

EVIDENCE BASED NURSING: OUTCOME TRENDS
FOLLOWING INPATIENT REHABILITATION

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submitted in accordance with the requirements
for the degree of

DOCTOR OF LITERATURE AND PHILOSOPHY

In the subject

HEALTH STUDIES

at the

UNIVERSITY OF SOUTH AFRICA

PROMOTER: PROF O N MAKHUBELA-NKONDO

NOVEMBER 2008

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List of abbreviations

CMS	Center for Medicaid and Medicare Services
DALY	Disability Adjusted Life Years
FIM	Functional Independence Measure
GBD	Global Burden of Disease
ICIDH	International Classification of Impairment, Disabilities, and Handicaps
IRF	Inpatient Rehabilitation Facility
LOS	Length of Stay
PAI	Patient Assessment Instrument
PPS	Prospective Payment System
PWD	Persons with Disabilities
WHO	World Health Organization

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Chapter 1

BACKGROUND INFORMATION

1.1 INTRODUCTION

Access to rehabilitation services for the disabled, has become globally inequitable (Green-Hernandez 2006:52). Research has shown that patients in countries where rehabilitation is offered fare better and achieve a higher level of function than do patients in countries where rehabilitation is not available (Health Canada 2006). In some countries, such as in the United States of America, participation in rehabilitation initiatives or joint ventures with governmental agencies has dominated the healthcare culture, to determine who will receive inpatient rehabilitation services and who will not. The current Federal government system, proposed by the Centre for Medicare and Medicaid Systems, is continually evolving, making changes in rules and regulations that determine who may receive services and for what length of time (Esselman 2004). Currently, this excludes some populations from receiving inpatient rehabilitation services that could facilitate their functional existence in the community. Disparities in healthcare availability and its delivery, supports the need to improve access to services.

1.2 ACCESSIBILITY OF REHABILITATION

An estimated 600 million people in the world have a disability and lack access to rehabilitation services (World Institute on Disability 2003:1). Eighty percent live in low-income and middle income countries where rehabilitation

services are limited or nonexistent (WHO 2006). Forty three percent of people with disabilities live in poverty (Miles 2006:1). Therefore, rehabilitation services may be considered a luxury and without financial resources, are unavailable. The World Health Organization, in a six year plan (2006 to 2011), is guiding and supporting countries to increase public health programs that promote rehabilitation and make available needed assistive devices to persons with disability (WHO 2006). In many countries, disability is excluded from public health and other social policies, which support and protect persons with disability, resulting in stigma and discrimination.

According to the “Standard Rules in the Equalization of Opportunities for Persons with Disabilities”, proposed by the United Nations (2006), various systems of society and the environment, such as rehabilitation services and activities, and rehabilitation health information and documentation, are made available to persons with disabilities. The United Nations (2006) proposed that as persons with disability achieve equal rights, they should also have equal obligations. Therefore, provisions should be made to assist persons with disabilities, by providing needed rehabilitation services, to assume full responsibility as members of society. Although these rules are not compulsory, they become international customary rules when applied by a large number of states (United Nations 2006). The rules offer an instrument for policy-making and action to persons with disabilities.

1.3 PREVELANCE OF THE POPULATION

It is estimated that 98% of people with disabilities in developing countries do not have access to rehabilitation and appropriate basic rehabilitation services (World Institute on Disability 2003). Developing inclusive rehabilitation programs and services could promote the inclusion of all persons with disabilities to improved outcomes. The composition of the population of persons with disability is rapidly changing. It is necessary to understand the global trends of persons with disabilities among varied populations, to plan and develop policy and health care services to meet their vast health care needs.

Health statistics for these populations are the source for estimates of the global burden of disease (GBD) (Institute of Medicine 2001). The WHO (2001) and World Bank (2005) developed the GBD to combine losses from premature death and losses of healthy life resulting from disability (Stanhope & Lancaster 2008:82). People who have debilitating injuries or disabling diseases must be cared for, often by families, and therefore, can no longer contribute to the family's or community's economic growth. This GBD represents units of disability-adjusted life years (DALYs) (World Bank 2005; Stanhope & Lancaster 2008:82). Overall, global premature deaths during the 1990s accounted for 66% of all DALYS lost, with debilitating injuries and diseases, accounting for 34% (Stanhope & Lancaster 2008:82). However, these statistics from developing countries are sometimes incomplete, inaccurate, or out of date, and rarely contain all information needed. However, they do provide information necessary

for understanding the magnitude of the burden of disease of persons with disabilities and for confronting the worldwide needs imposed by that burden.

In the United States of America Census of 2000, populations were assessed to determine and define disability based on functional limitations. The census identified six subpopulations of disability: physical disability, sensory disability, mental disability, self care disability, go outside home disability, and employment disability (Stanhope & Lancaster 2008:686). The ranking of cases of disabilities among non-institutional persons, greater than 18 years old, beginning with the greatest incidence to the least is as follows: 1) Arthritis, 2) Back or spine problems, 3) Heart trouble/ hardening of the arteries, 4) Lung or respiratory problem, 5) Deafness or hearing problem, 6) Limb/ extremity stiffness, 7) Mental or emotional problem, 8) Diabetes, 9) Blindness or vision problems, 10) Stroke, 11) Broken bone/ fracture, 12) Mental retardation, 13) Cancer, 14) High blood pressure, 15) Head or spinal cord injury, 16) Learning disability, 17) Alzheimer's disease/ senility/ dementia, 18) Kidney problems, 19) Paralysis, 20) Missing limbs (Centre for Disease Control 1999; Stanhope & Lancaster 2008:683).

Reported disability prevalence rates around the world vary from under 1% in Kenya and Bangladesh to 20% in New Zealand (Mont 2007). This variance in report of incidence may be caused by several factors including, differing definitions of disability, differing methods of data collection, and variations in the quality of study designs. The result is a lack of prevalence rates that are not understandable and internationally comparable (Mont 2007:9). Further,

complications exist in that the nature and severity of disabilities varies and reported measures are dependent on the intent of measuring. The purposes for collecting data on persons with disabilities and to determine the level of functioning in a population, designing service provisions for the needs of the population, and finally, providing equalization of opportunity for all persons with disability (Mont 2007).

In the United States of America, increase in the number of elderly with disability and chronic disease, children with disabilities and persons with disabling mental conditions, utilize rehabilitation services. The trend, particularly among the geriatric or elderly population with a disability, continues toward segregation and institutionalization (Wiersma 2000:2). Americans are living longer and extending the amount of time lived with chronic diseases and disabilities. By the year 2050, more than 20% of the population of the United States of America, will be 65 years or older with chronic diseases and disability (Centre for Disease Control 1999). However, trends for younger people with disabilities have been towards community reintegration. Populations are living longer due to advances in medical treatments and technology and therefore, the prevalence of disability and chronic disease and need for rehabilitation services is increasing (Lubkin & Larsen 2006:596).

The incidence of persons with disabilities are represented by many different regions of the country in the United States of America, and have been reported by Houtenville (2006). High disability rates have been identified throughout the

southern states, particularly east of Texas, the general geographic location for this study. The Northern states demonstrate the lowest rates of disability, especially west of the Mississippi River through the mid western part of the country. The West coast has reported only moderate disability rates (Houtenville 2006). Rehabilitation services to meet the needs of these differing geographic areas need to be considered, as well as differences among the globe.

The general prevalence measures of disability for international comparison from a census-based approach, according to Mont (2007), is as follows by country: United States 19.4% (2000), Canada 18.5% (2001), Brazil 14.5% (2000), United Kingdom 12.2% (1991), Poland 10% (1988), Ethiopia 3.8% (1984), Uganda 3.5% (2001), Mali 2.7% (1987), Mexico 2.3% (2000), Botswana 2.2% (1991), Chile 2.2% (1992), India 2.1% (2001), Colombia 1.8% (1993), Bangladesh 0.8% (1982), Kenya 0.7% (1987). In another report by the International Federation of Red Cross and Red Crescent Societies (2003) concerning the South Africa Region, the HIV/AIDS epidemic alone represents 25% of the adult population. The "Southern Africa Regional Programmes and National Society Capacity Building" reported an estimated 120 million people, with approximately 80% living below the poverty datum line (International Federation of Red Cross and Red Crescent Societies 2003:2). However, it is important to note the limitations of varying definitions of disability and cultural variability, as well as differing reported years of statistics and non-standard measures, to provide comparable prevalence rates internationally.

1.4 CULTURAL INFLUENCES ON REHABILITATION

Providing culturally competent care is complicated by the diversity of the people with disabilities and the lack of diversity of rehabilitation providers (National Centre for Dissemination of Disability Research 1999). Projections from the United States Census Bureau (1999) indicate that by 2050, the population will increase to 394 million, from 263 million in 1995, and minorities will account for almost 90% of this growth. According to Houtenville (2006), the varied ethnicity of the current data of persons with disability in the United States of America population alone, is as follows: Asian 6.3%, Hispanic 10.4%, White alone 12.6%, Pacific Islanders 12.7%, Black or African Americans 16.8%, Alaska Native 21.3%, and American Indian 22.4%. This data is representative of the working age group, 21 to 64 years old, with an even greater prevalence in older populations at an increasing rate (Houtenville 2006). A major challenge for the future will be providing culturally sensitive rehabilitation care to these diverse populations (Niemeir, Burnett & Whitaker 2003).

Culturally competent health care is defined as sensitivity to the differences between groups, to the differences in behaviour, and to the attitudes and meanings attached to emotional events such as disability (Seibert, Stridh-Igo & Zimmerman 2002; Lubkin & Larsen 2006:597). Ethnicity and culture influence the rehabilitation process and influences how clients and families perceive disability and may access rehabilitation services. Sensitivity to issues related to culture, race, gender, orientation, social class, and economic class can influence

clients' acceptance of rehabilitation services (Lubkin & Larsen 2006). Race, culture, language, experience and belief systems may also affect clients' access to information and services, goals for rehabilitation and independent living (NCDDR 1999; Lubkin & Larsen 2006). According to Seibert and colleagues (2002), considerations when providing culturally competent care might include:

- 1) identifying the rehabilitation client's preferred method of communication and obtaining translators when needed;
- 2) learning and identifying the rehabilitation client's culture and belief system;
- 3) respecting the rehabilitation client's beliefs and values that are different from the caregivers or rehabilitation health care provider(s); and
- 4) identifying client and family misconceptions or unrealistic views about care-giving of persons with disabilities, treatments and/or the recovery process.

Varied perceptions illustrate cultural differences in varied populations around the globe. Some cultural differences influencing rehabilitation have been identified. However, professional rehabilitation nurses and the interdisciplinary rehabilitation team must learn from the ethnic and cultural groups themselves for effective delivery of rehabilitation services. As described, in the United States of America, there is an ethnically varied population, with vast cultural differences effecting rehabilitation among the population. For example, in the Hispanic population, the belief that severe disability is a stigma for the family exists, yet they rely heavily on the family as their support system (Lubkin & Larsen

2006:597). In the Asian American population, there are feelings of guilt and shame in having a disability and as a result, health care delivery systems, including rehabilitation services, may not be sought (NCDDR 1999; Lubkin & Larsen 2006). Native American languages do not have words for the disabled, but use terms descriptive of the disability, providing a barrier to the understanding of rehabilitation services (Lubkin & Larsen 2006:598). In addition, African Americans may have a much broader view of normalcy, as opposed to disability, impacting their perception of the need for rehabilitation services (NCDDR 1999). This view is also compounded by their spiritual beliefs being important in determining the cause and the treatment of the disabilities. Believing that disability results from previous misdoings may eliminate securing rehabilitation services.

As a result of culturally varied populations, it is imperative that the varied cultural differences that influence perceptions of disability be considered by the rehabilitation health care delivery system. The growing number of immigrants, the blending of cultures, and the development of rehabilitation policy throughout the world, will challenge the rehabilitation professional and the much needed delivery of rehabilitation services (NCDDR 1999; Lubkin & Larsen 2006:598).

1.5 INSTITUTIONALIZATION OF PERSONS WITH DISABILITY

Following World Wars I and II in the United States of America, the numbers of persons with disabilities increased and forced society to develop more progressive rehabilitation alternatives to earlier institutional “warehousing”

(King 2000). Financial and vocational incentives for persons with disabilities, enhanced opportunities, shifting from institutions to living independently within the community, with greater safety and less reliance on others in society. Such progress would never have occurred without deinstitutionalization. However, current streamlining of financially driven corporate approaches to health services for the disabled, whether provided within institutions or institutionalized within the community, should ensure that functional gains made from rehabilitation services are not lost and persons with disabilities continue to receive needed rehabilitation services (King 2000:5).

To prevent institutionalization of persons with disabilities, the process of de-institutionalization must be examined. Institutionalization defines people with a special or different need from the mainstream of society, where needs could be better met (Wiersma 2000). However, the society of the persons with disability must be aware of the effects of institutionalization, and the alternative arrangements for community living explored. This may be achieved for persons with disability by offering inpatient rehabilitation programs, to prepare and examine the possibility of community re-integration. Appropriate discharge decisions into the community for persons with disabilities could be best determined after intensive rehabilitation services are received and functional gains or limitations are determined.

The lack of autonomy in institutional living promotes feelings of dissatisfaction, resulting in a decrease in overall well-being (Donnenwerth &

Peterson 1992:439; Wiersma 2000:2). In addition, concern with functional limitations while ignoring the quality of life may be complicated by stigmatization in institutional living. Persons with disabilities who enter an institution are more likely to experience an increase in disabilities than experience rehabilitation and greater independent living (Uhlenberg 1997; Wiersma 2000). Even though emphasis may be placed on physical health or even rehabilitation within the institution, other needs such as, social, emotional, spiritual, intellectual and environmental issues may be ignored and thus, complicating successful or effective rehabilitation of the persons with disability (Kappel 1995; Thomas 1996; Wiersma 2000). Therefore, institutionalization of persons with disabilities does not focus on rehabilitation into community living.

The governments of health care delivery systems need to examine re-inventing money spent on institutionalization into home and community supports, post acute rehabilitation delivery. As more funding is allocated to community services for the disabled, more research on the benefits of community reintegration and the negative effects of institutionalization are required. Community living of persons with disabilities promotes independence and is encouraged as the optimal goal of service, post discharge from acute rehabilitation. The feelings of purpose and value are increased, resulting in taking responsibility for oneself. Progress toward deinstitutionalization of persons with disabilities is dependent on political will and societal values.

1.6 REHABILITATION PRACTICE TRENDS

While promoting independence and deinstitutionalization, it is imperative to examine the practice trends of rehabilitation. In the United States of America, the number of free standing physical rehabilitation hospitals increased by 85% from 1985 to 1990, and the number of physical rehabilitation beds increased 61% (DeLisa, Martin & Currie 1988:25). These same statistics have continued to increase to the year 2000. However, the costs or cost effectiveness, which has led to cost containment efforts, is predicting the future of rehabilitation practice and limiting the current growth of rehabilitation services. It has been reported (Fowler 2007) that between 2004 and 2008, 98 acute rehabilitation programs closed across the nation. This trend is expected to continue. Social and economic pressures are forcing alternative cost effective methods for providing rehabilitation services. Public support for rehabilitation services must be correlated to reliable scientific data, or evidence based practice, that relates treatment to effectiveness and outcome (DeLisa et al 1988:26).

Although cost containment will be a major driving force, there must be assurance of the quality of services and programs. It is the financial and clinical interests of rehabilitation providers to have payment driven by functional outcome. It is important for rehabilitation nursing and other providers of rehabilitation care delivery to develop practice standards in rehabilitation for persons with disability with limited potential for full independence. Health care

providers will need to offer the continuum of care to meet the patient's total rehabilitation needs post discharge from inpatient rehabilitation.

The practice of rehabilitation and its providers, has historically failed to document the effects of rehabilitation services, the effectiveness of rehabilitation treatments, and the related positive client outcomes (Keith 1987; Lubkin & Larsen 2006). Many providers and advocates of rehabilitation believe evaluation of rehabilitation services should not be computed by short terms costs, but should include the long term benefits of clients who experience any decrease in their level of dependency. The high economic cost of dependency, maintenance, and loss of productivity, has defined care for persons with disabilities as a social issue (Lubkin & Larsen 2006).

1.7 BACKGROUND OF REHABILITATION POLICY

The development of disability policy to guide the availability of rehabilitation services has resulted over the past 200 years. Ignorance, neglect, superstition and fear are social factors identified in the history of disability that delayed the development of effective policy and isolated persons with disability throughout the world (WHO 2006). The rights of persons with disabilities acknowledged by the United Nations and other International organizations, resulted in the "International Year of Disabled Persons", 1981, and the "World Program of Action concerning Disabled Persons", adopted by the General Assembly in 1982 (WHO 2006). Both of these actions emphasized the rights of

persons with disabilities and provided opportunities throughout the globe for the promotion of rehabilitation services.

In a response to this need for health care policy for services of persons with disabilities, the WHO Action Plan for 2006-2011 resulted (WHO 2006). This action plan will be coordinated and implemented by the Disability and Rehabilitation Team (DAR) located in the Department of Injuries and Violence Prevention in the Non-communicable Diseases and Mental Health (NMH) Cluster. The vision of this action plan is that “all persons with disabilities live in dignity, with equal rights and opportunities” (WHO 2006). The nine priorities are as follows:

- 1) to produce a world report on disability and rehabilitation;
- 2) to raise awareness about the magnitude and consequence of disability;
- 3) to facilitate data collection, analysis, and dissemination of disability related data and information;
- 4) to support national, regional and global efforts to promote health and rehabilitation services for persons with disabilities and their families;
- 5) to promote community based rehabilitation (CBR);
- 6) to promote the development, production, distribution and servicing of assistive technology;
- 7) to build capacity among health/ rehabilitation policy;
- 8) to contribute to the development of international, national, and regional public health policies on disabilities and rehabilitation; and

- 9) to foster multi-sectional networks and partnerships to assist persons with disability (WHO 2006)

Currently this action plan is at its' inception and will be addressed for several years, until 2011. Many countries have begun to respond to this call for action. This research study will offer support to many of the priorities of this action plan of the World Health Organization for persons with disability. Specifically, the data collection, analysis and dissemination of disability related data and information; the promotion of health and rehabilitation services for persons with disabilities; and the influence and contribution to policy regarding rehabilitation service for persons with disabilities will be included.

1.8 BACKGROUND INFORMATION ABOUT THE RESEARCH

An individual's functioning, or lack of functioning resulting from a disease or disorder, requires professional nursing intervention. It is the role of the rehabilitation nurse to facilitate maximum function and independence in the disabled population (Hoeman 2002:144). The outcomes of rehabilitation interventions and rehabilitation programming are determined by a person's level of functional improvement, while the unit of analysis is the patient (Hoeman 2008). Practice patterns and policies tend to be provider-driven and focus on eliminating as much as possible, the condition that is causing the physical disability (Lutz & Bowers 2003). However, government agencies have determined which of these diagnoses or disabling conditions are appropriate to receive rehabilitation services (CMS 2005), based on insufficient evidence.

Therefore, the need for evidence based practice exists in the specialty practice of rehabilitation, specifically post acute rehabilitation services (Lubkin & Larsen 2006:496).

Evidence-based practice can be utilized to guide interventions and provide information on how to assist consumers of rehabilitation services, as they gain or regain their highest level of productivity and function. Rehabilitation nurses must define their position within the healthcare system and demonstrate their role in maintaining and improving health and even independence of persons with disability, based on this evidence-based practice. Thus, research is needed to show that post acute inpatient interdisciplinary rehabilitation services decreases the burden on the healthcare system by facilitating functional independence of the disabled (Lubkin and Larsen 2006). In addition, research is needed to provide implications for the role of rehabilitation nursing, in developing healthcare policy and practice.

In 1984, the FIM instrument was developed to address the functional status measurement issue in the proposed rehabilitation plan, the Prospective Payment System (PPS). In the years that followed, RAND and Medical College of Wisconsin investigated PPS, finding diagnoses alone explained very little of the variance in cost and that functional status explained more of the total costs for rehabilitation patients (RAND 2005). The VA Medical Centre of Los Angeles developed the concept of Functional Related Groups (FRGs) as a possible basis for rehabilitation prospective payment. This concept was refined in 1994 by

Stinemann and colleagues from the University of Pennsylvania to large rehabilitation databases for use as a patient classification system (Stinemann 2001). In 1994, the RAND Corporation (2005) was commissioned to study the stability of the FRGs and their performance related to cost rather than length of stay. Findings indicated that: FRGs remained stable over time, explained 50% of patient costs and 65% of facility costs, could be used as a case mix methodology to establish a PPS.

Information regarding outcome trends and the impact of changes in the Center for Medicare and Medicaid Services (CMS) Regulations for inpatient rehabilitation has been limited (Esselman 2004). Managed care oversight of rehabilitation admissions has resulted in pressure to achieve functional goals faster with a shorter length of stay (Murer 2006). The use of alternative treatment options has also increased, such as nursing home-based sub-acute rehabilitation and consolidation of inpatient rehabilitation facilities (IRFs) by large for-profit corporations (CMS 2005). Due in part to concerns about these trends, the United States of America's Congress enacted the Balanced Budget Act of 1997 that authorized the implementation of the Prospective Payment System (PPS) for inpatient rehabilitation which started in 2002. The PPS classifies patients into a case-mix group based on diagnosis; functional status measured by functional independence measure (FIM), age, and comorbidities. This case-mix group determines payment or reimbursement for rehabilitation services, and

therefore, determining who will receive rehabilitation services and who will not (Murer 2006).

According to the RAND Corporation (2005), “realized access” to care by necessary paid IRFs (inpatient rehabilitation facilities), changed in response to the prospective payment system of the 1990s and early 2000s. Payment systems on the use of post acute care (PAC) reduced the use of the site of care, including inpatient rehabilitation facilities. In addition, payment systems were implemented nationally, and were limited by uncontrolled analysis. Conclusions could not be made about the causal effects of payment changes. Overall, most of the payment systems that were intended to contain costs had the effect of decreasing the use of the site of care, including inpatient rehabilitation facilities (RAND Corporation 2005).

Beginning in 1984, the Health Care Finance Administration (HCFA) of the United States of America, now known as the Centers for Medicare and Medicaid Services (CMS), imposed a rule called the 75% Rule. This rule stated that 75% of all of the admissions to the acute rehabilitation facility had to have one of 10 diagnoses, known as the HCFA 10 (Courman 2006). However, research began in an effort to develop and refine this Prospective Payment System for inpatient rehabilitation facilities, delaying implementation. The United States of America Congress mandated in 1997, to implement the inpatient rehabilitation facilities prospective payment system, as soon as possible, and the criteria was published by the Health Care Financing Administration (HCFA). Following this mandate,

inpatient rehabilitation facilities were required to submit data by a computerized data system to establish and administer the PPS by grouping patients for payment. This resulted in the patient assessment instrument (IRF PAI) that continues to be refined (UDS for CMS 2005). The Final Rule for PPS was published for all consumers and health care providers in 2001. However, due to the refinement and criticisms, implementation of this payment system has again been delayed until 2008.

