up of the communication and social cognition items. Each item is measured on a 7 point scale: a score of 1 indicates total dependence on a caregiver whereas a score of 7 on an item indicates total independence, therefore the possible assessment scores range from 18 (total dependence) to 126 (total independence). Data is also gathered on patient demographics characteristics, diagnoses, impairment groups, length of hospital stay, and hospital charges. The FIM is a useful tool to facilitate treatment management and monitoring, quality assurance, program evaluation, determination of cost effectiveness, and care policy decision making. In summary, a model combining rehabilitation, life function, burden of care and economics serves as the basis for the development of the Uniform Data System, and as such encompasses the conceptual framework and theoretical basis of the FIM.

The FIM has been used to study various diagnostic groups including spinal cord injury, total hip replacement, apoplectic shock, paediatric brain injury,

cancer, lower extremity amputees, stroke, A.I.D.S., and multiple trauma (Davidoff, Roth, Haughton, & Ardner, 1990; Emhoff, McCarthy, Cushman, Garb, & Valenziano, 1991; Granger, Cotter, Hamilton, Fiedler, & Hens, 1990; Wong, Bellamy, & Toller-Lobe, 1992). For the purpose of this study the FIM will be used with a sample of geriatric patients with multiple diagnoses.

Granger and Hamilton (1992) completed a report on the Uniform Data System which examined patients discharged from 108 subscribing medical rehabilitation hospitals in 33 states in the United States in 1990. The data were gathered from 33,427 patients who were admitted to a rehabilitation program for the first time. The investigators examined five impairment groups: stroke (33%), orthopaedic conditions (29%), brain dysfunction (8%), spinal cord dysfunction (5%), and neurologic conditions (5%). The measure of functional status on admission and discharge was the FIM. They examined three aspects of rehabilitation: onset days i.e., the mean number of days from acute onset of the impairment to admission to rehabilitation facility, length of stay in days and length of stay efficiency, i.e., measurement of change of FIM score per day. The average age was 67 years with 42% being male. The report concludes that:

> ... across impairment groups there was significant, timely and measurable functional improvement of patients undergoing medical rehabilitation in hospitals and units and that a high percentage was returned to living in the community ... comparing facility data to national averages may be useful

to demonstrate effectiveness and efficiency and to identify opportunities to improve program services and outcomes (p. 112).

Heinemann et al. (1991) completed a study involving the FIM over a broad spectrum of disabilities of 33,709 patients. They noted that their research on the FIM would enable clinicians and researchers to plan cost effective treatment by establishing a valid measure of disability. This would likely lead to increased effectiveness and efficiency of care, improve prediction of rehabilitation outcomes, allow evaluation of innovative interventions, and assessment of prospective payment consequences. Rehabilitation services would be improved by the enhanced communication between rehabilitation professionals about patient status and improvement, and by the provision of valid and reliable measures that rehabilitation professionals and policy makers could use (Heinemann et al., 1991).

Wong et al. (1992) examined the predictive value of admission FIM scores, age, interval between stroke onset and rehabilitation admission, and severity of medical conditions on discharge. Their results indicated that the FIM scores on discharge and six weeks post discharge were significantly greater than at admission. They determined that increased FIM scores reflected gains in independence made during the rehabilitation program. Stepwise multiple regression analysis was used to determine the independent variables responsible for predicting discharge FIM scores. The best single predictor was found to be FIM scores on admission ($r^2=0.64$). Admission FIM scores was also the best predictor

in the research by Heinemann et al. (1991) although the authors warn against using the admission FIM scores as a sole criterion for acceptance to rehabilitation hospitals.

Collection Of Follow Up Data

Smith (1992) provided details of procedures for collecting follow up data using the FIM. She recommended that data be collected between three to six months post discharge as collection of data prior to three months post discharge may not document the sustained effects of a rehabilitation program. The patient needs a period of time post discharge to readjust to the new environment, establish home care services, receive equipment, and begin outpatient services. Collecting data after six months may lead to the question of whether the patient's performance can be attributed to the rehabilitation program, or if there were other extraneous variables contributing to patient's functional performance. Also, it may be difficult to track patients after six months. Patients may have a decreased feeling of connection with the facility after a passage of time and may be less likely to be compliant with a follow up assessment.

Smith (1992) indicated that follow up data is essential to provide evidence of sustained effects of rehabilitation services in today's health care environment. The true test of outcome is whether individuals who have received rehabilitation services can remain independent over time, in their own environment, and without

the direct support of rehabilitation services. Follow up information is also essential for rehabilitation managers for program evaluation, quality improvement, accreditation, marketing and research. Smith stated that National Followup Services, Inc. is available to provide post discharge assessment of functional outcomes. It should be noted that Smith is the president of National Followup Services, Inc. and therefore obviously has a vested interest in the continued use of follow up data, although that aside, she raises valid points with respect to gathering follow up data. Functional independence, the overall goal of rehabilitation, is only reached if patients are able to apply skills learned during rehabilitation. If the quality of life outside the rehabilitation centre is not assessed the true success of the rehabilitation program is not known.

Three methods to collect follow up data were suggested by Smith (1992): in-person, by telephone, and by mail. The best method as determined by Smith is by telephone. The in-person method is costly, and the mail method is subject to poor response rates. The developers of the FIM have recently developed a telephone interview format of their instrument: FONE FIM. The FONE FIM is structured identically to the FIM and has instructions for use in telephone interview to collect functional status information. Unfortunately, there is no published research available on the use of the FONE FIM.

Self-report

There is no published research available which examines the difference of self-report versus therapist assessed functional status using the FIM, although there is support for the use of performance based as well as self-report measures for clinical and research purposes (Guralnik et al., 1989; Reuben, Siu & Kimpau, 1992). Jacobs et al., (1992) attempted to determine how well self assessment questionnaires reflect the true functional status of rheumatoid arthritis patients. The clients' scores on the assessment scale were compared to the objective assessment of experienced physical therapists. The results showed a high correlation between clients' and therapists' assessment scores with no significant differences found between the mean scores except for the mobility scale.

In comparing the difference between patient and proxy responses on a measure of patient health and functional status in elderly patients with hip fracture Magaziner, Simonsick, Kashner and Hebel (1988) noted that agreement across items ranged from poor to good and varied with respect to the health or functional area assessed. The proxies tended to overestimate patient disability when compared to the patients themselves. The proxies who reported the greatest contact with the patient responded most comparably with the patients, however, when there was disagreement, there was a tendency to overestimate patient disability. The authors noted that attention to item construction and phrasing may improve response comparability.

In a study of urban elderly persons Ford et al., (1988) compared self-reported illness and disability to illness and disability as objectively assessed by clinician assessment. They noted that when functional disability was estimated by self-report and by clinician assessment, the results from the self-report can provide useful information, although self-report alone is not sufficient to be used for diagnosis.

Sager et al., (1992) attempted to determine the accuracy of self-reports of physical functioning of the hospitalized elderly by comparing self-report and performance as measured by an occupational therapist. The rate of agreement between self-report and performance was lowest for bathing and dressing. The factors that were statistically associated with poor agreement between the ADL measures were cognitive impairment and a decline from the pre-hospital level of ADL functioning which had occurred during hospitalization. They concluded that:

> ... there may be significant differences between patient assessments and performance based measures of ADL functioning in hospitalized elderly at the time of discharge. [this may have] ... implications for the collection of functional measurements for discharge planning or for geriatric research in the hospital environment. (p. 457)

Weinberger et al., (1992) compared patients and their proxy ratings of the patients' ability to perform activities of daily living. Concordance of ratings was significantly lower for instrumental ADL (IADL) than for physical ADL tasks,

with patients consistently rating themselves as more independent than their proxies. Concordance was significantly less for patients whose scores were below 24 out of 30 on the Mini Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975), with patients rating themselves as more independent. Similar findings were note by Kivela (1984) who found that self rating and objective assessments have a higher correlation in the less complex tasks of ADL, then the more complex tasks of IADL.