The “final rule”, referred to now as “HCFA 13”, contains 13 diagnoses selected to receive rehabilitation services. These diagnoses include: stroke, spinal cord injury, congenital deformity, amputation, fracture of the femur (hip fracture), burns, brain injury, major multiple trauma, neurological disorders, joint replacement, osteoarthritis, polyarticular rheumatoid arthritis (including psoriatic arthritis and seronegative arthropathies) and systemic vasculitides (CMS 2005). Although joint replacements are included, they are only included with other qualifying data, such as, if the patient is 85 years old or older, has bilateral joint replacements (both hips or both knees), or has a BMI of 50 or greater (CMS 2005). Many of the other diagnoses also have qualifying conditions and are defined in the CMS Report (2005). Therefore, rehabilitation services are limited and not all disabling diagnoses are allowed to receive rehabilitation, due to the 75% Rule, identifying select diagnoses and qualifying conditions.

The “final rule” time line for implementation for all inpatient rehabilitation facilities in the United States of America, CMS guidelines (2005), required 60%

compliance in 2005-2006, 65% compliance in 2006-2007, and 70% compliance in 2007 (Courman 2006). The American Medical Rehabilitation Providers Association (AMRPA) and many providers of rehabilitation services lobbying effects have delayed the implementation of the “75% Rule” until 2009. However, the impact on Rehabilitation Services and therefore, Rehabilitation Nursing Practice, is great, limiting access for a population requiring professional intervention from a disease or disorder that has impaired functional performance (Miller 2003).

Access to Rehabilitation Nursing and rehabilitation services in an acute rehabilitation facility is becoming limited due to the 75% Rule proposed by The Centres for Medicare and Medicaid Services (CMS 2005). The qualifying admission criteria of an individual’s functional decline and then potential for improvement will no longer exist alone to receive acute rehabilitation, but the cause of the decline has become the focus for CMS and third party payers (Esselman 2004). The need for the existence of acute rehabilitation facilities in our healthcare system and society must be explored and documented with evidence based practice, demonstrating improved functional outcomes post discharge to the community (Jacelon, Pierce, & Buhner 2007).

1.9 STATEMENT OF THE RESEARCH PROBLEM

The focus of this study is to document trends in inpatient rehabilitation post discharge outcomes. This will include all patients receiving inpatient rehabilitation services, even those excluded from the current 75% Rule, but

exhibiting functional decline, meeting inpatient rehabilitation admission requirements, and with the potential for improvement. Follow-up post discharge assessments, measure the post-rehabilitation progress of a discharged patient (UDS for CMS 2005). In addition, follow-up assessments provide evidence of rehabilitation program effectiveness, whether patients maintain or continue to make functional gains following inpatient rehabilitation services (Bruyere & Houtenville 2006). This study will provide evidence that inpatient rehabilitation services decreases the burden on the healthcare system by facilitating a functional level of independence, as in the functionalist model, as well as the social perspective.

1.10 PURPOSE OF THE RESEARCH

The purpose of this research study is to document trends resulting from inpatient rehabilitation post discharge outcomes. This will include all populations receiving inpatient rehabilitation, even those excluded from the current 75% Rule, but exhibiting functional decline with potential for improvement on admission. While not required by the Centres for Medicare and Medicaid Services (CMS) in the United States of America, post discharge assessments help to meet accreditation standards and to measure the post rehabilitation progress of a discharged patient. In addition, follow-up assessments provide evidence of rehabilitation program effectiveness, whether patients maintain or continue to make functional gains following inpatient rehabilitation services. This study will provide evidence that inpatient rehabilitation services decrease the burden on the

healthcare system by facilitating independence, or the optimum level of functioning, in this population, allowing their successful community re-integration or return to the community, living within society.

1.11 RESEARCH QUESTIONS:

- a) Do inpatient rehabilitation patients maintain functional gains achieved post discharge to the community setting.
- b) What is the relationship between age, gender, race, marital status, and maintained functional performance?
- c) What is the relationship between impairment groups, comorbidities, length of stay efficiency, and maintained functional performance?
- d) What is the relationship between discharge living setting, discharge with home health services, discharge to person living with, and maintained functional performance?

1.12 ASSUMPTIONS UNDERLYING THE STUDY

The assumptions pertinent to this study focus on the population referred for inpatient rehabilitation services. The primary assumption is that the appropriate patients, meeting admission criteria for inpatient rehabilitation, are the studied population. Admission criteria, as identified by the UDS of CMS (2005), states that “rehabilitation is (financially) covered for patients who have a reasonable expectation of practical improvement” (UDS for CMS 2005). Other required criteria, as stated by UDS for CMS includes: “around the clock” availability of Registered Nurse; frequent (every 2 to 3 days) assessment and

interventions of a Physician; coordinated multidisciplinary care; intensive (typically 3 hours per day) skilled intervention; and services cannot be provided in a less intense setting (UDS for CMS 2005).

In addition, the admission criterion includes defining the loss of physical function exhibited in the population. UDS for CMS (2005) defines this as: pathology that results in significant loss of function of two or more extremities; CNS pathology that results in significant loss of function of a single extremity along with the loss of higher functions, such as speech/language, balance and coordination; and single extremity loss of function combined with medical complications that necessitate continuous Registered Nurse (RN) and/or Physician supervision, which is not part of the normal acute inpatient recovery process (UDS for CMS 2005).

Thus, it is assumed that all participants in the inpatient rehabilitation facility, referred for rehabilitation services post acute inpatient services, meet the admission criteria suggested and required by Uniform Data Systems and the Centre for Medicaid and Medicare Services for reimbursement (UDS for CMS 2005). These criteria are consistent with the admission criteria, documented and contained in the organization's policies and procedures, as approved and mandated by the institutional governing board and the owning rehabilitation corporation, where the population of participants received rehabilitation services.

1.13 SIGNIFICANCE OF THE STUDY

The contribution of this study's results will provide knowledge much needed by the government, policy makers, and health care providers for the population of persons with disabilities. Results will provide knowledge needed regarding the current and proposed guidelines, effecting persons with disabilities access to inpatient rehabilitation services. The recovery of physical functioning will be evidenced by functional status or outcome over time in patients receiving inpatient rehabilitation as required in evidence based practice. In addition, this study will provide the knowledge needed relevant to persons with disability receiving high quality, cost effective care without restrictions to only certain populations of persons with disability. The optimal trajectory for the population of persons with disability is less dependence on other health care resources, such as unnecessary institutionalization or readmissions to acute care, and successful community reintegration utilizing the most cost effective resources (ARN 1993). This evidence will suggest the government and/or third party payers not support limitations of inpatient rehabilitation services.

1.14 DEFINITION OF KEY TERMS: REHABILITATION AND DISABILITY

1.14.1 Conceptual/theoretical definitions

The concept of Rehabilitation has evolved over the past 50 years, including the American Nurses Association (ANA) publishing, *Guidelines for the Practice of Nursing on the Rehabilitation Team* (ANA 1965). Further, the Americans with Disabilities Act, passed in 1990, has had a lasting effect across

all segments of our society, from the government to the community, in providing access and opportunities for individuals with disabilities. According to the Commission on Accreditation of Rehabilitation Facilities (CARF), rehabilitation is

“...the process of providing in a coordinated manner those comprehensive services deemed appropriate to the needs of a person with a disability in a program designed to achieve objectives of improved health, welfare, and the realization of the person’s maximal physical, social, psychological and vocational potential for useful and productive activity.” (Commission on Accreditation of Rehabilitation Facilities 1991:138; Association of Rehabilitation Nursing 1993)

The Social Security Administration (SSA) in the United States of America ultimately determines an individual’s status for disability (United States Social Security Administration 2006). The SSA defines disability as, “the inability to engage in any substantial, gainful activity by reason of a medically determinable physical or mental impairment, which can be expected to result in death or which has lasted for a continuous period of not less than 12 months” (United States Social Security Administration 2006; Stanhope & Lancaster 2008:686). Definitions of disability need to account for the degree of disability, the limitation the disability imposes, and the degree of dependence that occurs as a result of the disability (Stanhope & Lancaster 2008). Situational factors also contribute to the experience of disability and influence an individual’s ability to function in society or their community.

The purpose of rehabilitation nursing is to care for persons with disabilities by minimizing the effects of disability. Rehabilitation nursing practice is based on the rehabilitation model of disability and the conceptual model of theories of nursing (Derstrine & Hargrove 2001; Secret 2000). While nursing theories and models for practice conceptualize how to provide care to persons with disabilities, the rehabilitation model of disability provides the framework for conceptualizing disability. The rehabilitation model for rehabilitation nursing is based on a functionalist perspective of illness and conceptualizes disability, a problem of individual functioning (Lutz & Bowers 2003).

In the functionalist paradigm persons with disability are “obligated to try to become rehabilitated if possible” (Myers 1965:38). A consequence of this paradigm is that as long as a person is not “fully functional,” he or she is “exempted from normal social responsibilities” and is expected to be dependent on others for care. Therefore, the assumption inherent in this perspective for persons with disability who cannot regain full function, places the person in a chronic role of dependency. However, with rehabilitation, the potential for achieving the disabled person’s optimal level of function places them in an impaired role, rather than a dependent role (Hoeman 2002:193).

In addition to the functionalist perspective, a definition of disability resulted from a study commissioned by the Institute of Medicine, with the same focus on function and expected roles. Disability is defined as, “a limitation in performing certain roles and tasks that society expects an individual to perform. Disability is

the expression of the gap between a person's capabilities and the demands of the environment—the interaction of a person's limitations with social and physical environmental factors” (Brandt & Pope 1997:25).

The rehabilitation models of disability, on which rehabilitation nursing research and practice was based in recent years, were developed from this functionalist perspective. The first draft of the rehabilitation model was developed by Nagi (1965) as an extension of the medical model. In the late 1970s the World Health Organization developed the International Classification of Impairments, Disabilities and Handicaps (WHO ICIDH) (WHO 1980). While both Nagi and the WHO ICIDH provide a more comprehensive scheme of disability than does the medical model, they remain based in the functionalist paradigm and their central and defining construct is the pathology or disease and its resulting effect on functioning. Recent revisions included the addition of societal limitations, environmental and individual factors and risk factors, quality of life, and health status. It is the rehabilitation model and all of its variations that locates disability in the person. The central focus is on the disease process and the patient's resulting functional limitations within the environment or society.

More recently, the “Enabling-Disabling Process” provided a framework for professional rehabilitation practice. The model was developed by the Institute of Medicine (IOM) in 1997 (Lubkin and Larsen 2006:582). The IOM defined rehabilitation as:

“...the process by which physical, sensory or mental capacities are restored or developed. This is achieved not only through functional change in the person, such as strengthening injured limbs, but also through changes in the physical and social environments, such as making buildings accessible to wheelchairs. Rehabilitation strives to reverse what has been called the disabling process, and may therefore be called the enabling process.” (Brandt & Pope 1997: 12-13)

This model recognizes contextual aspects of disability and the interaction between the person with the disability and their environment (Lubkin & Larsen 2006; Lutz & Bowers 2003).

Basic concepts included in the enabling-disabling framework include: pathology, impairment, functional limitation, disability and society limitations. This model addresses the uniqueness of each individual, noting all pathologies do not result in disability. In addition, different levels of disability may exist with the same diagnosis or impairment, ranging from severe to only minimal. Therefore, vastly differing outcomes can be expected for individuals, even with similar impairments, as their personal, differing characteristics interact with their environment (Lubkin & Larsen 2006).

The enabling-disabling process is influenced by biological, environmental, and lifestyle/ behavioural factors. Biological factors may include comorbidities, the physical condition of the individual, and their genetic construction. Societal prejudices, availability of services, and reimbursement mechanisms are to be

considered as environmental factors. Lifestyle or behavioural factors include, health practices, such as the use of alcohol and cigarettes, dietary practices, and exercise patterns (Lubkin & Larsen 2006:582). Many of the biological and environmental factors are significant to this study and will contribute to grouping and identifying significant trends in the data.

1.14.2 Operational definitions

The following operational definitions are defined by UDS for CMS (2005), as elements of the Inpatient Rehabilitation Facilities Patient Assessment Instrument (IRF PAI) (Annexure A):

- a) Length of Stay (LOS) is the number of days a patient is in the rehabilitation hospital receiving rehabilitation services, including the day of admission and discharge.
- b) Length of Stay Efficiency (LOS Effic) is the length of stay effects or end results achieved in relation to the effort expended in terms of resources, time, and money (LOS divided by FIM gain).
- c) Community Discharge includes home, board and care, and transitional living environments. Community discharge options are further defined as follows: Home is a private, community-based dwelling (a house, apartment, mobile home) that houses the patient, family, and/or friends; Board & Care is a community-based setting where individuals have private space (either a room or apartment), or a structured retirement facility with no nursing care;

Transitional Living is a community-based, supervised setting, where individuals are taught skills so they can live independently in the community; and Assisted Living is a community based setting that combines housing, private quarters, freedom of entry and assistive supportive services, personalized assistance, and health care to meet the needs of activities of daily living and instrumental activities of daily living, available 24 hours a day (may involve family, neighbours, and friends).

- d) Functional Independence Measure (FIM) is an instrument measuring disability, not impairment, and is included in the Uniform Data Set for Medical Rehabilitation (IRF PAI 2005).
- e) Rehabilitation effectiveness is determined by the functional independence measure at discharge minus the functional independence measure at admission.
- f) Impairment Group is the primary reason or diagnosis for admission to the rehabilitation Program.
- g) Comorbid Conditions, referred to as Comorbidities, is the specific patient conditions that affect a patient in addition to the principal diagnosis or impairment group.

Rehabilitation Diagnoses, or impairment groups, as identified by CMS (2005), in inpatient rehabilitation are typically covered financially and supported by Centres for Medicare and Medicaid Services, Prospective Payment System

for: pathology that results in significant loss of function in two or more extremities; Central Nervous System (CNS) pathology that results in significant loss of function of a single extremity along with the loss of higher functions such as speech/language, balance and coordination; and single extremity loss of function combined with medical complications that necessitate continuous Registered Nurse (RN) and/or Physician supervision and which is not part of the normal acute inpatient recovery process.

Meeting these rehabilitation criteria for inpatient rehabilitation is financially reimbursed, usually partially, for patients who have a reasonable expectation of practical improvement and are receiving medically necessary rehabilitative services. This is further defined by the following CMS (2005) guidelines: requires around-the-clock availability of an RN; frequent (every 2 to 3 days) assessment and interventions by a Physician; requires coordinated multidisciplinary care; requires intensive (typically 3 hours per day) skilled intervention; and needed care cannot be provided in a less intensive setting.

1.15 LIMITATIONS OF THE STUDY

Limitations to this study include a very diverse disabled population studied, with a variety of diagnoses, possibly confounding the results. However, this limitation is necessary to determine the relevance of the proposed governmental 75% Rule, creating future policy for rehabilitation services in the United States of America. It is relevant to note, that although the variety of diagnoses may be confounding, they all met the admission criteria for inpatient

rehabilitation services (UDS for CMS 2005), referred from acute inpatient environments, further supporting the need of inclusion in this study and providing much relevance to the findings of this study.

Another limitation of this study is the post discharge follow-up by telephone interview. The possibility of inaccurate, self-reported data exists, although the UDS for CMS (2005) recommends this method of follow-up. Further, Polit and Beck (2004) suggest that telephoning may be an effective method of gathering information if the researcher has had prior personal contact with the respondents, which is consistent with the investigator's methodology. However, if attempts at conducting a telephone interview fail, than an attempt for a personal interview to collect data or follow-up appointments will be established (Polit & Beck 2004). To improve the accuracy and consistency of the telephone interview, the interview will be conducted by a single interviewer, certified in functional independence measure (FIM) scoring. Certification for the assignment of FIM scoring is awarded annually by the Uniform Data Systems of the Centre for Medicaid and Medicare Services, after educational training and testing. Telephone numbers, addresses, and next of kin relationship information will be obtained at discharge. Although unexpected health issues could change the discharge plan expected to be implemented at discharge from the inpatient rehabilitation services, this limitation is unavoidable in this disabled, vulnerable population, at risk for health related complications and will be recorded.

1.15.1 Ethical considerations

Ethical risks in this study are minimal. The benefits of participation in this study will provide information that could possibly increase access to rehabilitation services for this disabled population. All participants of the study that received inpatient rehabilitation services will compose a diverse sample, as to age, gender and ethnic composition, with equality to all. Patient rights will be of high regard, with all subjects given the right to participate in the study, as well as decline, without any change or alteration in services received. The participants will give Informed Consent voluntarily, prior to any participation in the study. All information is protected and confidential. Patient confidentiality will be protected at all times. No data information will be identified by name, and will only be represented by an assigned number. All ethical considerations will be upheld throughout this study and considered of highest importance.

1.16 ORGANIZATION OF THE REPORT

This study was initiated in thought and planning in 2004, at the announcement of the proposed 75% Rule by the Centre for Medicare and Medicaid Services in the United States of America, threatening the providing of much needed rehabilitation services for the disabled population. The planning of this study and initial written proposal was completed in 2005, and submitted for approval to the University of South Africa (UNISA), Health Studies Department. Proposal approval by Committee was received. All Institutional approvals were

obtained in the first quarter of 2006 and renewed in 2007, including facility approvals and Institutional Review Board (IRB) approval.

Following the Introduction, this research study will provide a broad Literature Review (Chapter 2) of the concepts, rehabilitation and disability. In addition to the use of these concepts in the United States of America, a review of the International literature will provide variations in the delivery of rehabilitation services, resulting outcomes, and therefore, suggestions of differing provider policies. Included in the review of the literature will be the research model and conceptual framework. Next, the Research Methodology (Chapter 3) will focus on reliability and validity of the measures and content. The design, sampling, and data collection methods will be reviewed. The method of data analysis will be included. The Presentation and Discussion of the Data (Chapter 4) will provide the analysis of the data. Chapter 5 will provide the conclusions, limitations and recommendations of this research study.

1.17 SUMMARY

The need for evidence based practice, including research and utilization of research, in the health services delivery of rehabilitation, is imminent. Policy development based on this evidence based practice could provide access to much needed health care rehabilitation services for the disabled population. Documenting trends resulting from inpatient rehabilitation, post discharge outcomes, will determine the functional gains that are maintained or achieved in this population. In addition, determining the relationships of the demographic

data, the medical information and the discharge information and maintained functional performance will provide needed evidence for inpatient rehabilitation services. Finally, determining maintained or improved functional performance, as it relates to community discharge, post discharge inpatient rehabilitation services, will be included. This study will provide evidence based practice for the disabled consumer, health care providers, government agencies, researchers and educators, by studying outcome trends following inpatient rehabilitation.

Chapter 2

LITERATURE REVIEW

2.1 INTRODUCTION

Rehabilitation nursing practice is based philosophically and theoretically on the rehabilitation model of disability and the conceptual models and theories of nursing (Derstine & Hargrove 2001; Lutz & Bowers 2003). The rehabilitation model is based on the functionalist perspective of illness and conceptualizes disability as a problem of individual functioning. The social model, however, conceptualizes disability as a problem of the social and physical environments constructed by our society (Lutz & Bowers 2003). In the evolution of these concepts, theories, and models, the World Health Organization (WHO 2001) conceptualized disability from rehabilitation, social, and integrated perspectives, providing implications for rehabilitation nursing policy, practice, and research. Also grounded in nursing theory, Orem's Self Care Deficit Theory provides an understanding of individual function and varying degrees of dependence or independence of the disabled within society (Orem 1980; Orem 1985; Orem 1991).

2.2 PURPOSE OF THE LITERATURE REVIEW

The purpose of this literature review is to provide a theoretical perspective of the concepts and models of rehabilitation and disability, and their existence in the social environment. Documented trends are examined in post discharge outcomes of the rehabilitation population. This population includes all diagnostic

or impairment groups meeting rehabilitation criteria for services. Further, studies of follow-up assessments are examined, measuring functional gains following rehabilitation services. Inpatient Rehabilitation services are the focus, while outcomes and other post discharge community services will be included. Additionally, implications of prospective payment systems or financial funding on outcomes and alternative models of rehabilitation delivery, including international studies are investigated as significant to the disabled rehabilitation patient having successful access to needed services.

2.3 SCOPE OF THE LITERATURE REVIEW

The conceptualization of disability has been in transition for 30 years. Both conceptual models of disability, the rehabilitation perspective and the social perspective, provide a foundation for the concepts of disability and rehabilitation. The WHO's attempts to integrate the models, has carried the assumption of the functionalist model. More recently, the enabling-disabling framework for rehabilitation practice, developed by the Institute of Medicine in 1997 is applied. Conceptual models and theories of nursing practice, specifically that proposed by Orem (Orem 1991), helps define how to care for persons with disabilities (PWDs), with similarities to the functionalist perspective in relation to health deviation self care. Therefore, the functionalist perspective guides the definitions of disability and approach to care of PWDs in this research study. Further, when the disease process or the societal barriers are central in the research, policies, and practice, rehabilitation nursing can assist in expanding this focus. This

expansion may include that disability is often conceptualized from a provider defined, functionalist perspective within our rehabilitation practice environments, and should include a comprehensive perspective.

2.3.1 Rehabilitation perspective

In the rehabilitation perspective, the social world “exists as a whole unit or system which is comprised of interrelated functioning parts” (Bowers 1988:33). In this paradigm, all of the parts must be able to fulfil their expected roles that promote optimal operation of the larger system (Lutz & Bowers 2003). In persons with disabilities (PWD), they are “obligated to try to become rehabilitated if possible.” (Myers 1965:38). The PWD is dependent on society until he or she can function in socially expected roles. In this functionalist paradigm, social institutions have the authority and responsibility to ensure these individuals perform their socially defined roles. However, if this is not possible, then the person remains permanently in a dependent role.

In a study commissioned by the Institute of Medicine in 1997, the focus on function and performance of expected roles defined disability as:

“a limitation in performing certain roles and tasks that society expects an individual to perform; it is the expression of the gap between a person’s capabilities and the demands of the environment...the interaction of a person’s limitation with social and physical environmental factors.” (Brandt & Pope 1997: 25).

The focus of the rehabilitation perspective is on a person's ability to function in socially expected roles from the functionalist perspective. However, there are various definitions of disability, depending on legislation and cultural standards.

The model that has been identified as the philosophical and theoretical framework of disability in rehabilitation literature that has guided rehabilitation nursing practice was proposed by the World Health Organization (WHO) in the 1970's (Derstine & Hargrove 2001; Secret, 2000; Lutz & Bowers 2003; WHO 1980). Disability is any restriction or lack (resulting from an impairment) of an ability to perform an activity in the manner, or within the range, considered normal for a human being (WHO 1980; Lubkin & Larsen 2006:326). The model developed the International Classification of Impairments, Disabilities, and Handicaps (ICIDH). (WHO 1980). More recently, the ICIDH model and Nagi's (1965) adapted medical model were revised to include the addition of societal limitations (Jette 1994); environmental and individual risk factors (Verbrugge & Jette 1994); and quality of life and health status (Ebrahim 1995; Pope & Tarlov 1991). This rehabilitation model, also referred to as the individual model of disability, and the variations, identifies disability in the person, with the focus on the disease process and the patient's resulting functional limitations (Lutz & Bowers 2003).

2.3.2 Social perspective

The social perspective evolved from socio-political movements that believed certain groups of people, such as PWD, are oppressed by more

powerful classes of society. The goal was to shift the emphasis and the burden of disability from the persons with disabilities to the society. An assumption of this perspective is that people with disabilities are discriminated against and oppressed. (Hahn 1993). Another major assumption is that PWDs should be independent and should have the same rights and responsibilities as people without disabilities and should be independent in society.

The Disability Rights Movement, with its National and International frameworks, recognized the oppression suffered by persons with disabilities and took an operational focus towards a rights based approach. This movement called for revisions at the 1987 World Health Organization (WHO) meeting in Sweden. By the 1990s, there was international agreement that disability was a rights issue. The Environmental Task Force (ETF) with the Centre for Disease Control (CDC) in the U.S.A., realized that major problems for disabled people are social: poverty, lack of personal and technical assistance, unemployment, and attitudes (CDC 1999).

The International Classification of Functioning (ICF) has defined disability as the outcome of the interaction between impairment and functioning and the environment (WHO 2001). It was their earlier definition of disability, as synonymous with functioning, which caused a barrier to society's understanding of disability as a social and rights issue. The WHO continues to have a system operating on the medical and individual model of disability, alongside the rights based definitions of the ICF and its environmental factors. The World Council of

Disabled Peoples' International (DPI) has noted disability as dehumanizing and abnormal, leading to increased stigmatization and isolation of persons with disabilities, assumptions of persons with disabilities as social burdens and the denial of life itself (DPI Europe 2000).

The ICF and WHO ensured that impairment or functioning themselves do not make a disabled person, as the environment, including attitude, has the crucial role (Hurst 2003). The ICF continues that the major negative aspects of PWD and life are socially induced and have become a rights issue in today's society. Disability is the outcome of social barriers and society has to change to prevent discrimination and promote rights of persons with disability. Therefore, society has a responsibility to address barriers that prevent the participation of persons with disabilities. These socially constructed barriers can include physical access barriers and prejudicial barriers.

In this social model, disability is found in an excluding, oppressive environment, instead of an impaired malfunctioning body. It moves disability into the realm of community development. Forced dependence on relatives, professionals, and the healthcare system exists. Swain, Finkelstein, French & Oliver (1993:2) state:

“Disability is not a condition of the individual. The experiences of disabled people are of social restrictions in the world around them, not being a person with a “disabling condition.” This is not to deny that individuals

experience “disability”; rather it is to assert that the individual’s experience of “disability” is created in interactions with a physical and social world.”

This model advocates flexible policies and benefits systems for persons with disabilities, and that the persons with disabilities determine the best use of funds allocated for their well-being (Lutz & Bowers 2003).

2.3.3 Integrated models

The integration of these theoretical/conceptual models, the rehabilitation and social perspective, identifies disability as a problem of individual functioning resulting from a disease or disorder that requires professional intervention, as well as a societal problem or obligation. In either model, the outcomes are determined by that person’s level of functional improvement. Rehabilitation practice patterns and rehabilitation delivery policies may be provider-driven, improving the condition causing the physical disability. For example, the Functional Independence Measure (FIM), a tool that is widely used in rehabilitation nursing to measure functional performance in the person with disability, is based on this rehabilitation model. (Lutz & Bowers 2003).

The Institute of Medicine (1997) identified a framework for professional rehabilitation practice that focuses on individuality of the rehabilitation client. This work, *Enabling America*, identified a framework termed the enablement-disablement process (Brandt & Pope 1997; Lubkin & Larsen 2006). This model for rehabilitation, acknowledges that individuals with the same disabling impairments, have different levels of disability. Similar to the functionalist and

social perspectives, personal characteristics of each individual person with a disability, are in interaction with their environment, including the degree of insult or deficit imposed, resulting in a variety of different outcomes (Lubkin & Larsen 2006). Biological, environmental, and lifestyle/behavioural factors influence each stage of the disabling process. These concepts are similar to those proposed by an integrated perspective.

The biological aspects of disability include comorbidities, the physical condition or the impairment, and the genetic disposition of the person with disability. Environmental factors include societal prejudices, availability of services, and reimbursement mechanisms (Lubkin & Larsen 2006:582). Both are relevant to this study and the outcomes of this study.

Access to the environment represents both physical space and social structures (family, community, society). A person with disability is integrated into society and has access to both, social opportunities and physical space. Social opportunities include: employment, education, parenthood, and leadership roles. Physical space is equivalent to the same access to services and the environment as persons without disabling conditions (Brandt & Pope 1997).

Important in this enabling-disabling model is that potentially disabling conditions become an actual disabling condition once the person is dislocated from the environment as a result of that condition (Brandt & Pope 1997:65). There remains a need for quantifying disability that is sensitive to the person with disability and the environment. Although it was not the intent of this work, there

is much implication for policy development in rehabilitation and services for persons with disabilities.

2.3.4 Orem self care deficit theory

Orem's Self Care Deficit Theory of nursing can be applied to rehabilitation nursing (Hoeman 2002:6). Orem's levels of a patient's self-care capabilities, attention to wholeness, and important contributors to patient education are applicable to the rehabilitation environment (Orem 1991; Orem 1985). Knurst and Quarn (1983) suggest that "the key to utilizing self-care theory in rehabilitative nursing is a thorough assessment of each category of self-care (universal, developmental, and health deviation). The interrelationships among areas of the assessment indicate the uniqueness of the individual client and ultimately, direct interventions that are holistic." (Hoeman 2002:6; Knurst & Quarn 1983:27).

In Orem's description of the requirements of health care, variations of health care requirements and their description in nursing situations, including rehabilitation, are identified. The systems of preventive health care include primary prevention, secondary prevention, and tertiary prevention, with secondary prevention being the focus of this study. Secondary prevention is defined by Orem (1991) as:

"Secondary prevention is appropriate after the onset of disease is directed to the prevention of complications (disease that occurs concurrently with other diseases) and of sequelae (disorders of structure or function that

follow or are caused by an attack of a disease) and prevention of prolonged disability.” (Orem 1991:194)

Further, tertiary prevention must be considered in the post discharge patient, following inpatient rehabilitation services. Persons with disability have a demand to function in society with limited human capacities. This tertiary prevention is “directed toward bringing about effective and satisfying human functioning in accord with existing powers for human functioning.” (Orem 1991:194).

The requirements of preventing complicating diseases, adverse effects and prolonged disability (secondary prevention) and rehabilitation in disability (tertiary prevention) are identified as health deviations self care in practices of a therapeutic quality. These practices include the human potential for living with and overcoming the disabling effects of disease (Orem 1991:197). However, the patient as a self care agent will vary with the methods of diagnosis, treatment and the effects of differing diseases or impairment groups. This includes the rehabilitation patient’s functional capacity, and the interventions used to enable the patient to function effectively. This level of health care “requires a belief in the human potential to overcome functional disorders and disability, effective techniques for determining functional loss, and remaining functional capacities, and effective restorative, or compensatory techniques.” (Orem 1991:197) In addition, as in the social perspective, a requirement exists for the patient, family, health care provider, and the community to work toward the common goal of

rehabilitation, enabling the rehabilitation patient to live, or progress in living, as an active member of a social group or society.

The person with disability or individual client is considered when Orem's Self Care Model is applied to institutional settings, such as inpatient rehabilitation facilities. Determining activities that clients are able "to initiate and perform on their own behalf in maintaining life, health, and well-being" (Orem 1991; Orem 1980) is included in Orem's Self-Care Model. Rehabilitation nursing interventions can be guided by assessing a client's functional status as "wholly compensatory, partially compensatory, or supportive of educational need" (Hoeman 2002:7; Orem 1980).

To meet a patient's self care requisites, Orem (1991) described this typology of nursing systems, as wholly compensatory, partly compensatory, and supportive-educative. In the delivery of inpatient rehabilitation, the rehabilitation patient has moved from a wholly compensatory nursing system, when the nurse compensates for the patient's total inability to perform self care activities requiring ambulation and manipulative movements (Orem 1991:287), to a partly compensatory system, the patient can perform some but not all self care actions, requiring nursing intervention to develop the self care agency. However, if the rehabilitation patient is able to progress to total independence, performing all self care activities, the supportive educative nursing system pursues.

The nursing systems of wholly and partly compensatory in rehabilitation is consistent with the integrated model of functionalist and social perspective,

describing persons with defined limitations as “socially dependent on others for their continued existence and well being.” (Orem 1991: 289) The subgroups range from a level of function of total dependence, to making decisions regarding self care without performed actions, to persons performing some measure of self care with guidance and/ or supervision. Orem states that these persons with total dependence on the wholly compensatory system, “must be protected and cared for.” (Orem 1991:89) Because these patients have an inability to manage themselves and to control environmental variables, the role of the rehabilitation nurse to be not only a contributor in meeting the self care requisites of rehabilitation patients but to protect their powers of self care agency and personal integrity exists. Further, Orem described the role of persons with disability within society as follows:

“If persons are to obtain and maintain their social positions and roles, they must be able tolive with dysfunctional conditions that in themselves may be hazards to continued health and well being and to life it self....and to identify, adapt and operate within their own functional norms.” (Orem 1985:36; ARN 1993:16)

One of the health care requirements/ requisites proposed by Orem defines rehabilitation in the event of disability (tertiary level of prevention), as specified in relation to what is known about “the nature and effects of specific diseases, valid measures of regulatory disease, and the human potential for living with and overcoming the disabling effects of disease” (Orem 1991:197). Health deviation

self-care of a therapeutic quality includes practices at this level of prevention. It varies with the method used to determine the extent of the disorder or disability, the patient's remaining functional capacity, and interventions used to enable the patient to function effectively.

2.3.5 Nursing theories utilized in rehabilitation

In addition to Orem's Self Care Deficit Theory, King's Theory of Goal Attainment (1981), Newman's Health Care Systems Model (1982), and Roy's Theory of Adaptation (1984), have been utilized and applied in the practice of rehabilitation nursing (ARN 1993). However, limitations of these studies in the literature supported the application of Orem's Self Care Deficit Theory in this research study.

Mumma (1987) cited limitations in Imogene King's Theory of Goal Attainment (1981) to rehabilitation nursing (ARN 1993:14-15). According to Mumma (ARN 1993), the focus on interaction limited applicability to some groups of rehabilitation patients, specifically persons with disability who have cognitive and/ or communicative deficits. In addition, the theory of goal attainment implies compliance as a result of interaction, with limited guidelines for assessment, diagnosis (impairment), and intervention in the rehabilitation health care delivery system.

In Betty Newman's Health Care Systems Model (1982), nursing interventions are provided through primary, secondary, and tertiary prevention activities (ARN 1993:15-16). However, these levels of nursing activities, similar

to Orem's terminology, are defined much differently, utilizing the individual's relationship to stress as the indicator for nursing intervention. According to Cross (1990), Newman described nursing as a unique profession that concerns itself with all the variables affecting human responses to stressors, with primary concerns for the total person (Cross 1990:267). Although Newman's model can be applied to many disciplines, a limitation exist in identifying its' contribution to the discipline of rehabilitation nursing in health care delivery. The relationship of stress to persons with disability for intervention is inadequate in the multi-faceted delivery of rehabilitation nursing.

The Roy Adaptation Model (1984) describes the person/ patient as an adaptive system within four models (ARN 1993:16-17). These models of adaptation include physiological needs, self concept, role mastery, and interdependence. The disabled person experiences physiological changes that affect self concept negatively and hinder successful adaptation to a disability. The rehabilitation nurse assists the patient and family in adapting to the environmental stimuli (Haughey & Dittmar 1989:26; Piazza & Foote 1990:257). Although this theory of adaptation has strong evidence of rehabilitation nursing process, it does not allow for a rehabilitation delivery system with an interdisciplinary approach, as required in the current delivery of rehabilitation care.

2.4 LITERATURE REVIEWED ON DISCHARGE TRENDS

In an eight year empirical study by Ottenbacher and colleagues

(2004), admission, discharge, and follow-up data were reviewed from 226,147 patients, receiving inpatient medical rehabilitation from 744 hospitals in 48 different states in the United States of America. Trends were documented post discharge including, functional status, length of stay (LOS), discharge setting, and mortality from 1984 to 2001, prior to implementation of the inpatient rehabilitation prospective payment system (PPS) of 2002. Inpatient rehabilitation facilities (IRFs) increased efficiency as measured by patient functional gain and decreased LOS by 8 days while maintaining stable gains in functional improvement (FIM) at 3 month follow-up (Ottenbacher, KJ, Smith, PM, Illig, SB, Linn, RT, Ostir, GV & Granger CV 2004). In addition, evidence that earlier admission to rehabilitation produces improved functional outcomes for some impairment or diagnostic groups was supported.

Evidence exists in the literature, supporting the functional performance of patients post discharge from rehabilitation hospitalization. In studies by O'Connor, Cano, Thompson, & Playford (2005); Poon, Zhu, Ng, & Wong (2005); and Yu, Evans, & Sullivan-Marx (2005), physical functioning improved from admissions to discharge and was maintained at follow-up assessment. FIM was found to be an independent predictor for 1 year outcomes in the studied populations (Poon, Zhu, Ng & Wong 2005) and at 3 month follow-up (O'Connor, Cano, Thompson, & Playford 2005). Poon and colleagues (2005) found FIM was statistically significant (0.86) at 12 and 16 week follow-up of this disabled population. Further, the telephone administration of the FIM at 12 and 16 weeks

was found to be a useful and cost effective method for community follow-up of disabled patients, also significant to this study.

In a contrary study, 176 highly dependent patients with FIM scores of 18 to 39, discharged within 60 days were studied. At 1 year follow-up, 89 subjects survived, 72 died, and 14 were not found, with a significantly negative correlation existing between age and FIM score at follow-up (Giaguinto 2006). However, this study proposed that unexpected improvement of these subjects can not be ruled out.

An increasing FIM score implied functional improvement when both FIM scores and their changes over time were used to measure changes in functional abilities in a study by Bottemiller, Bieber, Basford, & Harris (2006). Scores at the extremes of the scale correlated with discharge disposition. Lower scores were more likely to discharge to facilities while higher scores (88%) returned home (Bottemiller et al 2006). Therefore, FIM scores and FIM efficiencies were associated with discharge disposition. These results were also supported by Lutz (2004), who identified the variables of age, gender and prior living status as having a relationship to discharge.

Contrary to these studies, was a 5 year study by Valach and colleagues (2004). Utilizing the FIM as a predictive tool for LOS and decisions to discharge was examined in their study of 1047 subjects. Criteria identified included aiming for optimal improvement and different rates of improvement as indicated by FIM (Valach, Selz & Signer 2004). Authors concluded that further research needs to

exist examining these criteria for statistically significant data but at this time, could not support FIM as a predictor of LOS as it is associated with discharge disposition.

2.5 LITERATURE REVIEW OF OUTCOMES MEASUREMENT

In a study by Aitken & Bohmannon (2001), reliability and validity of FIM were well established. Results showed that discharge FIM scores were significantly higher than admission FIM scores ($p < 0.001$) following inpatient rehabilitation. Adding support to the validity of FIM scores was the consistency of the significant predictors of outcome. Findings recommended the FIM as an effective outcome measure (Aitken & Bchannon 2001).

Several studies supported the FIM gain as an indicator of discharged subjects functioning at a greater level of independence. Subjects discharged home were more independent in bowel and bladder function, transfer ability, and locomotion as measured by the FIM (Andstrom and Mokler 1998). In a study by Lutz (2004), subjects with higher FIM scores were more likely to be discharged to the community associated with a higher level of function (Lutz 2004). Further, evidence of the potential for discharge to home resulting in longtime economic savings over alternative placements of long term care was provided by Schmidt, Drew-Cates, & Dombovy (1999). In this study, 63% of subjects studied were discharged home with a FIM score mean of 61.24 and admission FIM score mean of 34.12. The severely disabled in this population also benefited from rehabilitation, even though longer LOS and increased costs were identified

(Schmidt, Drew-Cates, & Dombrov 1999). Finally, FIM increased during rehabilitation hospitalization from admission to discharge, with the functional change weakly predicting significantly by therapy units (hours/day) received (Bohannon, Ahlquist, Lee & Maljanian 2003).

Research has shown that patients in countries where rehabilitation is offered have more optimal outcomes and achieve a higher level of function, than patients in countries where rehabilitation is not available (Health Canada 2006). In a Dutch rehabilitation setting, a longitudinal study to determine if FIM assessed progress during rehabilitation, found FIM was not suitable to assess progress in Dutch Rehabilitation (Steppel 2002). The mean FIM difference between admission and discharge of the subjects was 19.3 (16.9), with only 55% exceeding a difference score (gain) of 13 points, indicating progress and therefore, did not support the FIM as an outcome measurement in this Dutch population.

An Australian National Strategy to improve consumer outcomes, identified measures of functioning as relevant in monitoring consumer outcomes, as well as, quality of life and satisfaction with services. The strategy concluded that the lived experience and the interaction of persons with their environment are needed to guide the development of functional outcome measures (Fossey & Harvey 2001). In the Australian rehabilitation setting, authors stated that further exploration is required for a conceptual framework integrating the disabled's

living experience and the interaction with their environment at discharge (Fossey & Harvey 2001).

In a Netherland study (Van Achterberg, Hollemann, Heijnen-Kaales, Van der Brug, Roodbol, Stallinga, Hellema, & Frederiks 2005), a multidisciplinary classification in Nursing was utilized, the International Classification of Functional Disability and Health (WHO 2001). This study concluded that the ICFDH was a useful tool in classifying and communicating patient functioning by nurses. However, challenges in this part of the world in rehabilitation programming have continued, with a lack of research directed at the predictive abilities of functional outcomes.

2.6 LITERATURE REVIEW ON FUNCTION RELATED TO FINANCE

The social construct of disability and availability or allocation of resources largely determines the nature of rehabilitation and beliefs about persons with disabling disorders and also determines their subsequent treatment (Hoeman 2002). Federally funded programs reflect societal values and cultural expectations and introduces assessment and evaluation of independent functioning into health economics.

In the search for an appropriate payment system for rehabilitation hospitals and units, the use and necessity of a functional status measure has been supported. Conceptually, functional status measurement is important because the primary goal of medical rehabilitation is to enhance patient function and independence (Wilkerson, Batavia, & DeJong 1992). According to Menon,

Peshawaniam, & Ginguli (2002), studies have indicated that functional status and functional gain are among the best predictors of resource utilization in rehabilitation facilities, thus providing a means for justifying payment or continued payment for services, However, each country must set priorities according to the needs of its people (Menon, Peshawaniam, & Ginguli 2002).

There is evidence in the literature, evaluating the impact of the current inpatient rehabilitation prospective payment system (PPS). Implemented in 2002 by the Centre for Medicare and Medicaid Services (CMS) in the United States of America. Identifying the patients in need of rehabilitation services, how patients access services and the equity of hospital payments has been documented. Studies from the RAND Corporation resulting in negative consequences for beneficiaries were prepared by Paddock, Escarce, Hayden & Buntin (2007). This study found patients within payment groups were provided less care and/or decreased length of stays attached to the IRF PPS. Decreased LOS following PPS, yielded more patients transferred to nursing homes than in the community. The RAND report of 2005 also concluded that after payment systems were implemented nationally, uncontrolled pre/post analysis does not allow strong comparisons about the effects of payment changes (RAND 2005). However, PPS was not associated with increased use of healthcare alternatives like visiting nurse services or adult day care (Evans, Hendricks, Bishop, Lawrence-Umlauf, Kirk & Halar 1990).

Reduction in LOS by 916 days was established in a study by Dobrez, LoSasso, & Heinemann (2004), supporting PPS reimbursements less than costs by 37%, regardless of how much therapy was reduced. Further, McCue & Thompson (2006) found inpatient rehabilitation facilities (IRFs) under PPS implemented cost controls that lead to lower operating costs below the fixed payment to allow for profit for the institution. However, the Department of Health Administration found that PPS facilities did not implement strategies to attempt to admit more patients to increase payments for profitability (McCue & Thompson 2006). The need for improvements in clinical and cost data need to be studied to assist in patient management, in which real time data and analytical tools will be used to manage patient care efficiently and effectively (Morrison 2000).

Although adherence to rehabilitation guidelines has resulted in improved patient outcomes in these U.S.A. studies, cost management strategies to yield high quality, cost effective health care is needed. (Duncan, Horner, Reker, Samsa, Hoenig, Hamilton, LaClair & Dudley 2002). Rehabilitation services in the South Asia region have been influenced by low financial allocation to disability by the governments in western countries. Recommendations for study include involving people with disability in policy planning and resources to programs on prevention and benefits to service users (Menon, Peshawaniam, & Ganguli 2002). In a study by Saka and colleagues (2005), the major problem encountered by the disabled in receiving rehabilitation health care was the lack of funds. The need continues to make provisions for better services for the

disabled, and subsidizing their treatment costs with the government, making special provisions for rehabilitation in the National Health Policy reform (Saka, Kuranga, & Abeguide 2005).

2.7 LITERATURE REVIEW ON PROPOSED ALTERNATIVE MODELS

Globally successful rehabilitation delivery must assess the context, process, meaning and explanatory models in all cultures (Hoeman 2002:8). Findings for proposed improvements in the PPS rehabilitation health care delivery have been provided by Paddock, Wynn, Carter & Buntin (2004); Sutton, DeJong, Song & Wilkerson (1997); and Sutton, DeJong, & Wilkerson (2006). The Bayesian outlier accommodation model was utilized in identifying statistical outlier hospitals when developing facility payment adjustments for Medicare's PPS for IRF. Evidence was found to support more statistical outlier IRFs than standard linear regression for developing facility payment adjustments (Paddock, Wynn, Carter & Buntin 2004).

Studies examining the impact of IRF PPS on rehabilitation health care delivery included the accuracy of IRF data "upcoding", differences in pre and post PPS IRF data sets including FIM, changes in types of patients treated and changes in admission and stay patterns. Results found coding (identifying diagnostic impairment) improved under PPS, FIM ratings decreased in data sets, admissions to IRFs increased under PPS (primarily orthopaedics), and onset time, as well as LOS decreased (Deutsch 2006). IRF PPS had no effect on case mix, utilization and outcome, except for the shift in therapy from more severely

impaired to moderately impaired patients. This shift in therapy was documented in a study of 3 inpatient rehabilitation facilities (DeJong, Horn, Smout, & Ryser 2005).