Edwards (1990) compared hospitalized elderly patients self rating and ratings by occupational therapists based on direct observation of performance using the Physical Self Maintenance Scale and Instrumental Activities of Daily Living (IADL) Scale. She reported that the patients consistently over rated their ability in both ADL and IADL tasks which "... provided support for the use of direct observation of performance to gain valid data on an individual's ability" (p. 273).

A comparison of the estimates of health status was completed using a telephone interview and a face to face interview (Korner-Bitensky, Wood-Dauphinee, Shapiro, & Becker, 1993). Their results were similar when comparing information collected by telephone and in-person interview, although the information was more accurate with those individuals with no dysfunction or mild dysfunction. The telephone interview method underestimated the morbidity in those with moderate to severe disabilities. The investigators suggest that the

individuals should still be monitored even when a telephone interview reveals only mild impairment.

In another telephone interview study, telephone versus in-person mode for collecting self-reports of daily activities was compared using a spinal cord injured client sample (Hopkins-Rintals & Willems, 1991). Accuracy was assessed by comparing the client reports to the assessments completed by trained observers. The telephone client reported method and trained observer method did not differ and it was concluded that investigators could use the telephone method with confidence.

In summary, there are conflicting results with respect to self-report, proxy report, telephone assessment and objective performance assessment. Due to the costs involved in objective follow up assessment, if the self-report and telephone methods can be demonstrated to be accurate at least for the non-cognitively impaired population, it is more fiscally efficient to use these methods.

Cognitive Status

Cognitive status is commonly assessed using the Mini Mental State Examination (MMSE) (Folstein et al., 1975) (Appendix B). The MMSE will be used to determine the relationship, if any, between cognitive status and functional status. The MMSE was devised ... "for the serial testing of the cognitive mental state in patients of a neurogeriatric ward" (Folstein et al., 1975, p. 196).

Hamilton and Creason (1992) studied institutionalized elderly women and found a decline in mental status and an increase in functional dependency over the course of one year. Basset and Folstein (1991) examined the relationship between cognitive impairment and psychiatric diagnosis in an adult population. They administered the MMSE and psychiatric evaluations noting that over one third of the persons assessed to be cognitively impaired did not meet the criteria for a psychiatric diagnosis although, those who had a cognitive impairment were also found to have significant functional disabilities. They concluded that "... cognitive performance along with physical and emotional health predicted total functional disability" (p. 77).

Similar findings were noted by Loen (1991) who found that in a sample of frail elderly persons, cognitive impairment and lower functional status were associated with higher levels of dependency in IADL. Regression analysis of demographic variables as predictors of cognitive function revealed that education, geographical background, race, and neurological examination were all independent predictors of MMSE and that these variables accounted for 49% of the variance in the MMSE scores ($p \leq 0.001$). Cognitive function, emotional distress, physical illness, medications, age, education, race and gender also proved to be significant predictors of functional disability accounting for 39% of the variation in functional disability ($p \leq 0.001$).

Schut (1988) noted the importance of assessing cognitive abilities after a stroke to determine the client's motivation and comprehension of the rehabilitation process. This is essential so that the client can participate in a goal setting process and to facilitate compensatory strategies for decreased cognitive function. In summary, the literature shows that cognitive status has an effect on functional status.

Life Satisfaction

Shin and Johnson (1978) define life satisfaction as "a global assessment of a person's quality of life according to his chosen criteria" (p. 478). Diener, Emmons, Larson, and Griffen (1985) define life satisfaction and suggest that it be assessed as follows:

> a global evaluation by the person of his or her life ... It appears that individuals 'construct' a standard which they perceive as appropriate for themselves, and compare the circumstances of their life to that standard ... it is important to obtain a general or global evaluation from the respondent rather than relying solely on a summation of satisfactions with a list of researcher imposed domains. (p.71)

The Satisfaction With Life Scale (SWLS) (Appendix C) measures global life satisfaction using five questions which are rated on a seven point Likert scale (Diener et al., 1985). Delaney (1991) studied variables that had a direct or

indirect influence on life satisfaction using locus of control as a moderator variable. Functional ability had an indirect effect on life satisfaction via locus of control for a nursing home group, and a direct effect on life satisfaction and locus of control for a community-residing older adult group. These results suggest that professionals should increase ways in which older adults can enjoy a sense of independence in maintaining their degree of functional ability. Gould (1988) noted that "Life satisfaction is an indicator of well being which is useful as an outcome measure of quality of care because of its linkage to health". The literature suggests, as with cognitive function, that life satisfaction has an impact on functional status.

Summary

From literature that has been reviewed functional assessment of the geriatric population is considered to be essential. The literature suggests that data regarding functional status should be collected throughout the rehabilitation program. The FIM was selected to be used as the functional assessment instrument as it is a "... valid and reliable functional assessment tool which is widely used in rehabilitation programs to document levels of disability and improvements in physical functioning in response to treatment." (Sager et al., 1992). The lack of literature with respect to the FONE FIM demonstrates that research is required in this area. The decision to use the MMSE and the SWLS was supported by the demonstrated

impact of cognitive status and life satisfaction on functional status (Basset & Folstein, 1991; Gould, 1988).

CHAPTER III

METHODS AND PROCEDURES

Introduction

A sample of recently discharged patients from the EGH was asked to participate in an in home and telephone assessment. The assessment required participants to demonstrate their functional status, as well as complete a cognitive status assessment, a questionnaire regarding their satisfaction with life and a qualitative analysis question. The data were analyzed to determine the difference, if any, between functional status scores on admission, discharge and follow up, and to determine the relationship, if any, between cognitive status, and life satisfaction with functional status.

Study design

This study involved a collaboration between the EGH and the University of Alberta. The EGH agreed to facilitate the participation of clients for the study so that the proposed sample size of 40 was obtained. Members of the EGH occupational therapy staff informed eligible clients prior to discharge that the researcher may be contacting them within five to six weeks from their discharge

date. They provided clients with an introductory letter explaining the purpose of the study and posted information sheets regarding the study on the rehabilitation units (Appendix D). If the clients provided verbal consent for the researcher to contact them in their home, the occupational therapist included them in the list of eligible clients that comprised the subject pool. If the clients declined the invitation, the occupational therapist included them in the list of ineligible clients and they were eliminated from the subject pool.

The researcher randomly selected the sample from the previous three months eligible clients discharge list. The randomization process involved using a random number table to select client identification numbers. The eligible client's identification numbers were written out on individual pieces of paper and placed face down on a table. The random number chosen was "four", and therefore every fourth client identification number was selected for the study. Once the randomized patient list was obtained for the month, the list was further randomized to counter-balance whether the administration of the telephone interview (FONE FIM) or the in-person follow up FIM would be completed first by randomly assigning them to two groups.

At approximately five weeks following discharge, the eligible clients were contacted by telephone to ensure continued eligibility for the study and to ensure continued verbal consent. If the client agreed to continue with the project, the researcher arranged for an in-home assessment appointment and collected the

telephone interview functional assessment data (FONE FIM) prior to the home visit (where applicable due to the counter balance procedure). The researcher then attended the in-home assessment appointment and completed the following with the client and the client's caregiver (where applicable):

1. Informed consent form (client and caregiver) (Appendix E)
2. FIM data sheet (client)
3. Mini Mental Status Exam (client)
4. Satisfaction with Life Index (client)
5. Qualitative Data (client)

Due to the counter balancing procedure, the researcher arranged for an appointment (where applicable) to contact the client by telephone to complete the FONE FIM following the in-home assessment. The FIM data was collected following the informed consent. The FIM data was collected by having the client actually perform the task when possible, although objective performance data collection was not always obtainable (e.g., as the researcher was usually in the client's homes for approximately 90 minutes, bowel management was seldom observed). The researcher therefore accepted the client's report with corroboration from the caregiver where possible. The FIM manual requires that if a task is not observed, the client should be scored as totally dependent (1). This method did not seem warranted as the resulting total scores would have been very low, and likely less accurate in this instance, than a self-report method. Where the client

was unable to respond during either the telephone or the in-person assessment (aphasia, language barrier, severe cognitive impairment - admission MMSE < 17), the caregiver answered the questions on the client's behalf.

Sample

The Edmonton General Hospital (EGH) was the sample source. The sample was chosen randomly from all clients who agreed to participate in the study who met the eligibility criteria. Ten to twenty names were randomly chosen from the previous month's eligible client discharge list for three months until a sample size of 40 was reached. Clients who withdrew from the study (e.g, consent revoked, readmission) were replaced with an eligible client from the EGH until the sample size was achieved.

Clients were eligible for inclusion in the sample pool if:

- they consented to participate in the study
- their primary diagnosis was classified as a physical disability
- they were discharged home or to a lodge setting from the EGH
- they resided in Edmonton

Clients were not eligible for inclusion in the sample pool if:

- they declined to participate in the study
- they were discharged back to acute care centre from the EGH
- they were discharged to a long term care setting from the EGH

- their primary diagnosis was not classified as physical disability
- they had been subsequently readmitted to an acute care or rehabilitation hospital following discharge from the EGH
- they had been admitted as an outpatient to the EGH following discharge as an inpatient from the EGH
- they did not reside in Edmonton

Clients were from four geriatric assessment and rehabilitation units at the EGH. As the data collection for this thesis was part of a larger research project conducted at the EGH, a sample size of 40 was chosen to meet requirements agreed upon between the EGH and the researcher.

Pilot analysis

Data from the first 10 clients was reviewed to ensure that all data collection methods were viable in practise. The pilot study revealed that the data collection methodology was practical and appropriate therefore no changes were required. As the data collection methods did not need to be altered, the ten clients from the pilot sample were included in the research sample.

Data Collection

Instruments

There were three instruments used in this study:

1. The Functional Independence Measure (FIM).
2. The Mini Mental Status Examination (MMSE)
3. The Satisfaction with Life Scale (SWLS)

The Functional Independence Measure (FIM)

The purpose of the FIM is to determine the change if any in functional status from admission to discharge and follow up, or as summarized by Granger, Hamilton, Linacre, Heineman, and Wright (1993): "... the degree of disability that patients experience and the progress that they make through programs of medical rehabilitation" (p. 84). The FIM measures performance on 18 ADL tasks using a seven point ordinal scale. Hamilton et al., (1991) have reported on the reliability of the FIM noting that the total intraclass correlation coefficient for interrater reliability was .97 with the specific areas of the FIM rated as follows: self care: .96, sphincter control: .94, mobility: .96; locomotion: .93; communication: .95; social cognition: .94. The FIM item Kappa mean was .71 (range .61 to .76). The Kappa statistic of .61 to .76 is rated as substantial in the literature indicating that there is little likelihood of agreement due to chance alone (Landis & Koch, 1977; Law & Letts, 1989). Hamilton et al., (1991) concluded

that the seven level FIM appears to have good clinical inter-rater agreement. Fricke, Unsworth and Worrell (1993) strongly recommend that all clinicians complete training in the use of the FIM prior to using the tool to ensure acceptable reliability.

The face validity of the FIM was assessed by various health care professionals including occupational therapists, physical therapists, psychologists, speech language pathologists, recreation therapists, nurses, and physicians. The health care professionals rated the FIM with respect to whether it represented the content of disability, was appropriate to assess disability and was able to detect change in function. They rated the FIM on a scale from 1 to 5, with 1 being poor and 5 being excellent. The mean rating was 3.44 (Granger & Hamilton, 1992). The precision of the FIM (size of change detectable from admission to discharge) and its feasibility (time to learn and administer the FIM) were acceptable (Heinemann et al., 1991).

Dodds, Martin, Stolov and Deyo (1993) have shown that the FIM has high internal consistency and adequate discriminative capabilities for rehabilitation patients, and it is a good indicator of burden of care. However, the FIM's capacity to measure change over time needs further examination (Dodds et al., 1993). Heinemann et al. (1991) studied the use of the FIM in 33,709 patients who had a broad spectrum of disabilities. Part of their study focused on the scalability and the validity of the FIM, and the precision or sensitivity of the FIM by

examining ..."the extent of change of functional status from admission to discharge, and follow up with measures derived from the FIM ..." (p. 3). Using Rasch analysis, the results demonstrated that the FIM is comprised of two fundamental subsets of measures: one relating to motor function and the other to cognitive function. Dividing the FIM into 2 sub-scales, 13 motor (eating, grooming, bathing, dressing upper body, dressing lower body, toileting, bladder management, bowel management, transfers to bed/chair/wheelchair, transfers to toilet, transfers to tub/shower, walk/wheel chair, stairs) and 5 cognitive (comprehension, expression, social interaction, problem solving, memory) items provided a more decisive empirical basis, and better scalability. The data from the FIM is recorded on an ordinal scale. Rasch analysis is a statistical procedure that transforms the ordinal ratings to measures on an interval scale. The Rasch analysis transforms the FIM scores into general linear measures. Heinemann et al. (1991) state that measures from an interval scale can then be used in linear statistical analysis that relate independent and dependent variables such as multiple regression. Interval scales also enable assessment of smaller changes in a patient's functional status than ordinal data. Interval measurements allow one to obtain valid measures of an individual's functional ability or burden of care resulting from impairment, and make quantitative comparisons between individuals. Further explanation of Rasch analysis and its degree of accuracy is available in the

literature (Becker, Lambert, Schulz, Wright, & Burnett, 1985; Lambert & Wright, 1989).

The predictive validity of the FIM has been determined by comparing the FIM score on discharge with that on admission and with length of the rehabilitation hospital stay. The analysis of change in function from admission to discharge was performed using paired t-tests with significant improvements observed for each impairment group. Two limitations of this study are that it did not examine the change from discharge to follow up, and that the representativeness of the sample was questionable. The area of follow up is an area that was addressed in the present research proposal. The representativeness of the sample for the proposed study was compared to national data available on the geriatric population. An unexpected observation noted by the authors was that all impairment groups demonstrated a statistically significant increase in cognitive function. The reasons given include that some of the patients have comorbidity contributing to greater cognitive disability (e.g., spinal cord injury with head trauma). Cognitive status was addressed in this proposal by using a mental status exam as well as the cognitive component of the FIM. The literature demonstrates that the FIM has acceptable reliability and validity enabling further research using this instrument to be carried out.

The FONE FIM was used to collect follow-up functional status information from the clients by telephone. Shinar et al., (1987) indicate that the telephone

interview is a valid and reliable method of collecting follow up data although there is no published research which examines the reliability and validity of the FONE FIM. This study was designed in part to begin establishing the validity of the FONE FIM.

The Mini Mental State Examination (MMSE)

The literature has shown that cognitive ability is an important factor in skill retention and functional status. The MMSE was used to determine the relationship, of cognitive status and retention of functional status during this study. The MMSE examines only the cognitive aspects of mental functions and was found to separate patients with cognitive disturbance from those without cognitive disturbance. The MMSE examines orientation to time and place, registration of three words, attention and calculation, recall of three words, language and visual construction for a total possible score of 30. It has been classified according to levels of cognitive impairment: no cognitive impairment (24 to 30), mild cognitive impairment (18 to 23), and severe cognitive impairment (0-17) (Folstein et al., 1975). An overall score of 20 or less was "found essentially in patients with dementia, schizophrenia or affective disorders and not in normal elderly people or in patients with a diagnosis of neurosis or personality disorder" (Folstein et al., 1975, p.196).