Another payment model to promote payment efficiency was based on a function-related group (FRG) with the main outcome measure being financial performance, as measured by ratio of reimbursement to average costs. The impact of the FRG based payment would create strong relationships in resource intensity and reimbursement, resulting in greater equity in reimbursement of inpatient medical rehabilitation hospitals (Sutton, DeJong, Song, & Wilkerson 1997).

Another conceptual payment model was evaluated against the results of a Delphi Survey of rehabilitation providers' consumers, policy makers, and researchers. Conclusions found no financial incentive to maximize functional outcomes. However, this study supported a "quality of care" tool to be distributed to facilities if outcomes were attained (Sutton, DeJong, & Wilkerson 2006).

Statistical models were used to examine the relationship of functional items/ scales to accounting cost within impairment categories. In a study of 694 inpatient rehabilitation discharged patients, findings supported more independence leads to lower cost, and should be considered in the new IRF-PPS plan of service delivery and reimbursement (Carter, Reles, Ridgeway, & Rimes 2003).

Policy makers hoped to substitute a new multipurpose, functional assessment instrument, the minimum data set post acute care (MDS-PAC) for inpatient rehabilitation hospitals. A data base linking treatment costs with measures of the need for care utilized the functional independence measure (FIM). Researchers and policymakers had to abandon the effort due to multiple problematic issues that are not well documented (Bohannon, Ahlquist, Lee, & Maljanian 2003).

2.8 RESEARCH IN PROGRESS

The Health Services Research DRRP on Medical Rehabilitation is currently involved in a project to conclude June 30, 2008, funded by the National Institute on Disability and Rehabilitation Research (NIDRR 2003 to 2008). This study proposed that PPS may limit effective access to rehabilitation, avoiding “high cost” patients; prematurely discharging patients at higher rate to nursing home facilities to shorten LOS; and the increased use of therapy aids instead of licensed professionals. Preliminary results found significant correlation ($t=0.36$, $p<0.05$) between intensity (units/day) of therapy and goal attainment in subjects achieving 40 to 100% of their goals. A near significant relationship of LOS and percent goal attainment ($t=0.28$, $p<0.09$) was correlated with longer rehabilitation stays. These results recommended more therapy services and more intense services (hours/day) making larger FIM gains. The course of impairment and disability reduction varied across impairment groups. Ongoing work will include effects of comorbidities and complications on functional gains (Heineman 2007).

The Centre for Medicare and Medicaid Services (CMS) continues to propose payment and policy changes for inpatient rehabilitation facilities in the United States of America for 2008 (CMS 2007). The proposed rule would increase the IRF payment rate by 3.3% and allow comorbidities that meet regulatory criteria to be used to determine compliance (CMS 2007). Given the 4 year transitional nature of the “75% Rule” to be implemented in 2008, research to support current policy or options to extend the provision is being solicited by the CMS (CMS 2007).

In the United States of America, the “New Freedom Initiative” was announced in 2001, as a nationwide effort to remove barriers to community living for people with disabilities (US Department of Health and Human Services 2005a). Most of these initiatives were already introduced in the Americans with Disability Act of 1990, but not implemented as intended, promoting access to community life. The Department of Health and Human Services (DHS) provided assistance and support to the persons with disabilities, spending approximately \$73.5 billion in the year 2000 (US Department of Health and Human Services 2005a). The Centres for Medicare and Medicaid Services provide health coverage programs, although partially and with qualifying criteria, including long term care, home services and community services for most older Americans and low income individuals. However, noted in the literature the gap exists in providing only some rehabilitation services to individuals with only selected diagnosis or impairments, and certain incomes.

In Africa, a national survey on disability and rehabilitation was coordinated in Namibia to develop guidelines for a national policy and policy recommendations were made (Bruhns 1995). In more recent years, the International Federation of Red Cross and Red Crescent Societies (2003) presented an appeal to fund programmes and activities to be implemented in 2006 and 2007. These programmes were aligned with the International Foundation's Global Agenda, which set four broad goals to meet the Federation's mission to "improve the lives of vulnerable people by mobilizing the power of humanity" (International Federation of Red Cross and Red Crescent Societies 2003).

In the Southern Africa Region, the National society plans to strengthen rehabilitation centres in Gaborone and Francistown in response to this International call. The Southern African region is disproportionately affected by HIV/AIDS, with 25% of the adult population in the region being HIV-Positive. (International Federation of Red Cross and Red Crescent Societies 2003:2). Thus, much of this national appeal was directed at HIV/AIDS populations and community efforts, as opposed to the general disabled population in inpatient rehabilitation facilities, due to the needs of this culture. Included in program goals, is to "reduce intolerance, discrimination and social exclusion and promote respect for diversity and human dignity." (International Federation of Red Cross and Red Crescent Societies 2003:1).

The Australian Disability Development Consortium (ADDC) is a national network focused on building a national platform for disability advocacy (Fossey & Harvey 2001). The consortium will identify best practices and networking with the aim of maximizing disability inclusion in Australian programs and policies (Fossey & Harvey 2001).

China's health care system is transitioning to a market oriented, social basic medical insurance (Zhang 2000). This system is based on a financial responsibility that is shared jointly by individuals, employers, and the state. Although people with disabilities access health services on an equal basis, rehabilitation services might not be available. There is much needed research to support this transition and the development of policy. The government has developed and supported urgently needed rehabilitation programs that facilitate participation of people with disabilities in society (Zhang 2000).

In the South Asia Region, a large number of people are disabled and lack basic support, such as access to social safety, education, health sources, and employment (Worldbank 2006). However, the incidence of disability is increasing due to conflict, disasters, malnutrition, and HIV/AIDS pandemic. This situation is compounded by poverty and politics. The traditional view of medical and rehabilitation models of prevention, cure and intervention, has given way to the social model of disability in a socioeconomic construct (World Institute on Disability 2003). There is an imminent need for research in the understanding of rehabilitation and disability in this society, as well as service delivery.

2.9 STRENGTHS AND WEAKNESSES

Strengths of this literature review included concepts and models of rehabilitation and disability that were grounded in theory, including rehabilitation, social and self-care deficit nursing theory. Further, the use of the FIM as an outcome measure of function was widely utilized in the literature, consistent with this research study. The functional measurement as an outcome of inpatient rehabilitation post discharge was provided in an empirical study and several primary sources. Although there were recent studies of function post rehabilitation, they were limited in providing evidence of the relationship to a variety of variables or the explanation of the outcome. Variables of LOS and LOS efficiency were more likely studied as it related to functional performance, as opposed to the variables of age, diagnosis or impairment groups, which are relevant in this study.

Weaknesses of the literature review included resources that were greater than five years old, due to the lack of more recent primary sources significant to this study. However, there is much research in progress as indicated in the literature review, as well as rehabilitation policy development in many countries. The literature of proposed alternative rehabilitation models was not generally clear in recommendations from their results, and were more related to the impact of financial structures. Therefore, these studies of alternative rehabilitation models provided little evidence or support for use in this study as anticipated, but make the relationship of physical function or functional performance to cost.

2.10 FURTHER RESEARCH NEEDED

Much current research is needed and required in a rapidly changing rehabilitation health care delivery system, where policy is still being developed. Information regarding outcome trends and the impact of changes on policy regulations for inpatient rehabilitation has been limited (Esselman 2004), while an attempt to develop effective policy has been guided by unstudied payment systems. Further, the need for improvement in clinical and cost data needs to be studied to assist in patient data, in which real time data and analytical tools could be used to manage patient care efficiently and effectively (Morrison 2000).

Evidence-based research is needed to provide evidence of outcome trends post discharge from inpatient rehabilitation. Functional gains must be assessed by post discharge follow-up, facilitating some level of independence in the disabled. In the empirical study by Ottenbacher and colleagues (2004), trends in LOS, living setting, functional outcome and mortality were studied. However, the authors suggested that this research only provides baseline data to compare with much needed future outcome studies. Functional performance (FIM), as a predictive tool for LOS and LOS efficiency, and the relationship to other variables, such as age and diagnostic impairment groups, needs much study. The causes of the outcome, such as an increase in rehabilitation efficiency/ LOS, age or diagnostic impairment group, as it relates to functional performance must be examined for relevance to rehabilitation delivery. Although not included in this study, the influence of the persons with disabilities experience

and interaction with their environment as it relates to post discharge functional performance outcomes must be examined.

2.11 SUMMARY

In summary, the broad scope of the literature review encompassed a philosophical and theoretical review of the rehabilitation model of disability, based on the functionalist perspective, conceptualizing disability as a problem or deficit of individual functioning. In addition, Orem's "Self-care Nursing Theory" included disability as a health care deviation, existing as a health care requisite or requirement for the individual engaged in rehabilitation services. The discharge trends of rehabilitation post discharge from inpatient rehabilitation facilities were included, as well as utilizing outcomes measurement to determine the discharge trends. The relationship of variables to outcome function was reviewed, including function as it related to financial resources and/or cost of those services. Alternative models of rehabilitation delivery were examined to secure information regarding rehabilitation outcomes, influencing variables, and the influence of access to needed rehabilitation services. Due to the current rapidly changing rehabilitation health care delivery system in most countries, research in progress that will influence rehabilitation policy development for the disabled is reviewed with recommendations made for further research. The many strengths of the literature review were discussed, with minimal weaknesses of the review identified.

Chapter 3

METHODOLOGY

3.1 INTRODUCTION

The methodology of this quantitative study describes methodologic decisions and examines the rationale for those decisions. These decisions include sample selection, approach to the research, and the research instrument. In addition, the reliability and validity of the study is discussed. Reliability measures include the discussion of the instrument, observational measures, self-report and proxy. The validity of the variables, including threats to internal validity, describes the threat of mortality, attrition, and selection bias. Other threats to external validity, such as expectancy efforts, external events and treatment effects are included (Polit & Beck 2004, 2008). The methodologic decisions to minimize any threats to this study are based on the focus of this study, to document trends in inpatient rehabilitation post discharge outcomes (Polit & Beck 2004, 2008). The research question, to determine if rehabilitation patients maintain functional gains post discharge to the community setting, guides the rationale for these decisions. Further, examining the relationships of selected variables and maintained functional performance is analyzed. These variables will be described as demographic information, medical information, and discharge information of the population, post discharge from inpatient rehabilitation services into the community (Melnik & Vineout-Overholt 2005).

3.2 RESEARCH SAMPLE

3.2.1 Type and size of the research sample group

This study examines the outcome trends of patients discharged from an inpatient rehabilitation setting in an urban rehabilitation hospital in the central southern region of the United States of America, to the community or home environment. Community or home environment will be identified by discharge to home, board and care, transitional living or assisted living (UDS for CMS 2005). Approximately 244 patients are expected to be studied that have been discharged to these community or home settings. Of these 244 subjects signing Informed Consents (Annexure D), it is expected that more than 50% of the subjects will complete the study. Only 74 subjects declined participation in the study at initiation and did not sign the Informed Consent, while 170 subjects agreed to Informed Consent (Annexure D). Diagnosis or impairment groups assigned to subjects will be recorded and includes those occurring in this inpatient rehabilitation setting, meeting inpatient rehabilitation criteria (UDS for CMS 2005). These diagnoses, referred to as impairment groups, include, but are not limited to: stroke, brain dysfunction-traumatic and non-traumatic, amputation, arthritis, pain, orthopaedic conditions, cardiac disorders, pulmonary disorders, burns, congenital deformities, major multiple trauma, developmental disabilities, and debility/ other (UDS for CMS 2005). The expected mean age of the studied sample is 65 years old or greater, due to the historical data of this

facility, providing rehabilitation services for the Department of Health and Human Services, Centre for Medicare and Medicaid Services (2005). No control of other demographic characteristics of this sample (gender, race/ethnicity, marital status) was imposed.

3.2.2 Selection of research sample

The statistical theory of acceptance sampling allowed for the inclusion of study participants meeting inclusion criteria. Criteria for admission to inpatient rehabilitation were established and further, following inpatient rehabilitation services, subjects were discharged into the community setting. This eliminates any subjects experiencing death during the inpatient rehabilitation stay, which represents a small mortality rate (<0.2%) of this setting's discharged rehabilitation patients, consistent with the literature (Ottenbacher et al 2004). In addition, subjects admitted to the inpatient rehabilitation facility that were transferred to an acute care facility were not assigned discharge FIM scores and were not included in this study for analysis. Both mortality rate and acute care transfer rates of this facility are within the United States of America's National Benchmarks for the UDS for CMS data (2005). Those subjects discharging to intermediate care, skilled care facilities, acute care facilities, chronic hospitals, another rehabilitation hospital, an alternate level of care unit or sub-acute setting, as indicated on the IRF PAI (UDS for CMS 2005:Annexure A), were also not included in the studied sample.

3.3 APPROACH TO RESEARCH

3.3.1 Evidence based practice

Due to a lack of research reported in the literature, rehabilitation studies must be conducted to generate evidence to guide the practice of rehabilitation and rehabilitation nursing. Healthcare providers should base their treatment decisions or practice, on evidence from well-designed studies, as opposed to decisions based on opinion or tradition. Care delivery outcomes are defined as the observable or measurable efforts of some intervention or action (Melnyk & Fineout-Overholt 2005:307). These outcomes are focused on the recipient of the rehabilitation service and are measured at the individual, group, organization, and community level.

Outcomes research measures the effect of an intervention, directed toward populations (Melnyk & Fineout-Overholt 2005:307). In this study, rehabilitation measures are directed toward the people with disabilities. The goal of evidence based practice is to establish care delivery standards (in rehabilitation) or to develop policy statements about the best practices in rehabilitation (Melnyk & Fineout-Overholt 2005:457). Therefore, this outcomes research will produce evidence-based decision making and action as a result of its findings.

Melnyk & Fineout-Overholt (2005:301) identified evidence based contributors to outcomes. These contributors were grouped by illness severity, patient characteristics, location of services, and provider characteristics. The

patient characteristic contributors, resembles the descriptive demographics or patient identification data on the IRF PAI (UDS for CMS 2005:Annexure A). In this study, the data will be grouped and labelled as Demographic Characteristics. Similarly, the medical information on the IRF PAI (UDS for CMS 2005:Annexure A) includes the impairment group or diagnosis, and the number of comorbidities, as well as the outcomes of functional status (FIM) and the length of stay, with the onset of impairment to determine length of stay efficiency. These contributors will be grouped and labelled as Medical Information, providing information to illness severity. Finally, the data grouped and labelled as Discharge Information, is not unlike the location of services described in studies of evidence based practice, according to Melnyk & Fineout-Overholt (2005). For this study, similar contributors that are included as discharge information are: the community setting the patient is discharged to, whether the patient will be receiving home health services or not, and the person the patient is being discharged with. Therefore, this described data is grouped, labelled and reported, as identified in evidence based practice studies, as contributors to outcomes.

3.3.2 Controlling external factors

In non-experimental research, difficulty results in ensuring constancy of conditions (Polit & Beck 2004:202). In this quantitative non-experimental study, maintaining a constancy of conditions in the environment will be addressed by the investigator to enhance external validity.

3.3.2.1 *Constancy of setting*

Data gathered by telephone interview post discharge follow-up from inpatient rehabilitation will be performed in a consistent manner, but in a variety of community or home environments of the subjects. This may include a variety of settings, as described in the sample, although all are discharged to the home/community. Other settings considered as community or home by UDS for CMS (2005), include board and care, transitional living, and assisted living, and may not allow constancy. As indicated by Polit & Beck (2004:201), data gathered by interviews should be conducted in basically the same type of environment. This discourages a variety of settings, such as the home, place of work, or the investigator's office. The constancy of setting for this study is the community; although by definition has minimal variations.

3.3.2.2 *Constancy of respondents*

A variety of respondents, ranging from the subject to the subject's proxy, including spouse, caregiver, significant other, and/or attendant, will be communicating the physical functional performance of the studied subject by telephone interview. This variety of respondents could be compounded by the subjects and/or their proxy, assuming different roles (e.g. wife, husband, parent, child), with responses being influenced by roles and social desirability responses (Polit & Beck 2004:359). Social desirability response bias is the misrepresentation of the response by giving answers congruent with prevailing social values (Polit & Beck 2008:432). To assist the investigator in constancy of

conditions, the standard decision tree (UDS for CMS 2005:Annexure B) will be utilized for FIM scoring, post discharge follow-up, only by the trained, certified FIM Registered Nurse Investigator, to facilitate an effective telephone interview. Indirect and carefully worded questioning will assist in alleviating this response bias. In addition, sensitivity to the role of the respondent will be considered. Self-report is further discussed, Section 3.3.4.2. Telephone follow-up.

3.3.2.3 *Constancy of time*

In addition to constancy of setting and respondents, the time of day and/or the time post discharge (80 to 180 days) of when data collection is performed should optimally be consistent. Time constancy could be difficult for this quantitative study due to the unavailability of subjects by telephone at differing times of the day, in different home or community settings. However, all efforts will be made by the investigator to obtain data consistently, utilizing the structure of the FIM Decision Tree (UDS for CMS 2005:Annexure B); at no more than 80 to 180 days post discharge. Follow-up FIM data of functional performance of the subject will be obtained, with an effort of a minimum of three contact attempts per subject.

3.3.3 *Management of variables*

Assignment of subjects to groups will be used to manage extraneous variables. These groups are identified by the data collection instrument, IRF PAI (UDS for CMS 2005:Annexure A) and will include demographic variables, medical information, and discharge information. Although these groups are

used to analyze data, as identified in outcomes of evidence based practice studies (Melynk & Fineout-Overholt 2005), they will not be assigned or controlled prior to the study. In addition, homogeneity should enhance the interpretability of the relationships among the variables. Analysis of variance will increase the precision of the design by determining the relationships among these variables.

3.3.3.1 Homogeneity

Although all subjects were initially included in this study by meeting admission criteria into inpatient rehabilitation facilities and discharged into the community, some subjects were eliminated after informed consent was signed due to the medical order of an alternate discharge destination that was not predetermined according to the expected, planned trajectory. Therefore, the research findings will not be generalized to subjects that were not discharged into the home or community setting as indicated on the IRF PAI (UDS for CMS 2005:Annexure A). Those discharge destinations not included in this study, indicated on the IRF PAI (UDS for CMS 2005), include: transitional living (03), intermediate care (04), skilled nursing facility (05), acute unit of own or another facility (06-07), chronic hospital (08), another rehabilitation facility (09), other (10), died (11), alternate level of care unit (12), and sub-acute setting (13). Those discharge settings that were included in this study are: home (01), board and care (02), transitional living (03), and assisted living (14). This selection by the investigator allows for a homogenous group with confounding variables, as

determined by the focus for this study on the subjects discharged to the community, post inpatient rehabilitation.

3.3.3.2. *Descriptive analysis*

Descriptive Statistics will be used to examine differences in FIM outcomes at discharge and post discharge, 80 to 180 days. The mean, standard deviation, and standard error of the mean for both groups will be analyzed to determine if any difference is attributable to the intervention of inpatient rehabilitation services. Paired t-tests for equality of means will be utilized. Paired t-tests will allow two measures from the same subjects (Polit & Beck 2004:488). The null hypothesis will be rejected, or accepted, in making inferences about the relationship of functional performance at discharge, 80 to 180 days follow-up, to determine if inpatient rehabilitation patients maintain functional gains post discharge to the community setting.

3.3.3.3. *Analysis of Variance*

The analysis of variance (ANOVA) will assist the investigator in testing the differences between the means of extraneous variables. Extraneous variables that were identified by UDS for CMS (2005) and the literature review (Ottenbacher et al 2004; Bottemiller et al 2006; Lutz 2004; Aitken & Bohannon 2001; Andstrom & Makler 1998; Schmidt et al 1999) include: age, gender, race/ethnicity, marital status; diagnosis or impairment group, comorbid conditions, LOS/LOS efficiency; and living setting/ community, home health services including therapy, person living with. Analysis of variance is utilized to detect and

interpret relationships of these variables with outcomes as in evidence based studies, such as maintaining functional performance, indicated by the post discharge FIM.

To test the differences of the variables statistically, analysis of variance (ANOVA) will be used. The variability of the dependent variables of functional performance (FIM) at follow-up will be analyzed to determine the variability attributed to the independent variable(s) by mean group differences (Polit & Beck 2004:490; Polit & Beck 2008:596). F-ratios will be computed for each variable. The groups will be determined by the variables identified at data collection, as demographics (age, gender, race/ethnicity, marital status), medical information (impairment group, co morbidities, and LOS efficiency), and discharge information (living setting, home health services, person living with). The analysis of variance will decompose the dependent variable of follow-up functional performance into the variability attributed to the independent variables and all other variability, such as the individual differences (Polit & Beck 2008). This will assist in determining the relationships of the selected variables and maintained functional performance.

3.3.4 Using Records

3.3.4.1 *Advantages of records*

The charts and records of the subjects in this inpatient rehabilitation hospital were a valuable resource of available data. As required by the United States of America, Department of Health and Human Services, Centre for

Medicare and Medicaid Services (UDS for CMS 2005), the inpatient rehabilitation facility patient assessment instrument, IRF PAI (UDS for CMS 2005:Annexure A), is included in the record of each individual rehabilitation patient or subject, including identification information, demographics, admission information, payer information, medical information, medical needs, FIM scores assigned at admission and discharge, discharge information, and quality indicators (Annexure A). The problem of reactivity and response bias was minimized when data was obtained from existing records. Permission was obtained to utilize these records from the patient and/or family by Informed Consent (Annexure D) and by the institution responsible for the records providing rehabilitation services to the subjects (Annexure C). Institutional Review Board Approval was also obtained from a University setting, as requested by the approving provider of the rehabilitation services (Annexure C).

3.3.4.2 Telephone follow-up

Self report methods required by telephone follow-up to obtain FIM scores at 80 to 180 days is dependent on respondents, or their proxy, such as family members/ relatives, friends, caregivers, or attendants, willingness to verbally share the accurate information of physical performance (Polit & Beck 2008:369,468). Every effort was made by the Investigator to put the respondents at ease, to encourage openness and honesty, without any approval or disapproval. Informed consent allowed withdrawal from the study at any time if the subject or their proxy did not choose to verbally provide the information. In

addition, a decision tree (Annexure B) recommended for telephone follow-up (UDS for CMS 2005), and utilized by UDS for CMS (2005), required structure and training to lessen ambiguity, to facilitate obtaining accurate FIM data post discharge. Further, the telephone interview included sensitivity to different roles and response bias, with a permissive interview to allow honesty, utilizing open and closed questioning appropriately by the investigator.

3.3.5 Quantitative methods

This non-experimental, quantitative study will use statistics in a quantitative method to gather empirical evidence. This will be performed by obtaining two measures from the same subjects, to determine whether the variable that occurs at discharge (FIM) differs from the variable that occurs later in time, FIM at 80 to 180 days. This will be done with paired t-tests (Polit & Beck 2004, 2008). Thus, the research question: is the functional performance at discharge from the inpatient rehabilitation facility maintained later in time in the community? Additionally, analysis of variance (ANOVA) will be used to describe the relationship(s) between the dependent variable or functional performance, and the independent variables of demographics, medical information, and discharge information as indicated on the IRF PAI (UDS for CMS 2005:Annexure A). Thus, this study will also determine outcome trends following inpatient rehabilitation, by determining relationships among these variables and functional performance at discharge and then follow-up. These research questions include: the relationship between age, gender, race, marital status, and maintained

functional performance; the relationship between impairment groups, comorbidities, length of stay efficiency, and maintained functional performance; and the relationship between discharge living setting, discharge with home health services, discharge to person living with, and maintained functional performance?

3.3.5.1 Advantages

This quantitative research study is an efficient method of collecting data from a large population of rehabilitation subjects (greater than 100 subjects) with the data from many variables (Polit & Beck 2008). Due to the availability of the data collection of identified variables from the required IRF PAI (UDS for CMS 2005:Annexure A), the amount of time required to secure demographic data is not extensive. However, time assigning FIM scores post discharge telephone follow-up will prove to be more extensive, requiring many attempts to contact subjects and adequate time completing the FIM instrument accurately, including all 18 items of the 6 domains of the FIM tool, included in the IRF PAI (UDS for CMS 2005:Annexure A).

3.3.5.2 Disadvantages or limitations

No limitations are anticipated with regards to study design, measure and/or methods utilized. However, assumptions that the relationships of the variables, or the groups being compared are similar, may be weakly supported. The lack of evidence to support interpretations may exist due to the groups of subjects, rehabilitation patients, not being similar before the occurrence of the

independent variable on post discharge outcome FIM. Functional performance of rehabilitation patients and the variables examined could be inter-related in complexity and could prove to be tentative. However, pre-morbid status of this population and resulting functional performance following rehabilitation in an inpatient setting, will be analyzed by impairment groups and number of comorbidities, as well as other described variables to determine relationships among the variables.

3.3 RESEARCH INSTRUMENT

3.4.1 Selection of data collection instrument

The Functional Independence Measure (FIM) (UDS for CMS 2005; Keith, Granger, Hamilton and Sherwin 1987) is a tool that is widely used in rehabilitation and rehabilitation nursing. This instrument is a measure of disability, not the improvement of the disabled patient. The FIM Instrument included in the Uniform Data Set for Medical Rehabilitation, IRF PAI (UDS for CMS 2005), is intended to measure what the person with the disability actually does (UDS for CMS 2005). High reliability of the FIM Instrument has been documented and assessed using intra-class correlation coefficients. Results have consistently been found to be greater than 0.85 (Ottenbacher et al 2004; Ottenbacher et al 1996; Stinemann et al 1996).

This instrument is an ordinal measurement (Polit & Beck 2008:452) comprised of 18 items rated on a seven-level scale that represents graduations in function from complete dependence (1) to complete independence (7) (UDS

for CMS 2005:Annexure A). Noted that “0”, activity did not occur, is only used on admission. The levels of activity, as indicated on the IRF PAI (UDS for CMS 2005:Annexure A), are as follows: 0=no activity, 1=total assistance, 2=maximal assistance, 3= moderate assistance, 4= minimal contact assistance, 5= supervision or setup, 6= modified independence, 7= complete independence. These scores are grouped as complete dependence (0 to 2), modified dependence (3 to 5) and independent (6 to 7). These 18 items are organized into 6 domains: self-care or activities of daily living (6 items on dressing upper and lower body, eating, grooming, toileting, and bathing), bladder and bowel control (2 items), mobility (3 transfer items), locomotion (2 items on walking/wheelchair use and stairs), communication (2 items on comprehension and expression), and social cognition (3 items on social interaction, problem solving, and memory) (UDS for CMS 2005:Annexure A). Therefore, total scores range from 18 to 126, with higher scores indicating higher or better function, indicating more independence (UDS for CMS 2005). Conversely, lower scores indicate a lower level of function and indicate less independence or more dependence.

3.4.2 Selection of method of data collection

According to the UDSMR protocol in administering the FIM Instrument, FIM scores are obtained within 72 hours of admission to the inpatient rehabilitation facility and within 72 hours of discharge (UDS for CMS 2005). Data are collected by rehabilitation professionals, including Registered Nurses and the

professionally licensed interdisciplinary team members, who have been trained in the use of the IRF-PAI Instrument (UDS for CMS 2005:Annexure A) and have passed the credentialing examination for the assignment of FIM Instrument data.

Collection of follow-up data by telephone interview is the most common data collection method recommended by the Uniform Data Systems (UDS for CMS 2005). Follow-up data is collected 80 to 180 days after discharge from inpatient rehabilitation, utilizing a decision tree (UDS for CMS 2005:Annexure B) provided by the Uniform Data System as a format for the telephone interview for consistency (UDS for CMS 2005). Follow-up data is collected by a single interviewer, the investigator of this study, to improve consistency and accuracy. The research investigator will collect post discharge functional assessment data (Annexure A:2) using the UDS Decision Tree as a reference (Annexure B). If the patient was unable to respond to the telephone interview, the same decision tree will be utilized to collect information from a proxy, such as a family member, caregiver, or significant other. Information available on each discharged patient from this setting, the inpatient rehabilitation facility, is included in the IRF PAI (UDS for CMS 2005), and is entered within 72 hours of discharge.

Recommended procedures from UDS as a function of the IRF PAI (UDS for CMS 2005), includes data collection of admission and discharge FIM. These total scores will be recorded, including all functions within each of the six domains for analysis. In addition, selected variables for study including demographics, medical information, and discharge information were recorded.

Selected demographic data on the IRF PAI (Annexure A) includes the following items: age (6), gender (8), race/ ethnicity (9), and marital status (10). Medical information on the IRF PAI (Annexure A) selected includes: impairment group (21), comorbidities (24), length of stay (40) discharge date minus (12) admission date, length of stay efficiency determined by LOS divided by rehabilitation effectiveness (admission FIM minus discharge FIM). Discharge data, also indicated on the IRF PAI (Annexure A), includes: discharge living setting (44a), home services or activities including therapy (44b), and (45) discharge to living with, specified as alone (1), family/ relatives (2), friends (3), attendant (4), or other (5) (Annexure A). Although not extensively studied, many of these variables have been identified in the literature as having the possibility of significance to outcomes. (Ottenbacher et al 2004; Bottemiller et al 2006; Lutz 2004; Aitken & Bohannon 2001; Andstrom & Mokler 1998; Schmidt et al 1999). In addition, these outcome variables have been identified as significant in evidence based practice studies (Melnik and Fineout-Overholt 2005).

3.5 RELIABILITY AND VALIDITY

In developing the prospective payment system for inpatient medical rehabilitation, CMS reviewed the Uniform Data Systems Medical Record (UDSMR) data and associated information collection protocols. The review found that UDSMR hospitals included a large portion of the Medicare rehabilitation cases from most states in the United States of America and that patient demographics, hospital characteristics, and resources used by Medicare

beneficiaries were well represented by the UDSMR database (Carter et al 2003). The persons with disability population, the subjects for this study, are served by a participating facility, identified and licensed by the Centre for Medicare and Medicaid Services, to provide inpatient rehabilitation services in the United States of America. A summary of the national data collection in the United States of America is published annually, providing national benchmarks of demographic data and outcome measures for inpatient medical rehabilitation (UDS for CMS 2005). The reliability and validity of the instrument, and the threats to reliability and validity are examined in this study.

3.5.1 Reliability of the instrument

The sensitivity and responsiveness of the FIM instrument has been investigated with high reliability and validity (UDS for CMS 2005; Ottenbacher et al 2004; Granger et al 1993). When the instrument is administered to a sample, under similar conditions, to a group similar to the population of a previous study, then reliability is a good measure of the instruments accuracy (Polit & Beck 2004, 422; Ottenbacher et al 2004; UDS for CMS 2005). Instrument reliability is further supported with stability by test-retest reliability. Similar results were obtained on more than one occasion of the comparison computing a reliability interclass correlation coefficient or positive relationship between physical functioning and the level of numeric function (0.86 to 0.99) according to Ottenbacher et al (2004) and others (O'Connor et al 2005; Poon et al 2005; Yu & Sullivan 2005, Giaguinto 2006; Bottemiller et al 2006; Lutz 2004).

3.5.2 Reliability of observational measures

The inter-rater reliability of equivalence of observational measures was consistently performed during this study when assigning FIM scores at admission and discharge to this population. The interdisciplinary team, including rehabilitation nurses, observed the subject's physical function and assigned scores, according to UDS for CMS guidelines (2005), and discussed and negotiated for the most accurate measures that were assigned by all professional, certified FIM assessors. Similarly, the investigator of this study participated on the interdisciplinary team and was certified as a FIM assessor, also requiring inter-rater equivalence of observational scores (UDS for CMS 2005), participating in the discussion, negotiation and agreement of assigned FIM scores. Follow-up of FIM score assignments, post discharge from inpatient rehabilitation, were completed by the investigator of this study, including all 18 indicators of function. These scores were summed for an overall score on each subject. Assessing the internal consistency (Polit & Beck 2004:420) was required in training and credentialing as a FIM evaluator.

3.5.3 Threats to Reliability

3.5.3.1 Threat of self report

The primary threat of reliability to this study is the threat of self report (Polit & Beck 2008:369). The investigator of the study is the individual responsible for assigning FIM scores per telephone interview post discharge, according to UDS for CMS (2005) guidelines. Training and certification were achieved prior to the

inception of this study and re-training with re-certification occurred annually. The construction and the constancy of the IRF PAI (UDS for CMS 2005:Annexure A) FIM tool and decision tree (UDS for CMS:Annexure B) were acknowledged and utilized. The structured data collection instrument allows for open ended questioning when assessing, as well as closed ended questions. Sensitivity to roles, as previously described, was regarded, as well as open and closed questioning, to facilitate honest responses (Polit & Beck 2004, 2008). In addition, the assignment of function by an ordinal measurement scale of 0 (no function) to 7 (complete independence), reduces the significance of the threat of self report (UDS for CMS 2005:Annexure A). However, previously described concerns of self-report influenced by roles and socially desirable responses is acknowledged.

3.5.3.2 *Threat of proxy*

When the subject was unable to respond appropriately to FIM questions asked per FIM decision tree guidelines (UDS for CMS 2005), the decision tree (Annexure B), was used for collecting information from proxies. Proxies included family members, caregivers, or significant others (Smith et al 1996; Ottenbacher et al 2004; Polit & Beck 2008:468). These participants in the assignment of FIM scores all had some participation in the care of the subject and were knowledgeable about the functional tasks they could or could not perform. The interrater and test-retest reliability of the data collection process, including proxy responses, has been examined by independent researchers and consistently produced intra-class correlation coefficients between 0.86 and 0.99.

(Ottenbacher et al 2004; Ottenbacher et al 1994; Heineman et al 1994; Segal et al 1996).

3.6 VALIDITY

3.6.1 Validity of variables and sample size

The validity of the study is focused on the statistical methods determining that a relationship exists between FIM at discharge and FIM at 80 to 180 days later (UDS for CMS 2005). In addition, using analysis of variance (ANOVA) will determine if a strong statistical power or a true relationship among the variables, previously described as demographics, medical information, and discharge information, exists (Polit & Beck 2004, 2008). This further will be supported by a large sample size of more than 100 subjects. The precision post discharge FIM was increased by controlling the variable of discharge destination to home or community, including board and care, transitional care, and assisted living, and eliminating others, such as intermediate care, sub-acute care, acute care facility, chronic hospital, another rehabilitation facility, and sub-acute setting (UDS for CMS 2005:Annexure A). However, there was no attempt to assign subjects to these groups prior to the study.

3.6.2 *Threats to internal validity*

Internal validity is supported by the strong influence of previous studies that FIM at discharge is truly causing the FIM, post discharge, and is not the result of an extraneous variable, although relationships of influence may have been identified (Ottenbacher et al 2004; O'Connor et al 2005; Poon et al 2005;

Yu and Sullivan 2005, Giaginto 2006; Bottemiller et al 2006; Lutz 2004). Other possible influencing variables that are investigated to determine a relationship are the demographics of age, gender, race/ethnicity, and marital status (UDS for CMS 2005:Annexure A). Medical information selected for this study includes, impairment group or diagnosis, the number of comorbidities, LOS and LOS efficiency (UDS for CMS:Annexure A). In addition, the influence of the living setting, home health services including therapy, and discharge to person living with, are specified as alone (1), family/relatives (2), friends (3), attendant (4), or other (5) (UDS for CMS 2005). Although all of these options are variations of discharge to the community, the influences of each may impose variations in post discharge FIM or functional performance. The variables of medical information included in this study (impairment group, number of comorbidities, and LOS efficiency) could also influence demographics and discharge variations, as well as follow-up FIM (UDS for CMS 2005:Annexure A).

3.6.2.1 *Threat of mortality*

Mortality was not anticipated as a threat to internal validity. According to previous studies and the National benchmark from outcome data in the United States of America, this population has less than 5% mortality rate, existing for 2005 to 2006 (UDS for CMS 2005). The facility utilized for this study is similar, in that the mortality rate was <5%, actually occurring at .2% for 2005 (UDS for CMS 2005). Therefore, attrition bias due to mortality should not prove to be a threat to this study. However, noted that these statistics of mortality considered mortality

occurrence during the inpatient rehabilitation stay and not 80 to 180 days post discharge. There is a lack of research findings for post discharge mortality data.

3.6.2.2 *Threat of attrition*

In this longitudinal study, attrition was addressed by obtaining telephone numbers of 2 to 3 people, with whom the subject or family identified as a close relationship or next of kin, as well as the current contact telephone number of the subject and/or caregiver providing any needed post discharge care in the home. The subjects and/or family members/ relatives, friends, caregivers or attendants, and/ or significant others were given copies of their informed consent (Annexure D) with facility and investigator's phone numbers to respond if relocation was necessary prior to follow-up telephone calls being made. All were informed of the expectation of a follow-up telephone call from the investigator at 80 to 180 days following discharge from the inpatient rehabilitation facility to discuss the physical function of the subject. Therefore, attrition due to relocation or extreme illness, should prove only a minimal threat to validity, but is acknowledged due to the unpredictability of the vulnerable population of disability.

3.6.2.3 *Threat of selection bias*

The selection threat of biases resulting from pre-existing differences between groups can be problematic in non-experimental studies (Polit & Beck 2006:295). The possibility exists that differences in the FIM score at follow-up, the dependent variable, is due to extraneous factors rather than the independent variables selected and studied. In addition, selection bias will be investigated

and minimized by assigning individual subjects to groups, those that maintain function at follow-up and those that did not. Collecting data on subject characteristics, such as demographics (age, gender, race/ethnicity, marital status) and medical condition (impairment group, number of co morbidities, LOS efficiency), collected prior to the occurrence of the variable of follow-up FIM score, reduces the threat of selection bias.

3.6.3 Threats to external validity

3.6.3.1 Threat of expectancy efforts

Threats of external validity that may limit the generalizability of the findings of the study include expectancy effects. The subjects of this study could behave or perform functionally in a certain manner due to their awareness of the study (Polit & Beck 2004: 218). The possibility that the subject may not perform functional skills they have the ability to perform, to remain in the disabled role, could result in a lower FIM assessment at follow-up post discharge. Likewise, the subjects could report by telephone interview a higher level of independence and function than actually experienced when observed for social desirability, creating a social desirability response bias (Polit & Beck 2004:359). However, the telephone decision tree (UDS for CMS 2005:Annexure B) allows for related open ended and close ended questioning to determine the accuracy of the *actual* function in all categories, although a minimal risk exists.

3.6.3.2 *Threat of external events and treatment effect*

In addition to the threat of expectancy efforts, the unpredictable possibility exists that other external events, requiring treatment interventions, could influence the results of this study (Polit & Beck 2004, 2008). In this vulnerable population, persons with disability, the occurrence of other chronic diseases or comorbidities requiring treatment or intervention post discharge from inpatient rehabilitation could alter the outcome or influence the FIM post discharge follow-up at 80 to 180 days. This interaction of history and treatment effect occurs when rehabilitation inpatient intervention is implemented again in the absence of any such events or treatments with results obtained being much different (Polit & Beck 2008). In addition, the premorbid status of the subject, prior to admission to the inpatient rehabilitation facility, is an uncontrolled variable that could provide an external threat with treatment effect (Polit & Beck 2004,2008). This could be compounded with the expected age mean occurring greater than 65 years old, impacting the number of comorbidities or additional secondary diagnoses, in addition to the rehabilitation diagnosis or impairment group. Impairment group, age and co morbidities are addressed as variables to be analyzed in determining any relationship to functional performance, as evidenced by follow-up FIM, to reduce the threat of external events and treatment effects.

3.7 SUMMARY

The methodology of this quantitative, non-experimental study identifies and describes the research population and their selection, and the data collection

instrument, IRF PAI (UDS for CMS 2005:Annexure A), without concerns or limitations about the meaning of the study outcomes. The measurement of the data collection tool, the functional independence measure (FIM), has proven to be consistent and accurate as a measure of disability (Ottenbacher et al 2004; Ottenbacher et al 1996; Stinemann et al 1996). The study design described, using descriptive statistical analysis, paired t-tests, and analysis of variance (ANOVA), are the research methods selected to examine multiple variables statistically (Polit & Beck 2005, 2008). Statistical analysis will determine if rehabilitation patients maintain functional gains post discharge to the community setting. In addition, ANOVA will test the mean differences among the groups by comparing variability within the groups and between the groups (demographics, medical information, discharge information, follow-up FIM) (Polit & Beck 2004, 2008). This analysis will determine the relationships of the selected variables and maintained functional performance post discharge. The approach to the research, obtaining two measures from the same subjects and examining relationships among multiple variables, provided the rationale for methodologic decisions made to minimize any threats to validity and reliability. The threats of self-report and/or proxy, compounded by the threat of expectancy efforts, is acknowledged by the investigator and minimized by all known efforts. The unpredictable possibility exists that other external events, requiring treatment interventions or relocation to another level of care, could influence the results of

this study, as well as attrition, in this vulnerable population of persons with disability.

Chapter 4

PRESENTATION AND DISCUSSION OF THE DATA

4.1 INTRODUCTION

The purpose of this descriptive, quantitative study was to answer the research question: Do inpatient rehabilitation patients maintain functional gains achieved post discharge to the community? Additional research questions are intended to document trends resulting from inpatient rehabilitation post discharge outcomes. Additional research questions examine the relationships between demographic information, medical information, and discharge information to maintained FIM gains, as well as any interactions between the variables. Chapter 4 presents the data collected in this study. The sample is described and analyzed using the means of descriptive demographics, medical information, and discharge information, organized by impairment groups. The sample data collected is then described and findings are interpreted. Analysis of the data collection was performed using Minitab 15, following data collection and entry. Finally, the discussion of that data analysis is included, in response to the research questions.

4.2 ANALYSIS OF THE SAMPLE

4.2.1 Description of the Sample

Prior to discharge, Informed Consents (Annexure D) were obtained from inpatient rehabilitation patients, both written and verbally, to participate in this study. Of those admitted to this rehabilitation setting, meeting admission criteria for inpatient rehabilitation services, 244 patients were invited to participate in this study. Of this

number of 244 patients, 74 declined to participate in the study and 170 patients, or their proxy when necessary, agreed to participate by signing the Informed Consent. Of the 170 agreeing to participate in the study, 108 subjects actually completed the study. The description of the remainder of the patients not completing the study is addressed as follows: 16 deceased, 3 readmitted to acute care, 14 discharged to skilled care or other non-community destinations, 11 did not answer the telephone for follow-up assessment after three attempts at varying times of day, 8 responded as “wrong telephone number” when called for follow-up assessment, and 10 subject’s telephones had been disconnected when an attempt was made to contact the subject for follow-up assessment.

4.2.2 Description of the sample by impairment group

The final sample included 108 subjects who received inpatient rehabilitation and were discharged into the community. Community includes discharge to the home, board and care, transitional care, and assisting living, as indicated by UDS for CMS (2005) of the IRF PAI (Annexure A). This descriptive data was grouped into impairment groups for all subjects according to UDS coding guidelines (UDS for CMS 2005). The subjects are identified by impairment group, and are included as Table 1.

Table 1: Description of the Impairment Groups of the Sample

Code Group	Impairment Group	Total n	Code	n	Description
01	Stroke	17	01.1	3	Lt Body Involvement/ Rt Brain
			01.2	7	Rt Body Involvement//Lt Brain
			01.4	7	No Paresis
02	Brain Dysfunction	5	02.1	3	Non-traumatic
			02.22	2	Traumatic, Closed Injury
03	Neurologic Conditions	7	03.1	1	Multiple Sclerosis
			03.2	2	Parkinsonism
			03.3	1	Polyneuropathy
			03.4	1	Guillain-Barre Syndrome
			03.8	2	Neuromuscular Disorders
04	Spinal Cord Dysfunction	1	04.13	1	Other Non-Traumatic Spinal Cord Dysfunction
05	Amputation	4	05.4	3	Unilateral Lower Limb Below Knee (BK)
			05.9	1	Other Amputation
06	Arthritis	3	06.2	3	Osteoarthritis
08	Orthopaedic Disorders	57	08.11	20	Status Post Unilateral Hip Fx
			08.2	2	Status Post Femur (Shaft) Fx
			08.3	3	Status Post Pelvic Fracture
			08.4	1	Status Post Major Multiple Fx
			08.51	3	Status Post Unilateral Hip Replacement
			08.61	22	Status Post Unilateral Knee Replacement
			08.62	2	Status Post Bilateral Knee Replacement
			08.9	4	Other Orthopaedic
09	Cardiac	5	09	5	Cardiac
13	Other Disabling Impairments	1	13	1	Other Disabling Impairments
14	Major Multiple Trauma	4	14.9	4	Other Multiple Trauma
16	Debility	2	16	2	Debility -Non-cardiac/Non-Pul
17	Medically Complex	2	17.7	1	Skin Disorders
			17.9	1	Other Medically Complex Conditions

Of the 17 impairment groups, no subjects occurred in pain syndrome (07.1-07.9), pulmonary disorders (10.1-10.9), burns (11), congenital deformities (12.1-12.9), or developmental disabilities (15). The largest impairment group, that resulted in 53% of the total sample, occurred in the impairment group of orthopaedic disorders, with status post unilateral hip fracture (08.11) and status post unilateral knee replacement (08.61) having the most frequently occurring impairments. Approximately 16% of the subjects occurred in the stroke impairment group (01.1-01.9) and 6% in the neurologic conditions (03.1-03.8), with the remainder of the impairment groups having a less frequent occurrence.

4.2.3 Description of the demographic characteristics of the sample

The demographic characteristics included in this study were age, gender, race, and marital status. The relationship of these demographic characteristics to maintained function, post discharge inpatient rehabilitation, will be analyzed in this study. These demographic characteristics identified: a female population of 77%, three times greater than males; a predominately white population (79%) by race, although 21% of the black population was represented with no subjects occurring in the American Indian or Alaska Native, Asian, Hispanic or Latino, Native Hawaiian or Pacific Islander racial groups; and a more widowed or married population of subjects, with 43% of the population married, 38% widowed, and 27% in other subgroups such as separated, divorced, or never married. Also, significant is the mean age of the impairment groups of 76.57, primarily representing a geriatric

population. The descriptive demographic information for all subjects in this study is shown as Table 2, grouped by impairment groups.