The MMSE has been shown to be valid because it detects the presence of cognitive difficulty and the severity of the cognitive difficulty in an expected fashion according to the diagnosis of the client and in comparison to a control group (Folstein et al., 1975). Construct validity was established by correlating the MMSE scores with scores on the Weschler Adult Intelligence Scale: Pearson r of 0.77 ($p<0.0001$) for verbal skills and Pearson r of 0.66 ($p<0.001$) for performance skills. The MMSE was found to be reliable in test-retest and inter-rater reliability studies (Pearson $r=0.82$) (Folstein et al., 1975). Tombaugh and McIntyre (1992) completed a review of the MMSE which examined its reliability and validity. They found that, in general, the MMSE quantitatively assesses the severity of cognitive impairment and documents cognitive changes occurring over time, although they warned that the MMSE should not be used as a diagnostic tool. The reliability and validity of the MMSE has also been judged to be satisfactory when compared to a variety of gold standards in psychiatry and ADL measures. Crum, Anthony, Bassett, and Folstein (1993) recently published results describing MMSE scores by age and educational level for adults aged 18 years to over 85 years. In general, the norms support the standard criterion of using a score of 24 or greater to indicate no cognitive impairment if a person is under 85 years of age and has more than 5 years of education. These results can be used for comparative purposes for the proposed study.

The Satisfaction With Life Scale (SWLS)

The five item self rate SWLS was used to determine the relationship between functional status and life satisfaction in this study. The SWLS measures global life satisfaction which has been validated with the geriatric population (Diener et al., 1985, Pavot et al., 1991). When used with a geriatric sample, the SWLS shows good internal consistency as item total correlation coefficients range from .61 to .81 (Diener et al., 1985). Arrindell, Meeuwesen and Huyse (1991) found adequate internal consistency reliability using the SWLS. They note that the SWLS scores are not affected by age, gender, educational level, health insurance status or social desirability, but is affected by marital status. Those who are married or involved in long lasting intimate relationships were more satisfied with their lives than those who are unmarried, divorced or widowed.

The SWLS demonstrates good convergent and predictive validity when compared to another instrument in the area of life satisfaction, the Life Satisfaction Index (Neugarten, Havinghurst, & Tobin, 1961 in Diener et al., 1985). Finally, Pavot, Diener, Colvin and Sandvik (1991) provide further evidence for the convergent validity of the SWLS by demonstrating convergence of the SWLS with other self-reported measures of life satisfaction (Life Satisfaction Index, Philadelphia Geriatric Morale Scale).

Timetable

Data collection took approximately 12 weeks, therefore 3 or 4 clients were assessed per week in order to reach a sample size of 40. There is a difference of opinion in the literature about the appropriate time to collect follow up data (Smith, 1992; Wong et al., 1992). Smith (1992) recommends follow up data collection at 12 weeks, whereas Wong et al. (1992) recommend 6 weeks. The decision was made to begin collecting follow up data five to eight weeks from the discharge date as the geriatric population differs from the general rehabilitation population. The geriatric population has greater hospitalization and readmission rates due to their multiple diagnoses and comparably frail health.

Administration times and conditions:

The FIM:

Using the FIM there were four data sets collected for each subject:

- Admission FIM (EGH occupational therapy staff)
- Discharge FIM (EGH occupational therapy staff)
- Follow up FIM: there were two measures of the follow up FIM which were counterbalanced rule out the effects of possible bias.
    1. FONE FIM to be completed by telephone five to eight weeks post discharge from the EGH (researcher).

2. In-person follow up FIM to be completed in the client's residence five to eight weeks post discharge from the EGH (researcher).

To avoid possible bias by the researcher, she did not review the admission and discharge FIM scores prior to gathering the follow up FIM data.

The MMSE:

Using the MMSE there were two sets of data collected for each subject:

- Admission MMSE (EGH staff)
- Follow-up MMSE completed in client's residence (researcher)

In order to assist in determining the need for caregiver responses to the telephone interview on behalf of the client, the researcher reviewed the EGH admission MMSE scores prior to contacting the client. If a client scored below 24 (mild to severe cognitive impairment) the researcher would contact the caregiver and request that the caregiver complete the FONE FIM on the client's behalf.

The SWLS:

Using the SWLS there was one set of data collected:

- Completed by the client in the client's home (researcher)

Qualitative Data

The researcher gathered qualitative data regarding the client's rehabilitation experience in the EGH, and their experiences since discharge from the EGH. Each client was asked to answer the following open ended question:

Tell me about your experience now that you are home?

This data was gathered to provide a comparison of the quantitative results of the SWLS and a qualitative analysis of the client's life experiences.

Summary of Procedures

Data Collection Procedures are summarized as follows:

Admission	Discharge	5 to 8 Weeks Post Discharge
FIM (EGH)	FIM (EGH)	Consent
MMSE (EGH)	Information sheet (EGH)	FONE FIM
		FIM
		MMSE
		SWLS
		Qualitative data

Pre-Data Collection Reliability

Prior to the commencement of data collection, the researcher completed an inter-rater reliability test by reviewing the FIM training video series and completing four case studies (two video and two written). The researcher's reliability coefficients ranged from .89 to .97 and thus were considered acceptable. The researcher also reviewed the MMSE and SWLS administration materials and instructions to enhance the reliability and validity of the data collected.

Additional Data

The EGH provided the following information on eligible clients:

- Name of client
- Address of client
- Telephone number of client
- Telephone number of caregiver
- Discharge date
- Admission MMSE score
- ID Number
- Language

The above data were used by the researcher to contact the client to arrange for data collection.

- Admission and discharge FIM scores

The above data were used by the researcher for data analysis purposes.

- Gender
- Age
- Living Arrangement
- Marital Status
- Living With
- Homecare
- Education
- Diagnostic Grouping
- Length of stay

The above data were gathered by the researcher for demographic and data analysis purposes as outlined in the data analysis section. The variables were defined as follows:

Gender: Male or female.

Age: Chronological age in years according to the following categories established by Crum et al. (1993): 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, ≥ 84.

Living Arrangement: Home or lodge setting.

Living With: Alone, family/relative, friends, attendant.

Marital status: Married/common-law, single, divorced, widowed.

Diagnostic Grouping: Determined by researcher according to similar diagnostic categories:

- Cerebral vascular (cerebral vascular accident, cerebral thrombosis, transient ischemic attacks).
- Orthopaedic (lumbosacral disc degeneration, fracture of hip and pelvis, pathological fracture, arthritis).

- Pulmonary/cardiac (myocardial infarction, hypertension, arteriosclerosis, respiratory infection, chronic obstructive pulmonary disease, congestive heart failure, peripheral vascular disease).
- Other (major eye infection, urinary neoplasm, organic mental disorder with physical disease, postoperative infection, myalgia, skin ulcer).

Length of Stay: Days from admission to discharge.

Homecare: Receipt of self-care assistance in the home by the participant, may be through the Edmonton Home care program, or private contract. Non-self care assistance was not included (e.g., dressing changes, oxygen).

Education: According to categories established by Crum et al. (1993): up to 4 years, 4 to 8 years, 9 to 12 years, post secondary education (> 12 years).

Ethical Considerations

Clients were initially contacted by the staff of the Occupational Therapy department at the EGH to obtain verbal consent for the researcher to contact the clients following discharge. When the researcher contacted the clients by

telephone, she gained verbal consent prior to arranging for an appointment for an in-home assessment and proceeding with the FONE FIM (if applicable according to counter balance procedure). Upon arrival at the client's home, the researcher had the client and, where applicable, the caregiver complete an informed consent form prior to proceeding with the assessment. The consent form guaranteed confidentiality with respect to all data collected. Client data were not reported as independent data, but rather as group results so that anonymity was ensured. The research proposal was accepted by the Research Steering Committee at Caritas Group prior to commencing data collection (Appendix F).

Ethical considerations with respect to the assessment of the clients arose. In one instance the researcher judged from her clinical experience that the client was not functioning within independent safety parameters, and was at risk for injury. The researcher discussed her findings with the client to determine if the client wished to obtain medical care. The client agreed to receive medical care, and the researcher contacted Edmonton homecare on his behalf. If the client had not requested intervention, the researcher would have respected the client's wishes and no contact would have been made with homecare. A second instance of concern arose when two separate caregivers were not coping with their family member (client). In these instances, the caregivers were provided with information regarding caregiver support groups. The researcher was not aware of any other ethical considerations during the data collection process.