Table 2: Demographics of the Population by Impairment Group

Demo Chara	Stroke (01)	Brain (02)	Neuro (03)	Spin Cord (04)	Amp (05)	Arth (06)	Ortho (08)	Card (09)	Other (13)	Multi Trauma (14)	Debil (16)	Medi Comp (17)
N	n=17	n=5	n=7	n=1	n=4	n=3	n=57	n=5	n=1	n=4	n=2	n=2
Age (M)	67.08	58.4	75.14	83	82.25	85.33	75.37	69	90	78.75	73.5	81
Gender: Female	12	4	3	1	3	2	49	1	1	4	1	2
Male	5	1	4	0	1	1	8	4	0	0	1	0
Race: Black	2	4	0	0	2	0	14	0	0	1	0	0
White	15	1	7	1	2	3	43	5	1	3	2	2
Never Married	4	2	0	0	0	0	6	0	0	0	0	0
Married	9	2	7	1	1	1	20	4	0	0	1	0
Widowed	3	1	0	0	2	2	25	0	1	4	1	2
Separated	0	0	0	0	0	0	0	0	0	0	0	0
Divorced	1	0	0	0	1	0	6	1	0	0	0	0

4.2.4 Description of the medical information of the sample

The medical information characteristics described in this table are FIM admission mean, discharge FIM mean, follow-up FIM mean, LOS efficiency, and number of co-morbidities, grouped as 0 or no co-morbidities, 1 to 3 comorbidities, and more than 3 comorbidities. There were no subjects represented as having none or zero comorbidities. The greatest population had more than 3 comorbidities (65%). Although admission FIM was not a parameter for this study, it is included in

this data description to identify the physical functioning of the subjects when entering the rehabilitation setting. This parameter becomes of value when determining the LOS efficiency. The LOS efficiency was calculated by the discharge FIM minus the admission FIM and divided by LOS, according to UDS for CMS guidelines (2005). The FIM efficiency for all impairment groups was greater than 1, with a mean range of 1.63 to 5.02. The FIM means of physical functioning (admission, discharge, and follow-up) are represented by impairment groups. Noted that prior to statistical analysis, the follow-up FIM mean of all impairment groups, exceeded the discharge mean of all impairment groups, with the exception of the arthritis impairment group (Code 06.2). These three subjects in the arthritis impairment group were diagnosed as osteoarthritis. The greatest FIM gains from discharge to follow-up were identified in the impairment groups of major multiple trauma (Code 14.9), neurological conditions (Codes 03.1-03.8), and brain dysfunctions (Codes 02.1-02.22), in descending order. This group of subjects totals 16 (n=16) of the 108 total subjects. The medical information selected for review for all subjects in this study is shown as Table 3, grouped by impairment groups.

Table 3: FIM Scores, Comorbidities and LOS Efficiency by Impairment Groups

Variables	Stroke	Brain	Neuro	SCI	Amp	Arth	Ortho	Card	Other	MT	Deb	Med Comp
FIM (Means)												
Admission	56.65	50.40	50.57	38	48.75	64.33	58.16	58.67	64	60.25	50.5	64.5
Discharge	82.47	88.8	90	93	81.5	94.67	93.04	90	107	95.75	97	106
Follow-up	87.94	96.8	98.14	99	87	92	99.05	95.67	111	110	98	107
LOS Efficiency	3.19	2.93	2.27	1.9	2.26	1.94	4.24	3.13	3.58	1.63	2.39	5.02
Comorbidities:												
1-3	4	3	1	0	1	0	22	1	0	2	2	2
>3	13	2	6	1	3	3	35	4	1	2	0	0

4.2.5 Description of the discharge information of the sample

The variables described are those of discharge settings, identified by UDS for CMS (2005) as community settings. Those community settings identified include: home, board and care, transitional care, and assisted living. The majority of these subjects were actually discharged to the home environment, representing 92% (n=99) of the total subjects (n=108), with 8% (n=9) discharged to the other options. Another variable, those receiving home health services, including outpatient therapy, is slightly more than half of the population studied (51%, n=55). The person or persons that the subject was discharged with are represented as: alone, family, friend, attendant, or other. Almost all subjects (n=90, 83%) were discharged home with another person. The majority of these person(s) were family members, identified by 74% (n=80) of the subjects. Of the remaining subjects (n=18, 17%)

discharged alone, more than half (10 of 18 subjects) occurred in the orthopaedic disorders impairment group. The discharge information included in this study is included as Table 4.

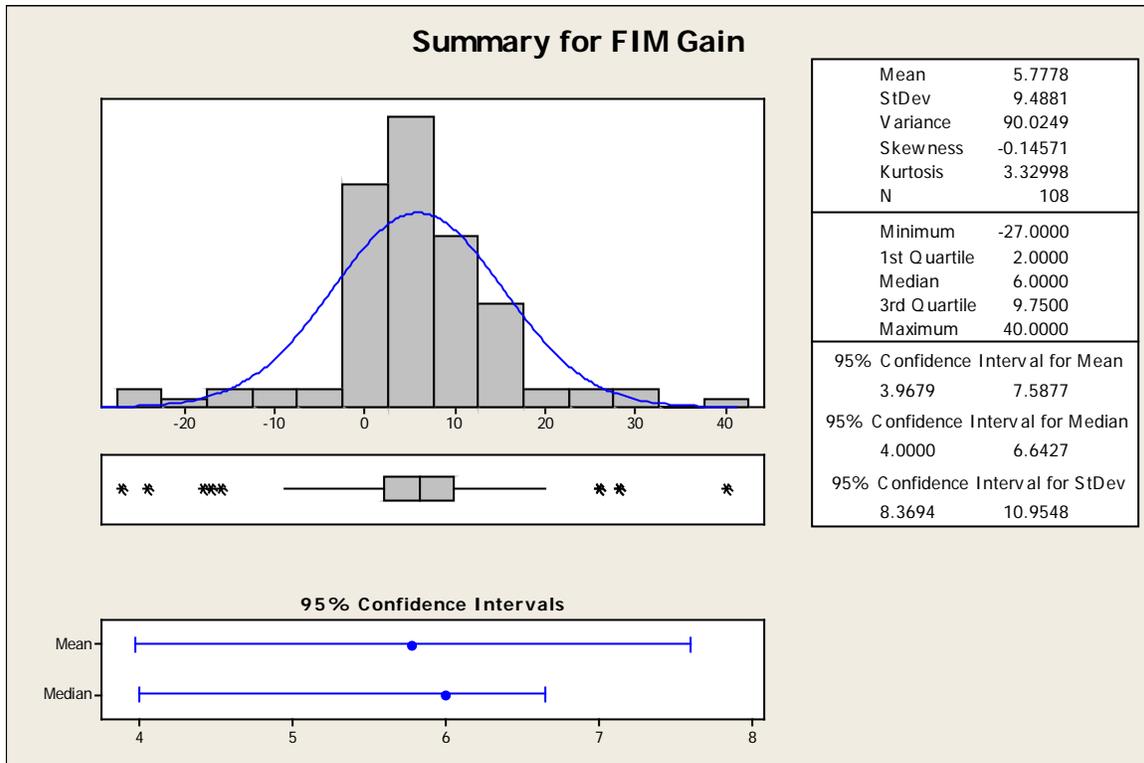
Table 4: Discharge Information by Impairment Group

Variables	Stroke	Brain	Neuro	SC	Amp	Arth	Ortho	Card	Other	Maj Trau	Deb	Med Comp
DC Setting												
Home	17	5	6	1	4	1	52	5	1	3	2	2
Room & Board	0	0	1	0	0	1	2	0	0	0	0	0
Transitional Care	0	0	0	0	0	0	1	0	0	1	0	0
Assisted Living	0	0	0	0	0	1	2	0	0	0	0	0
HH Services:												
Yes	5	3	4	1	3	1	32	2	1	1	2	0
No	12	2	3	0	1	2	25	3	0	3	0	2
Living With:												
Alone	2	0	0	0	1	1	10	1	0	2	0	1
Family	14	5	6	1	3	1	40	4	1	2	2	1
Friend	0	0	0	0	0	0	1	0	0	0	0	0
Attendant	1	0	0	0	0	1	3	0	0	0	0	0
Other	0	0	1	0	0	0	3	0	0	0	0	0

4.3 DO INPATIENT REHABILITATION PATIENTS MAINTAIN FUNCTIONAL GAINS POST DISCHARGE TO THE COMMUNITY?

To investigate whether inpatient rehabilitation patients maintain functional gains post discharge to the community setting, a paired t-test was employed. Let μ_d denote the average difference in FIM at discharge and FIM at follow-up (FIM at follow-up minus FIM at discharge) for inpatient rehabilitation patients. Restated, μ_d is the average gain in FIM from discharge to follow-up. The appropriate t-test is written as $H_0: \mu_d = 0$ vs. $H_a: \mu_d > 0$. The sample results for the 108 patients in the

study show an average gain in FIM from discharge to follow-up of 5.778. The standard deviation of the gains in FIM from discharge to follow-up is 9.488. The five-number summary for the FIM at follow-up minus FIM at discharge differences shows a minimum value of -27 and a maximum value of 40; and 25th, 50th, and 75th percentiles of 2, 6, and 9.75 respectively. The negative values indicate that FIM at follow-up is less than FIM at discharge, with positive values indicating FIM at follow-up as greater than FIM at discharge. It is notable that over 90% of the 108 study patients experienced maintained or improved functional performance post discharge into the community. Only 10 of the 108 study patients have a follow-up FIM score that is less than the discharge FIM score indicated by a negative score for FIM gain. A graphical summary for the gains in FIM from discharge to follow-up is provided below as Table 5.

Table 5: Summary of FIM Gains from Discharge to Follow-up

The distribution of FIM gain is reasonably normal except for the five outliers in each direction. Because these are not extreme and preserve the symmetry of the distribution, use of the paired t procedures was a safe or appropriate selection with 108 observations.

In statistical analysis, the probability of results may be determined by p-value (Polit & Beck 2008: 592,760). The p-value for the paired t-test in this study is less than .001 ($t = 6.33$), and therefore the sample results provide very strong evidence that the average change in FIM from discharge to follow-up is positive. In other words, the sample results provide very strong evidence that inpatient rehabilitation

patients have a higher FIM score at follow-up than at discharge, on average, and therefore are maintaining, or actually improving, functional performance post-discharge to the community.

A 95% confidence interval for the average gain in FIM from discharge to follow-up is given by (3.968, 7.588). Therefore, the average gain in FIM from discharge to follow-up for inpatient rehabilitation patients is between 3.968 and 7.588, with 95% confidence.

For further analysis the paired t-tests was repeated. To assess the effect of the outliers on the analysis, the outlying observations were removed and the paired t-test was repeated on the reduced data set. The differences in the results are not substantial ($t = 10.27$, $p\text{-value} < .001$) and present no contradiction in interpretation. Therefore, rehabilitation patients do maintain functional gains post discharge from inpatient rehabilitation into the community.

4.4 THE RELATIONSHIPS BETWEEN POST DISCHARGE FUNCTION AND THE INDEPENDENT VARIABLES

Using analysis of variance, the means of the independent variables were compared among three or more groups, identified in this study as demographics, medical information, and discharge information, with the dependent variable of follow-up FIM. All other variability was also examined, including variation between groups and variation within groups. Each group of variables, addressed as the research question, was statistically analyzed to determine the relationships or trends post discharge from inpatient rehabilitation.

4.4.1 What are the relationships of post discharge function and demographics?

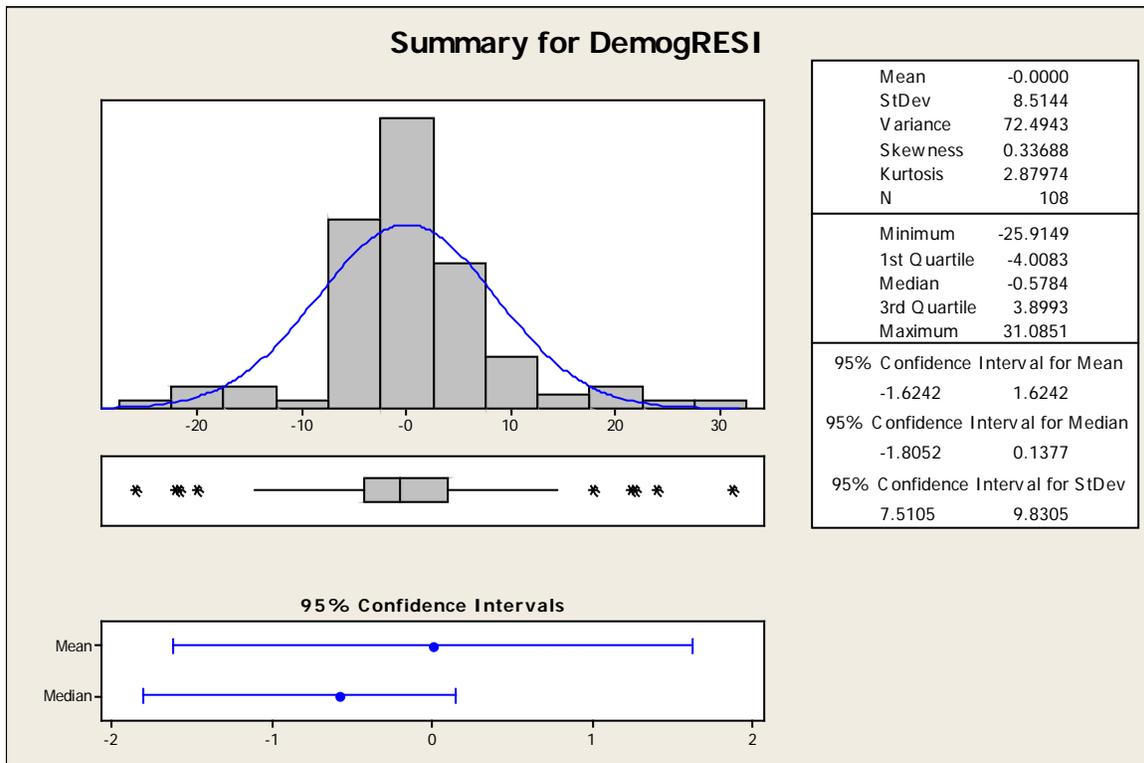
The demographic variables of age, race, gender and marital status were recorded. To investigate the effects of patient age, gender, race, and marital status on FIM gain from discharge to follow-up for inpatient rehabilitation patients, a four-way analysis of variance (ANOVA) was performed employing a model that allows the effects of these factors to be studied simultaneously, and allows the interaction effects between these factors to be estimated (Polit & Beck 2004:506; 2008:596). For the purposes of this study, age was studied at three levels: the younger category represented by ages less than 65; middle ages ranging from 65 to 75; and an older category indicated by 76 or older. The study patients were also classified for analysis by gender, race and marital status. Gender was indicated as male or female. Race was represented as black or white, with no other races identified in the sample. Marital status was indicated as, never married, married, widowed, or divorced, with no subjects represented as separated.

Levene's Test for Equal Variances of the treatment groups (H_0 : equal variances vs. H_a : unequal variances) yielded a p-value of 0.424 (Polit & Beck 2004:502). Therefore, there is no evidence that the equal variances assumption for the analysis of variance (ANOVA) F-test is not satisfied (Polit & Beck 2004: 489).

The distribution of the residuals is reasonably normal except for the five outliers in each direction, corresponding to the same outlying observations identified in the paired t-test analysis of FIM gain (Polit & Beck 2004:488; 2008:595). A

graphical summary of the residuals from the four-way ANOVA analysis is given below as Table 6.

Table 6: ANOVA Four-way Analysis of Demographic Residuals



The results of the four-way ANOVA on the full data set, including outlying observations, provides the following information about the effects of the demographic variables, age, gender, race, and marital status, on FIM gain from discharge to follow-up. All of the tests for interaction effects gave p-values greater than 0.15, indicating no significant interaction effects between these factors (Polit & Beck 2004:485-6). The lack of interaction effects allows a straightforward analysis of main effects. The tests for main effects on FIM gain from discharge to follow-up

due to age, gender, race, and marital status were also not significant. This analysis yielded p-values greater than 0.5 for all four tests of main effects (Polit Beck 2004;2008). The corresponding ANOVA table is provided as Table 7.

Table 7: ANOVA for FIM Gain with Demographics

Analysis of Variance for FIM Gain, using Adjusted SS for Tests
(full data set)

SOURCE	DF	Seq SS	Adj SS	Adj MS	F	P
Age	2	45.97	114.15	57.07	0.61	0.545
Gender	1	181.37	1.04	1.04	0.01	0.916
Race	1	19.27	16.42	16.42	0.18	0.676
Marital Status	3	125.87	74.56	24.85	0.27	0.850
Age Category*Gender	2	194.34	68.20	34.10	0.36	0.695
Age Category*Race	2	167.39	90.67	45.33	0.49	0.617
Age Category*MarSt	6	555.09	908.12	151.35	1.62	0.152
Gender*Race	1	80.39	0.66	0.66	0.01	0.933
Gender*Mar St	3	124.68	80.19	26.73	0.29	0.835
Race*Mar St	3	381.40	381.40	127.13	1.36	0.261
Error	83	7756.89	7756,89	93.46		
TOTAL	107	9632.67				

To assess the effect of outliers on the analysis, the outlying observations were removed and the four-way ANOVA was repeated. The corresponding ANOVA table is represented as Table 8.

Table 8: ANOVA for FIM Gain and Demographic Information Without Outliers

Analysis of Variance for FIM Gain, No Outliers, using Adjusted ss for Tests
(no outliers)

SOURCE	DF	Seq SS	Adj SS	Adj MS	F	P
Age	2	55.06	1.80	0.90	0.03	0.970
Gender	1	99.40	1.42	1.42	0.05	0.826
Race	1	9.92	0.87	0.87	0.03	0.863
Marital Status	3	152.51	105.69	35.23	1.21	0.311
Age Category*Gender	2	145.90	94.59	47.29	1.63	0.204
Age Category*Race	2	94.91	35.12	17.56	0.60	0.549
Age Category*MarSt	6	209.41	279.30	46.55	1.60	0.159
Gender*Race	1	89.46	0.18	0.18	0.01	0.937
Gender*Mar St	3	41.92	26.75	8.92	0.31	0.820
Race*Mar St	3	114.71	114.71	38.24	1.32	0.276
Error	73	2121.77	2121.77	29.07		
TOTAL	97	3134.98				

The differences in the results with and without the outliers are not substantial and presented no contradiction in interpretation (Polit & Beck 2004:551-2; 2008:645). Therefore, all interaction and main effects due to age, gender, race, and marital status are non-significant, with or without the outliers.

In summary, the ANOVA results indicated no significant differences in average FIM gains from discharge to follow-up for different age groups, different

genders, different races, nor different marital status (Polit & Beck 2004; 2008).

Thus, there are no relationships or trends identified between the FIM gain from discharge to follow-up and the studied demographic variables.

4.4.2. What are the relationships of post discharge function and medical information?

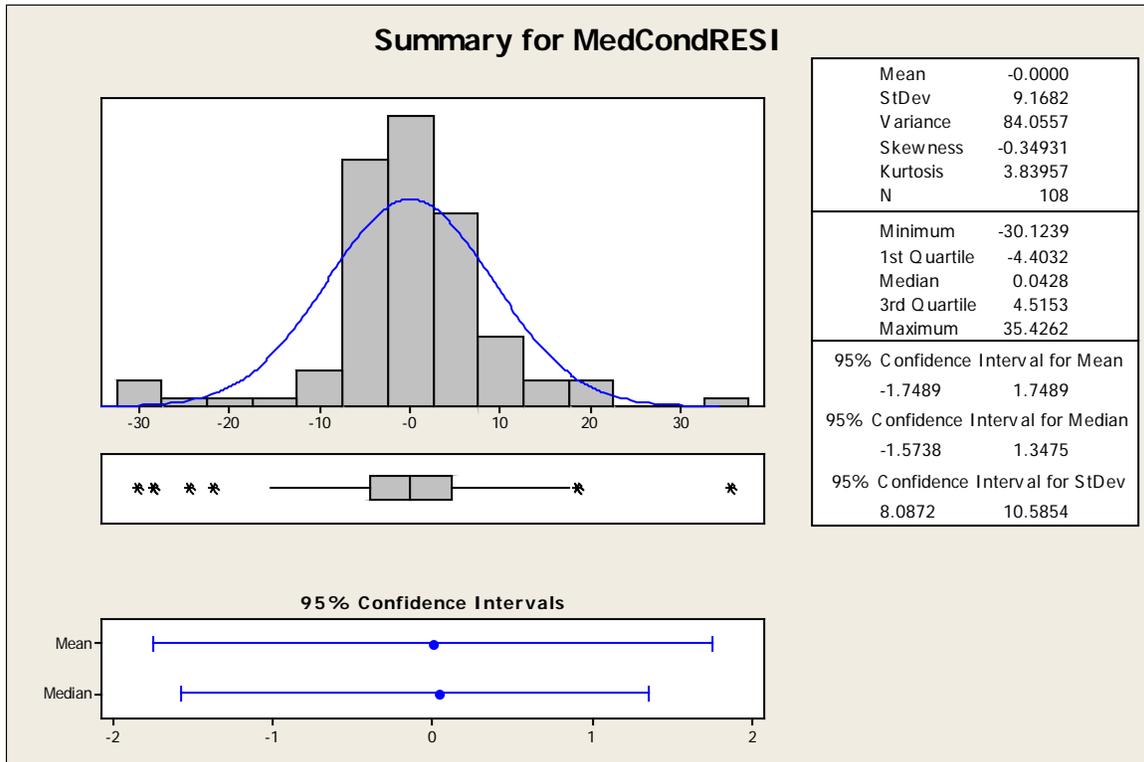
To investigate the effects of the medical information variables of impairment type, comorbidity, and LOS efficiency on FIM gain from discharge to follow-up for inpatient rehabilitation patients, a three-way analysis of variance (ANOVA) was performed employing a model that allows the effects of these factors to be studied simultaneously, and allows the interaction effects between these factors to be estimated (Polit & Beck 2004:506). For the purposes of the analysis of this study, impairment type was studied at three levels, based on the following groupings. The neurological impairments included stroke, brain dysfunction, neurological conditions, and spinal cord dysfunction (impairment group codes 1.1 to 4.13)(UDS for CMS 2005). The orthopaedic impairments included amputations, arthritis, and other orthopaedic disorders (impairment group codes 5.4 to 8.9)(UDS for CMS 2005). The other remaining impairments included cardiac, other disabling impairments, major multiple trauma, debility, and the medically complex (impairment codes 9 to 17.9)(UDS for CMS 2005). In addition, LOS efficiency was studied at three levels, high (3 or greater), middle (2 to less than 3), and low (less than 2). The study patients were also classified according to number of comorbidities, indicated as 1 to

3 comorbidities, or greater than 3 comorbidities, with no subjects represented as no (0) comorbidities.

Levene's Test for Equal Variances of the treatment groups (H_0 : equal variances vs. H_a : unequal variances) yielded a p-value of 0.586 (Polit & Beck 2004:502). Therefore, there is no evidence that the equal variances assumption for the ANOVA F-test is not satisfied (Polit & Beck 2004:489).

The distribution of the residuals was reasonably normal except for five low outliers and three high outliers. These outliers are a subset of the ten outliers identified in the previous analysis. A graphical summary of the residuals from the three-way analysis of variance (ANOVA) is provided as Table 9.

Table 9: ANOVA for Medical Information Residuals



The results of the three-way ANOVA on the full data set, including outlying observations, provides the following information about the effects of the medical condition variables, impairment types, comorbidities, and LOS efficiencies, on FIM gain from discharge to follow-up (Polit & Beck 2004:491). All the tests for interaction effects gave p-values greater than 0.4, indicating no significant interaction effects occurred between these factors. The lack of interaction effects allows a straightforward analysis of main effects (Polit & Beck 2004). The tests for main effects on FIM gain from discharge to follow-up due to the type of impairment, amount of comorbidities, and LOS efficiencies were also not significant, with p-

values greater than 0.3 for all three tests of main effects. The corresponding analysis of variance is given as Table 10.

Table 10: ANOVA for FIM Gain of Medical Conditions

Analysis of Variance for FIM Gain, using Adjusted SS for Tests
(full data set)

SOURCE	DF	SEQ SS	ADJ SS	ADJ MS	F	P
Impairment Category	2	23.18	8.65	4.32	0.05	0.956
Comorbidities	1	77.18	88.96	88.96	0.93	0.337
LOS Category	2	127.17	189.39	94.69	0.99	0.376
Impairment Categ*CoMor	2	48.40	0.98	0.49	0.01	0.995
Impairment Categ*LOS	4	342.20	344.78	86.20	0.90	0.467
Comorb*LOS	2	20.49	20.49	10.24	0.11	0.899
Error	94	8993.96	8993.96	95.68		
TOTAL	107	9632.67				

To assess the effect of outliers on the analysis, the outlying observations were removed and the three-way ANOVA was repeated (Polit & Beck 2004:491,551-2).

The corresponding ANOVA table is given as Table 11.

Table 11: ANOVA for Medical Conditions without Outliers

Analysis of Variance for FIM Gain with No Outliers for Medical Conditions using Adjusted SS for Tests
(no outliers)

SOURCE	DF	SEG SS	ADJ SS	ADJ MS	F	P
Impairment	2	44.71	7.90	3.95	0.11	0.895
Comorbidities	1	299.60	125.65	125.65	3.53	0.063
LOS Effic	2	310.85	150.57	75.28	2.12	0.127
Impair*Comor	2	100.08	12.89	6.44	0.18	0.835
Impair*LOS	4	261.37	277.56	69.39	1.95	0.109
Comor*LOS	2	18.84	18.84	9.42	0.27	0.768
Error	86	3056.98	3056.98	35.55		
TOTAL	99	4092.44				

The analysis of variance results using the reduced data set (outliers removed) uncovered some evidence of an effect due to comorbidity, with a p-value of .063. The differences in the ANOVA results with and without the outliers for all the interaction effects and for the main effects due to impairment type and LOS efficiency were not substantial and presented no contradiction in interpretation (Polit & Beck 2004; 2008).

Since the presence of outliers does have some implications on the results of the ANOVA, specifically related to the possible effect of comorbidities, a statistical method that is resistant to outliers needed to be employed to further investigate the possibility that patients with different comorbidity levels have different FIM gains.

Since comorbidity is studied at two levels (1 to 3 comorbidities and more than 3 comorbidities), two-sample rank procedures (for example, Mann-Whitney or the two-sample Wilcoxon rank sum) could be employed on the full data set to compare the median gains in FIM from discharge to follow-up for the two levels of comorbidities (Polit & Beck 2004:488-489,506). The two-sample rank procedures were resistant to any of the effects of the outliers.

The research hypothesis of interest is that the median gain in FIM is higher for the low comorbidity group (2 to 3 comorbidities) than for the high comorbidity group (more than 3 comorbidities). The associated p-value for the Mann-Whitney test was .0459 ($W = 2333.5$). This is interpreted as fairly strong evidence that the median gain in FIM is higher for the low comorbidity group than for the high comorbidity group (Polit & Beck 2004:488-9). The sample medians for FIM gain for the low and high comorbidity groups were 7.5 and 4.5, respectively. Therefore, a 95% confidence interval (based on ranked data to resist the effect of outliers) for the difference in median FIM gains is, 0.0005, 5.001 (Polit & Beck 2004:479-480). This suggests that low comorbidity patients (three or fewer comorbidities) have higher median gains in FIM than high comorbidity patients (greater than 3 comorbidities) between 0.0005 and 5.001 units.

Therefore, a relationship was identified between the lower comorbidity group (2 to 3 comorbidities) and greater gains in FIM or functional performance. However, the ANOVA results with and without outliers do not show any significant effects due to impairment type nor due to LOS efficiency (Polit & Beck 2004; 2008).

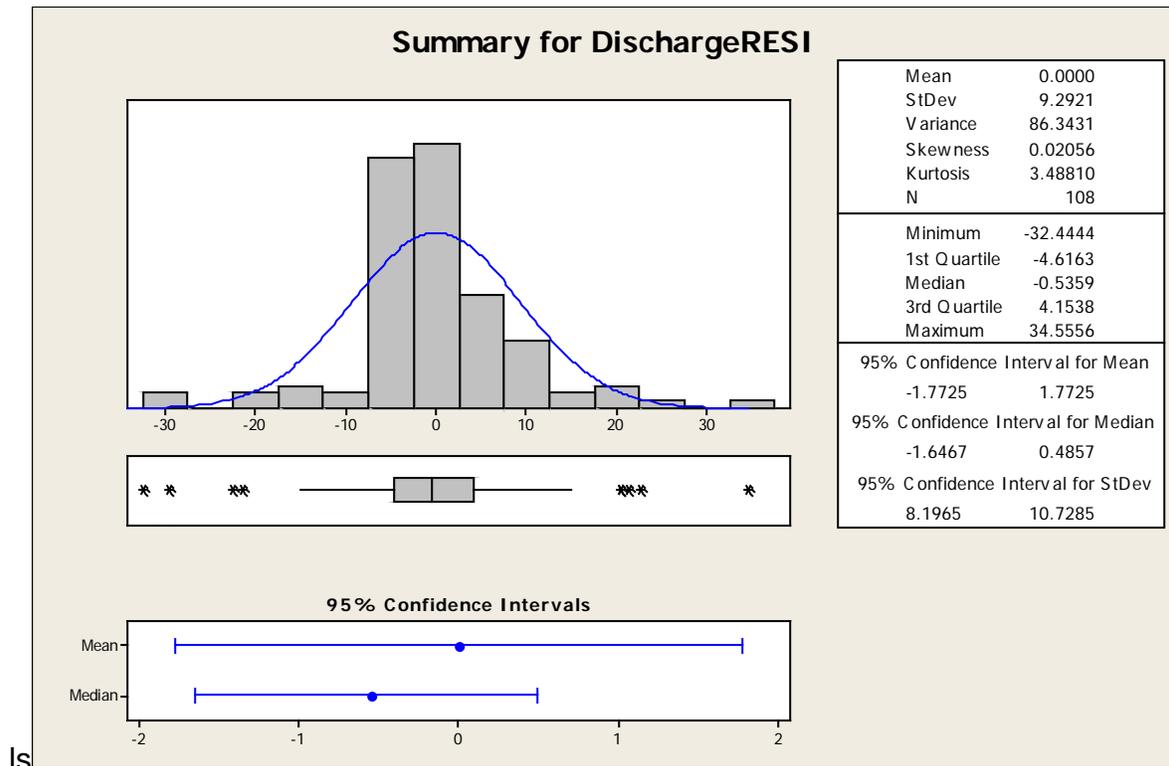
4.4.3. What are the relationships of post discharge function and discharge information?

To investigate the effects of three factors related to post discharge conditions on FIM gain from discharge to follow-up, a three-way analysis of variance (ANOVA) was performed employing a model that allows the effects of these factors to be studied simultaneously (Polit & Beck 2004:491,506). Interaction effects were not included in the model due to empty cells (i.e., not every treatment group has an observation). The patients were classified according to whether or not home services were provided after discharge, to whom the patient was discharged with (alone, with a family member, with a friend, with an attendant, or other) and the living setting after discharge (home, room-and-board, transitional care, or assisted living).

Levene's Test for Equal Variances of the treatment groups (H_0 : equal variances vs. H_a : unequal variances) yielded a p-value of 0.383, and therefore, there is no evidence that the equal variances assumption for the ANOVA F-test is not satisfied (Polit & Beck 2004:501).

The distribution of the residuals is reasonably normal except for four low outliers and five high outliers. These outliers are a subset of the ten outliers identified in the first two analyses (Polit & Beck 2004:488; 2008:595). A graphical summary of the residuals from the three-way ANOVA analysis is provided below as Table 12.

Table 12: ANOVA for Discharge Information with Residuals



The results of the three-way ANOVA on the full data set, including outlying observations, show no significant effects for the discharge information variables, with p-values all greater than 0.3 (Polit & Beck 2004). The corresponding ANOVA table is given as Table 13.

Table 13: ANOVA for FIM Gain of Discharge Information with Outliers

Analysis of Variance for FIM Gain, using Adjusted SS for Tests (full data set)

SOURCE	DF	SEQ SS	ADJ SS	ADJ MS	F	P
Home Services	1	3.54	1.01	1.01	0.01	0.917
Discharge With	4	104.67	107.30	26.83	0.29	0.886
Living Setting	3	285.75	285.75	95.25	1.02	0.387
Error	99	9238.71	9238.71	93.32		
TOTAL	107	9632.67				

To assess the effect of outliers on the analysis, the outlying observations were removed and the three-way ANOVA was repeated. The corresponding ANOVA table is provided as Table 14.

Table 14: ANOVA for FIM Gain of Discharge Information without Outliers

Analysis of Variance for FIM Gain with No Outliers for Discharge Information Using Adjusted SS for Tests

(no outliers)

SOURCE	DF	SEQ SS	ADJ SS	ADJ MS	F	P
Home Services	1	26.33	18.63	18.63	0.51	0.478
Discharge With	4	92.88	85.99	21.50	0.59	0.674
Living Setting	3	277.04	277.04	92.35	2.52	0.063
Error	90	3304.08	3304.08	36.71		
TOTAL	98	3700.32				

The ANOVA results using the reduced data set (outliers removed) uncovered some evidence of an effect due to living setting, with a p-value of 0.063. The differences in the ANOVA results with and without the outliers with respect to the effects of access to home services, including outpatient therapy, and type of discharge companion are not significant and do not present any contradiction in interpretation.

Since the presence of outliers does have some implications on the results of the ANOVA, specifically related to the possible effect of living setting, a statistical method that is resistant to outliers was employed to further investigate the possibility that patients with different living settings after discharge have different gains in FIM. This can be accomplished with the Mood's Median Test, a nonparametric alternative to ANOVA (Cardone 2002; University of Bangor [Sa]). This method is more resistant to the effect of outliers than is another well-known nonparametric alternative to ANOVA, the Kruskal-Wallis test (Polit & Beck, 2004:506). The null hypothesis states that median FIM gains for the different living settings are equal, and the alternative hypothesis states that at least one median FIM gain is different from at least one other median FIM gain for different living settings (Polit & Beck 2004:480-1). The p-value for the Mood's Median Test is .045, and this is interpreted as fairly strong evidence that there are some differences in median FIM gain for different living settings after discharge (Cardone 2002; University of Bangor [Sa]).

Of the 108 patients in the study, 99 patients were discharged to home, 4 patients were discharged to a room-and-board living setting, 2 patients were

discharged to a transitional living setting, and 3 patients were discharged to assisted living. Based on the sample data, the median FIM gains from discharge to follow-up for these groups were 6.0 for the group discharged to home, 8.5 for the group discharged to room-and-board, -1.0 for the group discharged to transitional living, and 2.0 for the group discharged to assisted living. Due to the small number of patients in most of the living setting categories, making statistical comparisons between the groups is tenuous. The ANOVA results with and without outliers do not show any significant effects due to access to home services nor due to discharge companion (Polit & Beck 2004; 2008).

4.4 SUMMARY

In summary, the results from this quantitative research study of inpatient rehabilitation patients revealed that inpatient rehabilitation patients maintain their functional performance post discharge into the community setting. The description of the sample indicated a sample of 108 subjects. Displayed by impairment groups, the largest groups represented were subjects with orthopaedic disorders, stroke and neurologic conditions, with status post unilateral hip fracture and status post knee replacement being the most frequently occurring. The demographic characteristics of the sample identified a sample greater than 75% of white females, with regard to gender and race. In addition, 21% black subjects were identified in the sample. Although many ethnic groups were represented on the data collection tool there were no representatives in the sample in the other categories. Marital status was also identified as a demographic with married and widowed subjects dominating,

and no subjects identified as separated. Significant in the demographics is the mean age of the sample at 76.57. Medical Information was grouped by impairment groups, indicating discharge and follow-up FIM scores, as well as admission FIM, necessary for LOS efficiency calculation. Comorbidities were grouped in two categories for analysis, 1 to 3 comorbidities and more than 3 comorbidities, with no subjects in the sample having zero comorbidities. Discharge Information indicated that the majority of subjects were discharged in the community to their home with another person, primarily family members. Further, more than half of the sample received post discharge services, such as home health or outpatient therapy.

To determine the answers to the research questions, statistical analysis was performed. A paired t-test was employed to determine if inpatient rehabilitation patients maintained functional gains post discharge to the community. Strong evidence (p -value $< .001$) existed that inpatient rehabilitation patients have a higher FIM score at follow-up than at discharge. A 95% confidence interval resulted for the average gain in FIM from discharge to follow-up. The paired t-test was repeated and the outlying observations removed to assess the effect of the outliers on the analysis. There was no contradiction to the interpretation. Therefore, rehabilitation patients do maintain functional gains post discharge from inpatient rehabilitation into the community.

A four-way analysis of variance (ANOVA) was performed employing a model that allows the effects of the factors or variables to be studied simultaneously, and to allow interaction effects between the variables. ANOVA results indicated no

significant differences in average FIM gains from discharge to follow-up for different Demographic Information (age, gender, race, marital status). Thus, there were no relationships identified between the FIM gain from discharge to follow-up and the studied demographic variables. In addition to ANOVA analysis with and without outliers, a Mann-Whitney test provided strong evidence that the gain in FIM is higher for those with fewer comorbidities (2 to 3), as compared to those with more than 3 comorbidities. The ANOVA with and without outliers did not show any significant effects due to impairment groups nor LOS efficiency. The three way ANOVA and Levene's Test for equal variances of treatment groups determined that there were no significant effects due to access to home services (including outpatient services) nor to the person living with. Although the living setting was further examined, making statistical comparisons between the small groups was difficult. Thus, the trends or relationships of selected demographic characteristics, medical information, and discharge information, to the follow-up functional performance (FIM) of this sample were described.

Chapter 5

CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter of conclusions, limitations and recommendations, includes a comprehensive overview of the research study. This broad discussion draws conclusions from its findings. Also discussed, are the limitations of the study. The diverse populations of persons with disabilities in other countries are acknowledged. The concepts that guide this study are disability, rehabilitation, functional outcomes, policy, and evidence based practice. Next, implications for practice in rehabilitation and rehabilitation nursing care are described. Finally, recommendations for further study are included.

5.2 CONCLUSIONS AND LIMITATIONS

5.2.1 General overview

This study resulted from the announcement of the implementation of the 75% Rule by the Centre for Medicare and Medicaid Services in the United States of America. This 75% Rule, as part of the prospective payment system (PPS) of rehabilitation services, threatens the access of much needed rehabilitation services for persons with disabilities. Within this ruling, the government determined which diagnoses or disabling conditions are appropriate to receive rehabilitation services (CMS 2005). Although it is not consistent with the reported census of disability incidence by diagnoses in the United States of America (CDC 1999), the PPS classifies persons with disabilities, according to

diagnosis, functional status measured by functional independence measure (FIM), age and comorbidities, to determine payment or reimbursement for rehabilitation services. Therefore, this payment system is determining who will receive rehabilitation services and who will not (Murer 2006). This excludes some populations from receiving inpatient rehabilitation services that could facilitate their functional existence in the community and are identified in the reported census of persons with disability (CDC 1999).

The implication of the implementation of this prospective payment system is that government agencies are not supportive of the belief that all patients with disabilities have equal rights to opportunities for rehabilitation services. In many countries, disability is excluded from public health and other social services, which support and protect persons with disabilities, resulting in stigma and discrimination of this population. However, in a global movement to equality of persons with disabilities, limiting access of needed rehabilitation services for a population requiring intervention from a disease or disabling condition that has impaired functional performance is an additional catalyst for this study.

The effect of payment systems on the use of post-acute care (PAC), reduced the use of the sites of care, including inpatient rehabilitation facilities. Most of the payment systems that intended to contain costs of health care services had the effect of decreasing the use of the site of care, including inpatient rehabilitation facilities (RAND 2005). It was reported by Fowler (2007) that in the United States of America, between 2004 and 2008, 98 acute

rehabilitation programs were closed or will be closed across the nation. More closings are expected, limiting the number of rehabilitation beds available, with the continued implementation of the 75% Rule of the prospective payment system. Inpatient rehabilitation facilities offer rehabilitation services and discharge options from acute medical care to facilitate eventual discharge into the community. The optimal discharge destination from inpatient rehabilitation services to the community may be compromised with this limitation of services and institutionalization could result. Persons with disabilities who enter an institution are more likely to experience an increase in disabilities, than experience rehabilitation and greater independent living (Uhlenberg 1997; Wiersma 2000).

The purposes of this study were therefore, to determine if inpatient rehabilitation patients maintain functional gains post discharge to the community and to document trends resulting from inpatient rehabilitation post discharge outcomes. Follow-up post discharge assessments, measure the post rehabilitation progress of a discharged patient (UDS for CMS 2005), providing evidence of rehabilitation program effectiveness, whether patients maintain or continue to make functional gains following inpatient rehabilitation services (Bruyere & Houtenville 2006). Further, this study provides evidence that inpatient rehabilitation services, decreases the burden of care on the healthcare system by facilitating independence, or the optimum level of functioning in this population of persons with disabilities, allowing their successful return to the

community. Thus, evidence is provided that post acute inpatient rehabilitation services decreases the burden of care on the healthcare system by facilitating functional independence of the disabled (Lubkin & Larsen 2006), as expected in the integrated functionalist and social models (Lutz & Bowers 2003).

Based on the outcomes of this study, much needed evidence is available to the government, policy makers, and health care providers for the population of persons with disabilities. Evidence based knowledge regarding the proposed 75% Rule of the PPS is needed and required for policy development, affecting the access and delivery of rehabilitation services. In addition, this study provides the knowledge needed relevant to persons with disabilities receiving high quality, cost effective care without restrictions to only certain populations of persons with disability. Therefore, inpatient rehabilitation services should be provided equally, without discrimination, to increase functioning to the greatest level of independence possible by the persons with disability. This would result in discharge from inpatient rehabilitation services into the community as opposed to institutional living, further complicating or increasing their disabilities, and the burden of care on society.

In addition, this study provides a response to the WHO's Action Plan, focused on addressing the need for health care policy for services of persons with disabilities, to continue until 2011 (WHO 2006). The priorities of this action plan that are consistent with the evidence provided by this study include: the data collection, analysis and dissemination of disability related data and

information; the promotion of health and rehabilitation services with disabilities; the influence and contribution to policy regarding rehabilitation service for persons with disabilities (WHO 2006).

The selected instrument utilized to measure disability was the functional independence measure (FIM), also recommended, utilized and required by UDS for CMS (2005), as a part of the IRF PAI (UDS for CMS 2005:Annexure A) The reliability and validity of this instrument were well established as an effective outcome measure of function or disability (Aitken & Bohmannon 2001; UDS for CMS 2005; Ottenbacher et al 2004; Granger et al 1993). As described by Stanhope and Lancaster (2008), the definitions of disability need to include the degree of disability, the limitation it imposes, and the degree of dependence that occurs as a result of the disability (Stanhope and Lancaster 2008:686). The FIM is acknowledged as a measure of disability or a measure of what the person with the disability actually does (UDS for CMS 2005). The best measure of the value of medical rehabilitation is client outcome (Kottke et al 1982; Lubkin & Larsen 2006). The outcomes and findings are described and the findings can be generalized to persons with disabilities in need of rehabilitation services. As in evidence based practice, care delivery outcomes or FIM, are defined as the observable or measurable efforts of some intervention or action, such as rehabilitation services (Melnik & Fineout-Overholt 2005:307). The methods selected were suitable for measuring persons with disabilities' function at

discharge from inpatient rehabilitation services and post discharge into the community.

Research to provide evidence that post-acute rehabilitation services decreases the burden of care on the healthcare system by facilitating functional independence of the disabled is needed (Lubkin & Larsen 2006). In an empirical study by Ottenbacher and colleagues (2004), trends were documented post discharge including, functional status, LOS, discharge setting, and mortality. Evidence that rehabilitation produces improved functional outcomes was also documented (Ottenbacher et al 2004; O'Connor et al 2005; Poon et al 2005; Yu et al 2005). These studies provided evidence that physical functioning improved from admission to discharge, and was maintained at follow-up assessment. There were many other primary and secondary studies included in the literature review. However, there was limited comprehensive evidence about the relationships of additional variables, as it related to the outcome measures of function to identify any trends post discharge rehabilitation services and providing needed information of causation or contributors to the outcome.

Therefore, based on this analysis and the findings of this study, information has resulted to support the need for inpatient rehabilitation services and the effectiveness of inpatient rehabilitation delivery. In addition, trends identified regarding the relationships of the variables to maintaining functional performance or gains is identified and discussed. The variables examined included, demographic information, medical information, and discharge

information. This comprehensive approach to providing evidence based knowledge, necessary for decisions in policy making and rehabilitation practice, further supports the need for inpatient rehabilitation services for all persons with disabilities.