Research Questions

Research Question 1

Is there a change in functional status from admission to discharge as measured by the FIM scores?

(a) If there is a change in functional status as measured by the FIM scores:

i) is there a change in score from admission to discharge across each of the 18 FIM items?

ii) what is the ability of each of the 18 FIM items to predict the change in FIM score from admission to discharge?

iii) what is the ability of the two FIM dimension scores (cognitive and motor) to predict the change in FIM score from admission to discharge?

iv) what is the ability of the four motor dimension scores (self-care, sphincter control, mobility, locomotion) to predict the change in FIM score from admission to discharge?

v) what is the ability of the two cognitive dimension scores (communication, social cognition) to predict the change in FIM score from admission to discharge?

Research Question 2

Is there a change in functional status from discharge to follow-up as measured by the FIM scores?

Research Question 3

Is there a difference between follow-up scores using a self-report or proxy telephone assessment (FONE FIM) and follow-up scores using an in-person assessment (FIM)?

Research Question 4

Is there a change in functional status between admission, discharge, in-person follow-up and telephone follow-up as measured by the FIM scores?

(a) when comparing diagnosis?

(b) when comparing age group?

Research Question 5

What is the relationship between discharge FIM scores and length of stay?

Research Question 6

What is the relationship between cognitive status and overall functional status?

Research Question 7

What is the relationship between satisfaction with life and overall functional status?

Research Question 8

Which themes were present in analysis of the qualitative data?

Data Analysis Process

There was no missing data in the data collection process therefore all data points were included in the data analysis process. Data was analyzed using the computerized Statistical Package for the Social Sciences (SPSS) program. Paired t-tests were used to compare means, Pearson r was used for correlational analysis, multiple regression was used for regression analysis and ANOVA was used for comparison of means with greater than two groups. Content analysis of the clients' responses to research question 8 was completed from verbatim records and analyzed according to the themes it revealed.

CHAPTER IV

RESULTS

Ineligible Participants

In order to achieve the sample size of 40, 50 clients needed to be selected via the randomization process since 10 clients were ineligible. Two clients refused to provide consent, and the other eight were ineligible due to readmission to an acute care or long term care facility in the intervening period between discharge from the EGH and follow-up.

Participant Demographic Characteristics

The participant demographics and characteristics are listed in Table 1. Sixty-five percent of the participants were female and the mean age of all participants was 80.68 years (range=58 to 94, SD=7.45). With respect to marital status, 32.5% were married (there were no common-law relationships in this sample), 45% were widowed, 12.5% were divorced or separated, and 10% had never been married. In comparison to the Alberta population (Statistics Canada, 1992), 53% of the Alberta population is female between the ages of 58 and 94, 68% are married or common-law, 21% are widowed, 7.7% are divorced or separated, and 5.3% were never married. This sample had a higher female to

male ratio than the Alberta population, and a higher percentage of widowed status and divorced status, and lower percentage of married and never married status.

The breakdown into the diagnostic categories was as follows: 17.5% cerebral vascular accident grouping, 30% orthopaedic grouping, 25% cardio/pulmonary grouping, and 27.5% grouped as other. Ninety percent of the participants lived in a home setting, and 10% lived in a lodge setting. Fifty percent of the participants lived alone, 42.5% lived with family/relatives, 2.5% lived with friends, and 5% lived with an attendant. Fifty-five percent of the participants received homecare services. With respect to education 7.5% had up to 4 years of education, 25% had 4 to 8 years of education, 35% had 9 to 12 years of education, and 32.5% had greater than 12 years of education.

Table 1: Client Demographics (n=40)

Variable	Value	Frequency	Percent
Gender	Female	26	65
	Male	14	35
Age	55-59	1	2.5
	60-64	0	0
	65-69	1	2.5
	70-74	6	15
	75-79	9	22.5
	80-84	11	27.5
	>84	12	30
Marital Status	Married	13	32.5
	Widowed	18	45
	Divorced	5	12.5
	Never Married	4	10
Diagnosis	Cerebral Vascular Accident	7	17.5
	Orthopaedics	12	30
	Cardiopulmonary	10	25
	Other	11	27.5
Education	≤4 years	3	7.5
	4-8 years	10	25
	9-12 years	14	35
	≥12 years	13	32.5

Table 1: Client Demographics (n=40) (continued)

Variable	Value	Frequency	Percent
Homecare	yes	22	55
	no	18	45
Environment	Home	36	90
	Lodge	4	10
Living With	Family	17	42.5
	Alone	20	50
	Friends	1	2.5
	Attendant	2	5

The results will be presented according to each of the eight research questions.

Research Question 1

Is there a change in functional status from admission to discharge as measured by the FIM scores?

(a) If there is a change in functional status as measured by the FIM scores:

i) is there a change in score from admission to discharge across each of the 18 FIM items?

ii) what is the ability of each of the 18 FIM items to predict the change in FIM score from admission to discharge?

iii) what is the ability of the two FIM dimension scores (cognitive and motor) to predict the change in FIM score from admission to discharge?

iv) what is the ability of the four motor dimension scores (self-care, sphincter control, mobility, locomotion) to predict the change in FIM score from admission to discharge?

v) what is the ability of the two cognitive dimension scores (communication, social cognition) to predict the change in FIM score from admission to discharge?

The change in functional status was measured initially by comparing the total admission and discharge scores. The hypothesis was that clients' functional status would improve on all categories from admission to discharge as measured by the FIM scores. Using a paired t-test, the total admission and discharge scores were found to be significantly different ($p \leq .001$). The total admission and discharge scores were further analyzed as unidimensional properties of the two FIM constructs: cognitive and motor scores. Again they were found to be significantly different ($p \leq .001$) from admission to discharge (see Table 2).

Table 2: Mean and Standard Deviation of Total Fim Scores, Motor and Cognitive Dimension Scores at Admission and Discharge (n=40)

Variable	Mean (SD)
Admission FIM Score	96.35(17.02)
Discharge FIM Score	107.55(13.31)
Admission Motor Score	67.43(13.58)
Discharge Motor Score	77.35(9.46)
Admission Cognitive Score	28.93(6.61)
Discharge Cognitive Score	30.20(5.61)

Results from paired t-test analyses showed that there was a statistically significant improvement noted from admission to discharge across each of the 18 FIM items with the exception of toileting and bowel management (see Table 3).

Table 3: Results of Paired t-tests for items on the FIM (n=40)

Variable	Mean (SD)	SEM	t value (df=39)	p≤
Eating	-.25 (.54)	.09	-2.91	.006
Bathing	-1.2 (1.56)	.25	-4.88	.001
Grooming	-.48 (8.77)	.14	-3.43	.001
Dressing Upper Body	-.43 (1.08)	.17	-2.48	.02
Dressing Lower Body	-.88 (1.57)	.25	-3.56	.001
Toileting	-.35 (1.35)	.21	-1.64	.11
Bladder Management	-.58 (1.24)	.20	-2.94	.006
Bowel Management	-.33 (1.19)	.19	-1.73	.091
Transfer: Bed, Chair, Wheelchair	-.80 (1.14)	.18	-4.45	.001
Transfer: Toilet	-.70 (1.14)	.18	-3.89	.001
Transfer: Tub, Shower	-2.00 (1.83)	.29	-6.93	.001
Walk-Wheelchair	-.53 (1.15)	.18	-2.88	.006
Stairs	-1.43 (1.78)	.28	-5.06	.001
Comprehension	-.18(.45)	.07	-2.48	.018
Expression	.15 (.36)	.06	-2.62	.012
Social Interaction	-.30 (.76)	.12	-2.50	.017
Problem Solving	-.38 (.81)	.13	-2.94	.005
Memory	-.28 (.55)	.09	-3.14	.003

As the admission and discharge FIM scores were found to be significantly different, four multiple regression analyses were used to determine the predictive variables. The first multiple regression analysis was used to determine the ability of the 18 individual FIM items to predict the change in FIM score from admission

to discharge. The single best predictor of change in functional status from admission to discharge was toileting ($r^2 = 0.54$). Although there was no significant improvement in toileting over time (admission to discharge), the level of toileting function at admission was found to be a good predictor of total discharge function. Of the other variables examined, stairs, and bladder management added significantly to the toileting score by contributing another 20% and 11% respectively to the variance of the predicted equation.