A total of 170 of 244 inpatient rehabilitation subjects completed informed consents to participate in this study. However, 108 subjects actually completed the study, due to mortality, readmission to acute care, discharge to a non-community defined destinations, and unavailability by telephone follow-up. These subjects met inpatient rehabilitation criteria, and included any patient receiving services, without regard to the 75% Rule, although 60% implementation of the rule was expected by all facilities during the time of this study. Important to this study, was the impairment groups identified by diagnosis, identifying 40 of the 108 subjects as having an unacceptable, non-qualifying diagnosis according to the 75% Rule. However, all impairment groups provided evidence of the effectiveness of rehabilitation by a functional gain from admission to discharge. In addition, gains were exceeded or maintained in all impairment groups, except arthritis, which was included in the 75% Rule. It is important to note that this population was very small with only 3 subjects included and all having more than 3 comorbidities with a mean age of 85.33. The mean age of all subjects was 76.57, indicating a primarily geriatric population and 77% female, with a 43% married rate. However, these demographic variables offered no relationship between the FIM gain from discharge to follow-up

Further, the sample studied was a predominately white population (79%) by race, although 21% of the black population (African American) was represented with no other cultural diversity identified in the subjects. Cultural influences on rehabilitation and cultural competency, influencing how people perceive and access rehabilitation services, was expected due to the ethnically varied population in the United States of America and also present in this urban city in the central southern region. However, consideration must not be disregarded due to the projection that by 2050, 90% of the population growth in the United States of America will be attributed to minorities (United States Census Bureau 1999). In addition, the census of disability in other countries indicated significant populations according to Mont (2007), although the comparable prevalence rates internationally is questioned.

5.3 CONCLUSIONS OF THE RESEARCH QUESTIONS

5.3.1 Do inpatient rehabilitation patients maintain functional gains?

Achieved post discharge to the community?

The use of FIM as an outcome measure of function was widely utilized in the Literature Review, consistent with this research study (Ottenbacher et al 2004; Giaguinto 2006; Bottemiller et al 2006; Lutz 2004). The FIM instrument has high validity and reliability historically, as an effective outcome measure (Aitken & Bohannon 2001; Andstrom and Mokler 1998; Lutz 2004; Schmidt et al 1999). Therefore, the outcome measurement of function for this population of rehabilitation patients was the FIM instrument, also included in the IRF PAI tool

(Uniform Data Systems for the Centre for Medicaid & Medicare Services 2005: Annexure A).

The paired t-test was employed to determine if inpatient rehabilitation patients maintained functional gains from discharge to follow-up. Noted that over 90% of the sample experienced maintained or improved functional performance post discharge to the community. The p-value for the paired t-test ($<.001$, $t=6.33$) provided strong evidence that the average change in FIM from discharge to follow-up is positive. A 95% confidence interval supported the gain in functional performance from discharge to follow-up for inpatient rehabilitation patients between 3.986 and 7.588. The paired t-test was repeated to assess the effect of outliers on the analysis, with no contradiction to the interpretation. Therefore, inpatient rehabilitation patients maintained or exceeded their functional gains post discharge to the community. These findings were consistent with previous studies in the Literature Review (Chapter 2), that found FIM was maintained at follow-up, 80 to 180 days, post discharge inpatient rehabilitation (Ottenbacher et al 2004; O'Connor et al 2005; Poon et al 2005).

5.3.2 What are the relationships between age, race, gender and marital status, and follow-up function post discharge to the community?

Although the use of FIM as an outcome measure of function was reported in the literature, there was limited evidence of the relationship of function to a variety of variables or the explanation of the outcome. Melnyk & Fineout-Overholt (2005:301) identified evidence based contributors to outcomes in

evidence based studies. The patient characteristic contributors, resembles the descriptive demographics or patient identification data utilized as demographic information for this study. Therefore, to document patient trends post discharge from inpatient rehabilitation, demographic variables were identified. Demographic variables of the IRF PAI (UDS for CMS 2005), selected for study were age, gender, race, and marital status. There was a lack of information in the literature review of the effect of the relationship of these variables to post discharge function or function (FIM) at follow-up.

The demographic variables studied (age, gender, race, and marital status) had no significance, with or without outliers, as related to the follow-up FIM. Noted the mean age of the population was 76.57 years old, indicating a primarily geriatric population. There has been a negative correlation reported between age and follow-up FIM by Giaguinto (2006). However, for this study the strength of the relationship between these independent variables and follow-up FIM, was determined by Four-way ANOVA. The test for main effects on FIM gain from discharge to follow-up due to age, gender, race, and marital status had no significance. ANOVA was repeated without outliers, identifying no contradiction in the interpretation. Noted that the sample was greater than 75% white females with a mean age of 76.57, mostly married or widowed. This analysis further supports the need for equal access for all persons with disabilities without regard to any demographic information. Therefore, the relationships between age, race,

gender and marital status and maintained function post discharge to the community were described with no relationship identified to the functional gain.

5.3.3 What are the relationships between impairment group, LOS efficiency, and comorbidities and follow-up function post discharge to the community?

The use of FIM as an outcome measure of function was widely reported in the literature. However, there was limited evidence of the relationship of function to a variety of variables or the explanations of the outcome. Melnyk & Fineout-Overholt (2005:301) identified evidence based contributors to outcomes in evidence based studies. To document outcome trends post discharge from inpatient rehabilitation, medical information variables were identified that were consistent with the evidence based contributors of illness severity. Medical information variables of the IRF PAI (UDS for CMS 2005), selected for study were impairment group, LOS efficiency (calculated by discharge FIM minus admission FIM divided by LOS), and comorbidities. Description of the data identified all subjects as having comorbidities, with 65% of the sample having more than three comorbidities, indicating a vulnerable population with multiple diagnoses. There was a lack of information in the literature of the effect of relationships of these variables to post discharge function.

The medical information variable of greatest significance to the follow-up function (FIM) was comorbidities. There was no significant effects due to impairment type or LOS efficiency. The description of the sample was presented

by impairment group (neurological impairments, orthopaedic impairments, and other impairments). Using three-way analysis of variance (ANOVA) to determine variation between the groups, as well as variations within the group, was performed with and without outliers. Following the employed Mann-Whitney test for comorbidities studied at two levels (1 to 3 comorbidities and more than 3 comorbidities), there was strong evidence that the FIM gain was higher in the low comorbidity group (2 to 3 comorbidities), than the high comorbidities group (more than 3 comorbidities). Therefore, a relationship was identified between fewer comorbidities and greater gains in function or FIM at follow-up. Although not anticipated or identified in the literature review, this further supports the need for equal access to rehabilitation services for all, with greater functional gains expected in patients with fewer comorbidities, although functional gains were recognized in both groups. The relationships of impairment groups, LOS efficiency, comorbidities and maintained function post discharge into the community were described with a relationship identified between fewer comorbidities and greater functional gains, again supporting the need for inpatient rehabilitation services.

5.3.4 What are the relationships between discharge living setting, discharge with home health services, discharge to person living with, and follow-up function post discharge into the community?

The use of FIM as an outcome measure of function was widely reported in the literature. However, there was limited evidence of the relationship of function

to a variety of variables or the explanations of the outcomes. Melnyk & Fineout-Overholt (2005:301) identified evidence based contributors to outcomes in evidence based studies. To document outcome trends post discharge from inpatient rehabilitation, discharge information variables were selected that were consistent with evidence based location of service contributors. Discharge information variables of the IRF PAI (UDS for CMS 2005), selected for this study were all considered community discharge options. Discharge variables included: discharge living setting of home, room and board, transitional care, and assisted living; discharge with home health services; and discharge to the person living with (alone, family, friend, attendant, other). There was a lack of information in the literature review of the effect of the relationships of these discharge variables to post discharge function. However, it was identified by Bottemiller and colleagues (2006), that higher FIM scores returned home and that FIM efficiencies were associated with discharge disposition.

Using a three-way analysis of variance (ANOVA) with and without outliers, variation between the groups contrasted with variations within the groups, found a relationship of person living with to the FIM gain. However, due to the small number of patients in most of the living setting categories (transitional living=2, assistive living=2, room & board=4, home=99), making assumptions should be warned. However, these results emphasize the ideal discharge destination from rehabilitation as being the community, consistent with the analysis of maintained functional gain. There was no significant effect due to home services or to the

person discharged with. This variable should be studied further to determine any benefits of home services, including outpatient therapy, for persons with disabilities. Thus, the relationships and relevance of discharge with home services, discharge to person living with, and follow-up function (FIM) post discharge into the community was described and found to have no significant effects or reported trends of this study.

5.4 DISCUSSION ON LIMITATIONS

As discussed in Chapter 1 of this study, the limitation of a diverse, population of persons with disability (PWD) with a variety of diagnoses can provide confounding results. Therefore, reviewing data as grouped/ subgroups, without reference to specific diagnoses, was essential. However, description of the sample by impairment group does indicate the sample by diagnosis. Noted that some impairment groups, such as spinal cord dysfunction, other disabling conditions, debility, and medically complex had only one to two subjects in each impairment group in this sample. On the contrary, orthopaedic disorders and stroke impairment groups comprised 69% of the sample. Data was statistically analysed by grouping these diverse group diagnoses, represented as the group at discharge and the group at follow-up. The limitation that conclusions can not be generalized from this study's results to individual impairment groups or diagnosis is acknowledged. Therefore, the results of this study can be generalized to the population of inpatient rehabilitation patients receiving rehabilitation services and discharged into the community, and should not be

generalized to specific individual impairment groups or diagnoses, with only limited numbers available in the sample.

In addition to the lack of subjects in selected impairment groups, there is significance in the impairment groups represented by some diagnoses that are not considered as qualifying for rehabilitation services, according to the 75% Rule by the current prospective payment system in the United States of America. However, all impairment groups had a mean increase in FIM score from admission to discharge, and all but the arthritis impairment group maintained or exceeded the functional gain post discharge. As previously discussed, this was a very small population of 3 subjects that did qualify for the 75% Rule for inpatient rehabilitation services. Those impairment groups not qualifying for rehabilitation services but having functional gains with a 38% occurrence rate include some orthopaedic conditions, cardiac, other disabling impairments, and debility. It must be noted at the time of this study, the 75% Rule had been partially implemented, possibly effecting the distribution of the impairment groups admitted and discharged from inpatient rehabilitation.

The limitations of the lack of diversity of the demographics of the population studied was unanticipated. The location of the inpatient rehabilitation facility in an urban area of the central southern region of the United States of America has a much more diverse population than resulted in the subjects for this study. Ethnicity was represented by a 79% white population, with 21% black or African American population. Although recorded as demographic information,

no other ethnic groups were identified in the studied population. However, 90% of the population growth in the United States of America by 2050 is expected to be attributed to minorities (United States Census Bureau 1999), and disability in other countries reported by Mont (2007) was significant but different. In addition, the studied population was 77% female, three times greater than males, and in some cultures considered a minority. The consideration of the impact of gender roles on the results of this study as they relate to functional outcomes must be acknowledged. However, it is important to note that by mid-life the gender ratio is reversed and the proportion of females to males continues to expand as age increases (Holtz 2008:506). Both of these demographics could limit the generalization to some very unsimilar populations.

Further, this population represents only subjects discharged to the community setting. The population of inpatient rehabilitation patients may be discharged to other facilities, not referred to as community discharges, including intermediate care, skilled nursing facilities, acute care facilities, chronic hospitals, another rehabilitation facility, alternate level of care, and sub-acute settings. This was consistent with the discharge FIM mean of this study at 92.078% and other studies indicating that higher FIM scores are related to community discharge (Bottemiller et al 2006). Therefore, findings can not be generalized to the entire population of inpatient rehabilitation patients. Results can only be applied to populations receiving inpatient rehabilitation services and discharged to the community.

In addition, the necessity of pre-morbid conditions and characteristics of the persons with disabilities prior to receiving inpatient rehabilitation services could also prove significant. Although the IRF PAI (UDS for CMS 2005: Annexure A) has admission information including: admit from (14), pre-hospital living setting (15), pre-hospital living with (16), pre-hospital vocational category (18), and pre-hospital vocational effort (19). These pre-hospital indicators were not recorded for this study. In addition, the FIM instrument contained in the IRF PAI (Annexure A), is an outcome measure of function or disability (Aitken & Bohannon 2001; UDS for CMS 2005; Ottenbacher et al 2004; Granger et al 1993). It does not explain the differences of disability or the limitation it imposes.

The limitation of the final sample size of 108 subjects provides only minimal concern. However, concern of the attrition of the subjects, or those not completing the study, indicated a greater population than expected of deceased subjects at follow-up. The attrition of the deceased population was greater than anticipated at 9%. Due to the lack of post discharge studies, the smaller mortality group expected was according to the mortality rate reported during the rehabilitation stay and prior to discharge. However, the mean age of the sample occurred at 76.57 years old with impairment diagnosis and comorbidities, in a population reported with a life expectancy of 79.8 years in females and 72.4 years in males (Stanhope & Lancaster 2008:665; CDC 1999). Subjects' having more than 3 comorbidities was 65%, with 35% having 1 to 3 comorbidities. There were no subjects in the sample having zero comorbidities. Also,

significant is the mean age of 76.57 years old, identifying a primarily geriatric, vulnerable population. All of these population characteristics could provide a limitation when studying subjects that are unsimilar.

Also, those subjects signing informed consents but not actually completing the study at follow-up (unavailable by phone, answered as “wrong number”, disconnected phone message) resulted in 16% of the initial population (n=170). Greater sample sizes of inpatient rehabilitation patients discharged to the community could provide a larger data base, considering attrition, and therefore, providing more documented trends in inpatient rehabilitation patients post discharge outcomes.

The threat of self-report is influenced by roles and socially desirability responses (Polit & Beck 2004:359). This can be compounded by not only the subject, but the proxy, assuming different roles (e.g. wife, husband, parent, child). This population was 35% married and 38% widowed, while 83% were discharged with another person and maintained functional gains. The persons identified at discharge were primarily family members (75%), possibly influenced by roles in the report of function. Social desirability response bias is always a concern in interviewing, with misrepresentations due to social values being a limitation as described. However, constancy of conditions described all possible approaches to eliminate this bias so as not to provide a limitation, but the possibility of a limitation to consider in similar studies.

5.5 IMPLICATIONS FOR PRACTICE

This study provides evidence of the discharge outcomes of patients receiving inpatient rehabilitation care. This information provides results of the effectiveness of rehabilitation programming, whether patients maintain or continue to make functional gains following inpatient rehabilitation services, including rehabilitation nursing intervention. The sample studied maintained or exceeded their functional gains post discharge from inpatient rehabilitation into the community with a FIM Mean at discharge of 92.03 and FIM Mean at follow-up of 97.81. This functional independence, or the optimum level of functioning, in this population of persons with disability (PWD), allows persons with disability to return to the community. Therefore, the burden of care on the healthcare system of persons with disabilities is lessened by the intervention of rehabilitation services. The global burden of disease (Institute of Medicine 2001) combines losses from premature death and losses of healthy life style from disability (Stanhope & Lancaster 2008:82). This global burden of disease (GBD) does not contribute to the economic growth of the community and recognizes that persons with disabilities may need to be cared for. The implication for nursing practice is the need for effective rehabilitation programming that improves function of persons with disabilities, resulting in discharge to the community as a result of the rehabilitation intervention, as opposed to institutionalization.

Appropriate discharge decisions into the community for persons with disabilities could be best determined after inpatient rehabilitation services are received and functional gains are determined, as indicated by this study. Community living of persons with disabilities promotes independence and is encouraged as the optimal goal of services. Persons with disabilities, who enter institutions without benefits of inpatient rehabilitation, are more likely to experience an increase in disabilities than rehabilitation and independent living (Uhlenberg 1997; Wiersma 2000). As a result, the implication for practice is a health care system that progresses toward deinstitutionalization by offering inpatient rehabilitation services to all persons with disabilities, and health care dollars spent on home and community supports post acute rehabilitation delivery.

The contribution of this study's results provides knowledge needed by our governments, policy makers and health care providers, including nurses, regarding current and proposed guidelines effecting persons with disability access to inpatient rehabilitation services. This evidence suggests that government and/or third party payers should not limit access of inpatient rehabilitation services to persons with disability. Historically, the government has determined diagnoses or disabling conditions appropriate to receive rehabilitation services based on insufficient evidence. This inequitable provision of rehabilitation services to the disabled, identifying who may receive rehabilitation and who may not, could benefit from the results of this study, noting a population

sample that increased functional performance (FIM) from admission to discharge to follow-up, following inpatient rehabilitation services.

This study provides a response to the WHO Action Plan (WHO 2006), focused on addressing the needs for health care policy for services of persons with disabilities. Evidence provided by this study, consistent with this global call for action includes: the data collection, analysis and dissemination of disability related data and information; the promotion of health and rehabilitation services with disabilities; and the influence and contribution to policy regarding rehabilitation services for persons with disabilities (WHO 2006).

The subjects for this study represented a population that did not all qualify for rehabilitation services, according to the 75% Rule. However, they were all listed by the United States Census of 2000, when determining and defining disability based on functional limitations (Stanhope & Lancaster 2008:686). In addition, the subjects met admission criteria for inpatient rehabilitation. The implication is that the current PPS 75% Rule, is not inclusive of all persons with disabilities that could benefit from inpatient rehabilitation services, as evidenced by the documented FIM gains post discharge from inpatient rehabilitation.

The Prospective Payment System (PPS) of the CMS in the United States of America determines who receives rehabilitation by determining a payment or fee structure for services according to diagnosis or impairment group, FIM, age and comorbidities. There is very limited research or evidence based practice to support these decisions. This study included variables, already identified on the

required IRF PAI (UDS for CMS 2005), that provides evidence of the relationships of these variables to the outcome measure of follow-up function (FIM). These documented trends, previously discussed (5.3 Conclusions of the Research Questions), of post discharge outcomes of inpatient rehabilitation could provide pertinent, useful information in policy development in determining the need for rehabilitation services for all persons with disability and a payment or fee structure to provide cost effective, quality care to all persons with disability.

The implication of the need for culturally sensitive rehabilitation care to diverse populations is supported in the literature of this study. However, the studied population could not provide evidence of this due to the lack of ethnic diversity in the population. The United States Census Bureau (1999) has indicated that by 2050, 90% of the population growth will be attributed to minorities. According to Siebert and colleagues (2002), culturally competent care should include: Identifying preferred methods of communication; learning the rehabilitation client's culture and belief system; respecting those beliefs and values that are different from the health care providers; and identifying misconceptions regarding disabilities, the treatments and/or recovery process. The implication for rehabilitation practice is the need for culturally competent health care providers and delivery systems, which influence how clients and families perceive disability and access rehabilitation services. This is imperative in a globally diverse population, as previously described (Chapter 1), in need of developing rehabilitation policy.

5.6 RECOMMENDATIONS FOR FUTURE STUDIES

Recommendations for future studies, includes replication of this study with a larger sample size influencing outcomes of each impairment group, with a more diverse population. The best measure of medical rehabilitation is client outcome (Kottke et al 1982; Lubkin & Larsen 2006:532). Functional status and functional gains have been identified as the best predictors of outcome and resource utilization in rehabilitation facilities, justifying payment for services (Menon et al 2002). Scientific data related to treatment effectiveness and positive client outcomes are lacking (DeLisa et al 1988; Lubkin & Larsen 2006:530).

Conceptual payment models are included in the Literature Review (Paddock et al 2004; Sutton et al 1997; Sutton et al 2006). Evidence to support more statistical outlier IRFs than standard linear regression for the development of facility payment adjustments was proposed by Paddock and colleagues (2004). Carter and colleagues (2003) supported that greater independence leads to lower cost and should be considered in planning service delivery, yet another study found no functional incentive to maximize functional outcomes (Sutton et al 2006). A need exist for improvement in clinical and cost data to assist in effective patient management in rehabilitation. These decisions for cost effective models in rehabilitation delivery must be based on research studies of evidence based practice.

In addition, determining the causes of the trends or relationships identified following inpatient rehabilitation, as they relate to rehabilitation efficiency, is a

recommendation for further study. Rehabilitation has failed to document clearly the effects of services (Lubkin & Larsen 2006:531). This information is critical in the development of an evidence based practice of rehabilitation, including rehabilitation nursing intervention. The importance of pre-morbid status, patients not similar prior to rehabilitation services, could provide another variable of significance, when identifying trends or relationships post discharge inpatient rehabilitation.

The Rehabilitation Nursing Research Agenda was recently published to identify needs in rehabilitation nursing research (Jacelon et al 2007). Evidence Based Practice was identified as the standard of excellence in nursing practice and the need for research based information regarding rehabilitation and rehabilitation nursing was identified. Included as identified needs in rehabilitation research was the effectiveness of programs on functional outcomes, the response of individuals and families to alterations in independence and disability, and the effects of rehabilitation nursing practice on individual outcomes.

As described in the Review of the Literature (Chapter 2), there is much research currently in progress. The National Institute on Disability and Rehabilitation Research (2003-2008) is proposing that the Prospective Payment System may limit effective access to rehabilitation by avoiding high cost patients, prematurely discharging to nursing home facilities to shorten length of stay, and increasing the use of non-licensed therapy aids instead of licensed professionals. However, preliminary studies have shown significant correlations between

intensity of therapy and LOS to goal attainment. Ongoing work will need to include the effects of comorbidities and complications on functional goals.

Many countries are initiating programs in a response to the International Foundation's Global Agenda, "to improve the lives of vulnerable people by mobilizing the power of humanity" (International Federation of Red Cross & Red Crescent Societies 2003:1). Much evidence based practice studies are needed, that are culturally sensitive, to provide cost effective, quality programs that meet the needs of the vulnerable population of persons with disabilities in all countries. This diversity of description in different countries must be considered when identifying the needs of each unique population.

5.7 SUMMARY

In summary, the overview of this study provides a comprehensive description of the inception and purpose of the study. The need for evidence based practice in rehabilitation and rehabilitation nursing is identified. The need for effective policy development is reviewed, including the outcome instrument (FIM), the effect and relationship of variables, and the population studied. The findings of this study indicate that inpatient rehabilitation patients maintained functional gains achieved post discharge to the community. It can be concluded from the findings of this study that age, race, gender, marital status, impairment group, LOS efficiency, discharge with home service, and person living with had no significant relationships with the follow-up function post discharge to the community. However, there was a relationship identified with fewer comorbidities

and greater functional gains. The living setting discharge to was also found to have a relationship with maintained functional gain but statistical comparisons were difficult due to the few numbers in the categories. Therefore, trends or relationships of the selected variables of demographics, medical information, and discharge information, were described.

Limitations of the study were identified, including impairment groups or diagnoses, ethnic considerations, attrition and mortality. Implications for the delivery of inpatient rehabilitation health care services included the significance of functional gains achieved and maintained when discharged to the community, recognizing the global burden of care. The access of rehabilitation services, as determined by policy and health care providers, is reviewed, as well as the implications of studied variables (demographic information, medical information, and discharge information) to identify the relationships or trends, as related to maintained function or functional gains. The importance and effect of cultural sensitivity in global policy was included. Recommendations for future studies was proposed, identifying the need for evidence based practice studies in rehabilitation and rehabilitation nursing.

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ANNEXURE

Annexure A: Data Collection Instrument: IRF PAI (FIM)

Annexure B: Instructions for the FIM Decision Tree

Annexure C: Institutional Approval: HealthSouth

Institutional Review Board of Arkansas State University

Annexure D: Informed Consent