The second multiple regression analysis was used to determine the ability of the change in the motor and cognitive dimension FIM scores to predict the change in FIM score from admission to discharge. The single best predictor of change in functional status from admission to discharge was the change in motor dimension score ($r^2 = .97$). The change in cognitive dimension score completed the total equation ($r^2 = .30$). The motor dimension would therefore seem to be the most significant factor in overall functional status.

The third multiple regression analysis further analyzed the change in motor dimension scores to predict the change in FIM score from admission to discharge. The single best predictor of change in functional status from admission to discharge was self care ($r^2 = .80$). Of the other motor dimension items examined, mobility and sphincter control added to the self-care score by contributing another 8% and 5% respectively to the variance of the predicted equation.

The fourth multiple regression analysis further analyzed the change in cognitive dimension scores to predict the change in FIM score from admission to discharge. The single best predictor of change in functional status from admission to discharge was social cognition ($r^2 = .99$).

Research Question 2

Is there a change in functional status from discharge to follow-up as measured by the FIM scores?

The second examination of change in functional status was between discharge and in-person follow-up as measured by the FIM scores. Results from paired t-test analysis suggest there was no significant difference between discharge functional status and in-person follow-up functional status as measured by the FIM scores ($p = .668$). While the follow-up score (mean = 106.98, SD = 13.52) was slightly lower than the mean at discharge (mean = 107.55, SD = 13.31), the decrease was not statistically significant.

Research Question 3

Is there a difference between follow-up scores using a self-report or proxy telephone assessment (FONE FIM) and follow-up scores using an in-person assessment (FIM)?

The third examination of change in functional status was between follow-up scores using a self-report telephone assessment (FONE FIM) and follow-up scores using an in-person assessment (FIM). Paired t-test analysis indicated that while the mean FONE FIM score (mean=107.60, SD=15.62) was slightly higher than the follow-up score mean (mean=106.98, SD=13.52), the increase was not statistically significant (p=.31).

Research Question 4

Is there a change in functional status between admission, discharge, in-person follow-up and telephone follow-up as measured by the FIM scores?

(a) when comparing diagnosis?

(b) when comparing age group?

An ANOVA was completed by dividing the sample into the four diagnostic categories (cerebral vascular accident, orthopaedic, cardio/pulmonary, other). Results of the ANOVA showed that there was no significant difference in discharge FIM scores between the four diagnostic groups (F value=1.9; df=3.36; p=.15) (Table 4).

Table 4: Comparison Between Diagnostic Groups by Discharge FIM scores

Diagnosis	n	Admit (SD)	Discharge (SD)	Followup (SD)	FONE (SD)
CVA	7	87.57 (20.39)	99.14 (14.05)	93.57 (11.86)	91.43 (16.59)
Ortho	12	90.00 (18.07)	105.33 (15.45)	106.58 (15.80)	107.67 (16.90)
Cardiopul	10	103.80 (11.79)	113.20 (7.73)	108.70 (10.67)	109.10 (11.07)
Other	11	102.09 (14.22)	110.18 (12.70)	114.36 (7.93)	116.45 (9.53)

NOTE:
CVA: Cerebral Vascular Accident and Associated Conditions
Ortho: Orthopaedics and Associated Conditions
Cardio/Pul: Cardiopulmonary and Associated Conditions
Other: Conditions not classified elsewhere

A second analysis was completed by dividing the sample into two age groups by the sample mean (≤ 79 and ≥ 80, mean age of sample = 80.68, SD = 7.45). There was no significant difference in admission, although there was a significant difference in discharge and follow up FIM scores as shown in Table 5.

Table 5: Summary for Comparison Between Age Groups By Admission, Discharge and Follow-Up

Variable	≤ 79 years (n=17) Mean FIM score (SD)	≥ 80 years (n=23) Mean FIM score (SD)	t (df=38)	p≤
Admission	99.06 (16.99)	94.35 (17.13)	.86	.39
Discharge	112.35 (10.38)	104.00 (14.31)	2.04	.05
Follow-up	112.18 (8.99)	103.13 (15.13)	2.19	.04

Research Question 5

What is the relationship between discharge FIM scores and length of stay?

The change in functional status over time was analyzed by correlating change in functional status from admission to discharge with respect to length of stay. There was moderate correlation (Pearson r=0.47) (p.002) indicating that those clients with shorter length of stay periods had higher discharge FIM scores, and those clients with longer length of stay periods had lower discharge FIM scores. On further analysis, clients with shorter length of stay were often those with higher admission FIM scores (Pearson r=-0.51) (p≤.001).

Research Question 6

What is the relationship between cognitive status and overall functional status?

As the discharge MMSE score was not collected by the EGH, it is not possible to determine if the rehabilitation program had an effect on the clients' mental status. Paired t-tests between admission and follow-up MMSE scores revealed no significant difference ($p=.21$) between the two MMSE results, and they had a Pearson correlation of $r=0.79$ ($p \leq .001$). The relationship between cognitive status and overall functional status was determined by examining the correlation of the MMSE follow-up scores and the follow-up FIM scores. The hypothesis was that higher functional status scores at follow-up as measured by the FIM scores would be positively correlated with higher cognitive status scores as measured by the MMSE at follow-up. The Pearson correlation was $r=0.62$ ($p \leq .001$). Regression analysis was then employed where the follow-up FIM score was the criterion measure and FIM discharge score and MMSE at admission were the predictors. The variance due to discharge FIM scores was removed to determine the predictive ability of the MMSE on functional status. The predictive ability of the admission MMSE score on follow-up was ($r^2=.31$).

The MMSE follow-up results from this study were compared to the normative data established by Crum et al., (1993) using paired sample t-test. There was no significant difference ($p=.10$) between the research data and the

established normative data. The sample was therefore considered representative of the cognitive abilities of the population according to age and educational level.

Research Question 7

What is the relationship between satisfaction with life and overall functional status?

As life satisfaction depends on an individual's expectations, the functional status at discharge may be considered to be the standard for expectations and the change from this as a basis for judgements about life satisfaction. Therefore, the change scores (FIM discharge scores to FIM follow-up scores) were used to correlate the SWLS scores. The correlation was negligible (0.035) ($p=.83$) indicating that there is little correlational relationship between functional status and satisfaction with life. This result was surprising, although after reviewing the SWLS results, it was noted that those clients with lower cognitive status often still maintained a high rating of satisfaction with life, even though their functional status was comparably lower to the rest of the sample. Many of these participants were often not particularly aware of their surroundings, or their decreased cognitive and functional abilities, which likely influenced the high overall rating they gave to life satisfaction.

As the literature suggested that SWLS was affected by marital status in a positive way (Arrindell et al., 1991), an ANOVA was completed using SWLS as the dependent variable and marital status as the independent variable. There were

no significant differences between the 4 groups (married, widowed, divorced, never married) (f value=.72; df=3,36; p=.55) as shown in Table 6.

Table 6: ANOVA Summary for Comparison Between Marital Status and SWLS

Variable	n	SWLS Mean (SD)
Married	13	27.38 (4.39)
Widowed	18	24.17 (7.76)
Divorced	5	24.00 (6.63)
Never Married	4	25.5 (3.70)

There was also no significant differences between the two age groups divided by the mean age (mean age=80.68, SD=7.45; p=.12; t=1.57) as shown in Table 7.

Table 7: Summary for Comparison Between Age Group and SWLS

Variable	SWLS Mean (SD)
≤ 79 Years	23.53 (6.71)
≥ 80 Years	26.65 (5.82)

Research Question 8

Which themes were present in analysis of the qualitative data?

Themes apparent in the qualitative analysis were:

1. Loss of independence (e.g., family controlling/interfering, difficulty adjusting to disability (no longer able to drive, need for oxygen, decreased

ability to walk, decreased ability to fix up house, living in new home and having to give up possessions).

2. Sadness/Loneliness (e.g., loss of previous healthy/independent life style).
3. Thankfulness (e.g., reunited with spouse, back to own home, appreciation of current health, appreciation of family and friends).
4. Resolution/Conclusion (e.g., "... when my time comes I will be ready.")

While the "loss of independence" theme was most prevalent (31 participants), the "sadness/loneliness" theme and the "thankfulness" theme were equally prevalent (25 participants). The "loss of independence" and "sadness/loneliness" themes are related in that usually the loss of independence was expressed as sadness, although these themes were counterbalanced by the thankfulness theme. Clients often began by stating their concerns which was understandable as the researcher had just completed an assessment which would bring their functional difficulties to the forefront, and the client was therefore often made fully aware of their limitations in functional performance (loss of independence, sadness/loneliness). With discussion of the positive elements of the assessment, the clients usually had good things to say about themselves and their lifestyle (thankfulness). Not surprisingly, it was clients who were living alone, or who were alone for a great part of the day, who described their feelings of loneliness. It was the older participants ($\geq$87 years) in the sample who described

resolution (9 participants), although it was not described in a despondent manner, rather a settlement to their overall life.

CHAPTER V

DISCUSSION AND CONCLUSIONS

Limitations of the Study

The limitations in this study are as follows:

1. Clients who declined to participate in the study may have been those at risk for not maintaining their functional status and the sample may therefore have been biased towards those who have a higher functional status following discharge. The clients who were ineligible to participate in the study were predominantly clients who had been readmitted to a hospital in the intervening period between discharge and follow-up (80%). There were only two (20%) ineligible clients who refused to provide consent at the time of the study.
2. Although clients who were discharged back to acute care or long term care centres from the EGH take part in the EGH rehabilitation program, they were not included in this study. Further research should be carried out with this population as they may be at greater risk for not maintaining their functional status following discharge from the EGH.
3. Although not the specific intent of this study, the difference, if any, between client assessment and proxy assessment with the telephone

interview was not detectable as only four caregivers had to respond on the clients behalf. The issues of perception of burden of care by caregiver and clinician expectations of client care by the caregiver should be addressed in future studies.

4. Functional status of the psychogeriatric population was not examined as the sample was limited to those with a primary diagnosis of physical disability. Due to the effect of cognition on functional status, this population may be at greater risk for poor functional status results following discharge.

5. Due to financial constraints, this study included only clients who reside in Edmonton. Those who reside in rural Alberta may be at greater risk for not maintaining their functional status following discharge as there may be decreased availability of community assistance (homecare, support groups).

Discussion and Clinical Implications

The major findings of this study are that there was a statistically significant difference between admission and discharge FIM scores, and that there was no statistically significant difference between the discharge and the follow-up scores, nor was there a statistically significant difference between the in-person assessment and the telephone assessment. The motor dimension scores would seem to be the most predictive of overall functional status at discharge with toileting, stairs and bladder care being the most significant predictors. This is not surprising as these

functional skills require significant amounts of mobility and motor control (e.g., toileting includes maintaining perineal hygiene and adjusting clothing before and after toilet or bed pan use).

The overall goal of rehabilitation programs is to increase clients' functional skills with the objective of maintaining or improving performance so that by discharge a certain level of functional performance has been reached. The clients' retention of that level of function is the primary issue. Nevertheless, following discharge each individual must set their own goals taking into consideration their living arrangements, available support, time and resources. The results of this study demonstrated that there was a slight decrease in total FIM scores from discharge to follow-up. This is understandable as an individual may choose to request assistance with self care in the home as they may wish to conserve their energy for other tasks that they consider to be more important or more enjoyable to be performed later in the day. This is an area which requires further research using a longer discharge to follow-up time interval. Overall, it was reassuring that the clients' follow-up scores were not statistically significantly different from discharge scores, indicating that they had retained their rehabilitation skills and that the rehabilitation program had been effective. Other variables which may have had an effect on the ability of the clients to maintain their functional status include family support systems, and individual client motivation.

The results from the telephone interview and the in-person follow-up assessment indicate that with screening of the subject (ensuring a pre-established level of cognitive, speech, language and hearing abilities), the telephone interview is an accurate method of establishing functional status. The FONE FIM score was slightly higher than the Follow-UP FIM score, although this difference in mean scores is likely not clinically significant. A slight increase in FONE FIM scores was expected as the literature demonstrated that individuals tend to rate their functional status as more independent than an objective assessor (Edwards, 1990, 1990, Weinberger et al., 1992). This has tremendous follow-up implications as it is a more cost effective method of data collection. Further research implications could involve training lay personnel to collect the telephone follow-up data and compare their results to professional telephone follow-up data as lay personnel would be more cost effective.

With respect to age group, it would seem that younger participants in the sample show more improvement while in hospital and maintain that improvement following discharge home. Also, those clients whose admission FIM scores were comparably higher had shorter a length of stay period. This is understandable as by virtue of their higher entry level skills they had less improvement to make in their rehabilitation program.

The impact of cognitive status on functional status must not be overlooked as it is a significant factor. From this research it does not appear that there is a relationship between functional status and life satisfaction, although this is in contradiction to the literature. The qualitative aspect of the study reveals that there is a prevalent theme of loss of independence as well as sadness and loneliness, indicating that the clients had difficulty adjusting to their loss of previous lifestyle, although they report overall satisfaction with life. This apparent contradiction between the qualitative data and the life satisfaction data warrants further investigation. There is a clinical implication for the EGH rehabilitation program as the themes of "loss of independence" and "sadness/loneliness" were prevalent. It may be possible to predict which clients will be likely to experience feelings of "loss of independence" and "sadness/loneliness" by examining their life situations (e.g., family setting, physical/functional losses, living arrangements). As supported by Delaney (1991) the EGH program would benefit by providing adjustment strategies for the clients at risk for "loss of independence" and "sadness/loneliness" prior to discharge (e.g., support groups, discussion of most suitable living situation, becoming accustomed to changes in physical/functional status).

While it is reassuring to EGH program providers that they are effective in the provision of their geriatric rehabilitation program, there are several implications for future research. Further studies should be carried out to examine:

the functional status of clients readmitted to hospital in the intervening period between discharge and follow-up; the functional status of clients discharged to long term care or acute care settings from the rehabilitation hospital; the functional status of the psychogeriatric population; the functional status of clients discharged in rural areas; and the differences in proxy versus observer evaluation in terms of burden of care and clinical expectations.

Summary

In these times of fiscal restraint it is a primary concern to prove that existing hospital programs are effective. The clients in this study demonstrated improvement in their functional status from admission to discharge and retained their functional status following discharge from the EGH, and thus the justification for the geriatric rehabilitation program has been initially proven for clients with a primary diagnosis of physical disability who were discharged to a home or lodge setting. The results of this research proposal has provided preliminary data on which to base further studies.

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APPENDICES

APPENDIX A
FUNCTIONAL INDEPENDENCE MEASURE

7	Complete Independence (Timely, Safely)	No Helper
6	Modified Independence (Device)	
Modified Dependence		**Helper**
5	Supervision	
4	Minimal Assist (Subject = 75%)	
3	Moderate Assist (Subject = 50%)	
Complete Dependence		
2	Maximal Assist (Subject = 25%)	
1	Total Assist (Subject = 0%)	

	Self Care
A.	Eating
B.	Grooming
C.	Bathing
D.	Dressing-Upper Body
E.	Dressing-Lower Body
F.	Toileting
	Sphincter Control
G.	Bladder Management
H.	Bowel Management
	Mobility
	Transfer
I.	Bed, Chair, Wheelchair
J.	Toilet
K.	Tub, Shower
	Locomotion
L.	Walk/wheel Chair
M.	Stairs
	Communication
N.	Comprehension
O.	Expression
	Social Cognition
P.	Social Interaction
Q.	Problem Solving
R.	Memory

FROM: Research Foundation of the State University of New York. (1990). Functional Independence Measure. State University of New York at Buffalo, Department of Rehabilitation Medicine: Author.

APPENDIX B

MINI-MENTAL STATE EXAMINATION

(Must be scored out of 30)

Patient No.:_____

Date:_____
Examiner:_____
Total Score:_____

I ORIENTATION (Maximum score 10)

What date is today?	1.____
What year is this?	2.____
What month is this?	3.____
What day is this?	4.____
What season is this?	5.____
What is the name of this building?	6.____
What floor are we on?	7.____
What city/town are we in?	8.____
What province are we in?	9.____
What country are we in?	10.____

II REGISTRATION (Maximum score 3)

I am going to name three objects. BALL, FLAG, TREE - What were those objects?	11.____ Ball
Repeat the words until the patient learns them.	12.____ Flag
(up to six trials). Number of trials _____	13.____ Tree

III ATTENTION AND CALCULATION (Maximum score 5)

Ask the subject to begin at 100 and count backward by seven. (If the subject will attempt even one subtraction, score the serial 7's in preference to the spelling task.)	14.____
93 ___ 86 ___ 79 ___ 72 ___ 65	15.____
If the subject cannot or will not perform this task ask to spell the word "world" backward. The score is one point for each correctly placed letter. D L R O W	16.____ 17.____ 18.____

IV RECALL (Maximum score 3)

What were those three objects I named a minute ago (Do not give clues.)	19.____ 20.____ 21.____

V LANGUAGE (Maximum score 9)

a) Naming	What is this? (point to a watch) What is this (point to a pencil)	22.____ 23.____
b) Repetition	"No ifs, ands, or buts." Repetition should be exactly correct.	24.____
c) Three stage command - Please follow the instructions. (Give all three instructions together.) "Take the paper in your right hand; fold the paper in half" put the paper on the floor." Score 1 point for each part correctly executed.		25.____ 26.____ 27.____
d) Reading - Please read and do what the sign says. Show the sign with "close your eyes". Score correct only if patient actually closes his/her eyes.		28.____
e) Writing - Please write a sentence of your choice. Sentence must contain a subject and verb. (Ignore spelling errors.)		29.____
f) Copying - Please copy this design. (Give patient pentagon design - ensure 10 points, 2 of which are overlapping.)		30.____

COMMENTS: Note possible barriers to the reliable use of this test. i.e., education level, language, anxiety, cultural background.

From: Folstein, M.F. et al Mini-Mental State: A Practical Method of Grading the Cognitive State of the Patient for the Physician, Journal of Psychiatric Review 12, 189, 1975.

APPENDIX C
SATISFACTION WITH LIFE SCALE

1. In most ways my life is close to my ideal _____
2. The conditions of my life are excellent _____
3. I am satisfied with my life _____
4. So far I have gotten the important things I want in life _____
5. If I could live my life over, I would change almost nothing _____

Instructions for administering the scale are:

below are five statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding. The 7 point scale is:

1 = strongly disagree

2 = disagree

3 = slightly disagree

4 = neither agree nor disagree

5 = slightly agree

6 = agree

7 = strongly agree

Diener, E., Emmons, R.A., Larson, R.J., & Griffen, S. (1985). The satisfaction with life scale. Journal of Personality Assessment, 49, 71-75.

APPENDIX D
INTRODUCTORY LETTER TO CLIENTS, STAFF AND VISITORS
REHABILITATION OUTCOME STUDY

Attention patients and family

During September and October 1993 the Edmonton General Hospital (Youville Geriatric Service) is completing a project designed to give us information about how well out patients are doing after they have been discharged home.

The patients we see on this unit are being asked to participate in this project.

We are gathering information on the following:

The ability of patients to perform activities of daily living on admission, discharge and after returning home.

How patients rate their quality of life

How patients rate their stay in Youville

Patients who will be returning to their home or to an apartment or lodge in the greater Edmonton area will be asked to participate in this project.

Participation in this project is totally voluntary and all information gathered will be treated confidentially.
If you have any questions about this project please ask the occupational therapist or the charge nurse on this unit.

APPENDIX E
CONSENT

TITLE: An assessment of functional status in geriatric rehabilitation.

The purpose of this project is to determine how you are managing in your home, specifically how you maintain your daily living habits. In order to determine this the researcher will complete an assessment with you today. After the assessment today, you will also be asked to answer three sets of questions. The first set of questions will ask you to rate your quality of life and overall well being. The second set of questions will ask you to rate your stay at the Youville. The third set of questions will assist the researcher to gather information about your intellectual abilities. Finally, the researcher will either have completed a telephone assessment with you within the past week, or she will make an appointment to complete a telephone assessment with you within the next week.

I have been informed that the information from my hospital health records, the telephone assessment, and the assessment today will be used to study the effectiveness of rehabilitation programs.

CONSENT:

I, _____, agree to participate in the
(patient)
project described above.

I, _____, agree to participate in the
(caregiver)
project described above.

I understand that my participation is voluntary.

I may refuse to answer any questions, or refuse to participate in any part of the assessment.

I may withdraw from the study at any time without any negative consequences.

I agree to have my caregiver answer the researcher's questions on my behalf.

I recognize that I may not necessarily benefit from the study, although patients in rehabilitation hospitals and rehabilitation professionals in general may benefit from the information gathered.

I understand that all information given will be treated confidentially. My name will not appear on any of the completed questionnaires or data gathering forms - only an identifying code number.

My name will not be associated with any publications arising from the research as all information will be presented in summary form.

All questions that I had about the project have been answered to my satisfaction, but I will be free to ask further questions of the persons listed on this page at the telephone numbers listed below at any time during, or after the data collection.

Rose Merke	482 - 8108	Edmonton General Hospital (Youville)
Deb Cartwright	482 - 8161	Edmonton General Hospital (Youville)
Susan Slaughter	482 - 8599	Edmonton General Hospital (Youville)
Sarah Schwab	492 - 9686	University of Alberta
Helen Madill	492 - 2342	University of Alberta

I acknowledge that I have received a copy of this consent form.

_____	_____
Participants Signature (Patient)	**Date**
_____	_____
Participants Signature (Caregiver)	**Date**
_____	_____
Witness	**Date**
_____	_____
Researcher's Signature	**Date**

APPENDIX F
CARITAS CONSENT FOR RESEARCH

CARITAS HEALTH GROUP

16940 - 87 Avenue Edmonton, Alberta T5R 4H5 Tel (403) 484 8811 Fax (403) 486 8774

26 October 1993

Ms. Sarah Schwab,
Department of Occupational Therapy,
Faculty of Rehabilitative Medicine,
University of Alberta,
2 - 64 Corbett Hall,
Edmonton, Alberta,
T6G 2G4.

Dear Ms. Schwab:

RE: OUTCOMES OF GERIATRIC PATIENTS DISCHARGED FROM HOSPITAL

I am very pleased to confirm that the Research Steering Committee of Caritas Health Group, at their October 15, 1993 meeting, has approved the above research project from an ethical and scientific viewpoint. The Committee requested that the *Information and Consent Form* and *Statement of Consent* be printed on Caritas letterhead. As well, the Committee requested that a phrase be added to stating that 'your Medical Record may need to be reviewed'.

We would appreciate a report to our Committee on completion of this project. It would also be appreciated if credit would be given to Caritas and its Research Steering Committee in publications when appropriate. All financial arrangements must be submitted and approved by Mr. Anand Rao, Controller, Financial Operations, of Caritas.

If you have any questions, please do not hesitate to contact me. You can page me at the Grey Nuns Hospital or leave a message with Peggy Morton at 930-5924.

Yours truly,

Peggy Morton

for Dr. G.F. MacDonald, M.D., FRCP(C)
Chairperson,
Research Steering Committee

/pm

Members: Edmonton General Hospital Grey Nuns Hospital Misericordia Hospital