A STUDY OF HEALTH CHANGES AFTER CLIENT-CENTRED, TEAM-BASED REHABILITATION

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ABSTRACT

This study explores the role of rehabilitation as a link between illness and health by describing global and subjective health change after rehabilitation. Global health is described through the disability and handicap levels of the International Classification of Impairments, Disabilities and Handicaps, and subjective health through patient's self-rated capacity to undertake individually preferred activities. Rehabilitation theory suggests that a client-centred approach where patients identify their own health goals for rehabilitation might lead to superior outcomes, but there is scant evidence for this.

Subjects ($N = 54$) were provided with either facility-based or home-based rehabilitation, after client-centred health goal identification. Age, cognitive status, diagnosis and program type were identified as independent variables, and therapy intensity and length of stay as intervening variables related to rehabilitation efficiency. Global health was measured through the Functional Independence Measure (FIM) for disability, the Reintegration to Normal Living Index (RNL) for handicap, and subjective health, through the Canadian Occupational Performance Measure (COPM).

Multivariate analysis indicated significant positive changes on all measures of global and subjective health after rehabilitation, although without a control group attribution could not be assumed. Disability change was significantly associated with program type, and change in one aspect of subjective health with program type and diagnosis. However, patient profiles indicated that team-based decisions regarding patient admission to rehabilitation programs and selection for the client-centred process may have impacted on the disability-related associations.

As there was no significant correlation between handicap and disability level changes, or any strong association between global and subjective health changes, it was suggested that health change after rehabilitation should be measured at disability, handicap and subjective health levels. Further exploration of client-centred rehabilitation and its link with health changes is recommended.

STATEMENT OF AUTHORSHIP

Except where explicit reference is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis by which I have qualified for or been awarded another degree or diploma. No other person's work has been relied upon or used without due acknowledgement in the main text and bibliography of the thesis.

Maureen Lesley Mac Phail	Dr. Michael Reynolds
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CHAPTER 1

INTRODUCTION

Health and illness are complex concepts. Illness can be described by association with pathology in physical or mental function, and in terms of a person's experience. Health can also be described objectively and subjectively. Objective health status is measured at a number of levels: the person's basic abilities (for example, muscle strength), practical abilities (for example, mobility), and the person's broad participation in life (for example, worker role). Health from the subjective view involves the person's capacity to undertake those activities and roles that are of personal value: "Health is how I live my life" (Parse, 1990, p. 140). Illness, on the other hand, may interrupt a person's ability to live the everyday life of choice.

Rehabilitation may provide a link between illness and health, assisting a person to move towards better health after sustaining an illness or injury. Kottke (1980), a pioneer in modern medical rehabilitation stated "it is generally agreed that medicine's role is not only to deal with acute and life-threatening problems, but also to restore the patient to health and maintain him (sic) at his optimal level of function in his community" (p. 1). The community values health and health care, and from a social justice and ethical viewpoint, access to health care and rehabilitation is emphasised. Rehabilitation may facilitate independence, which is also highly valued in industrialised societies (Blackmer, 2000; Keith, 1995). Furthermore, the community is sensitive to the cost of the dependency associated with ill health. Rehabilitative health care can assist people to restore their independence and to participate in community life.

With improvements in health care and increasing life expectancy over the twentieth century, the number of people surviving serious illnesses and injuries has become greater (National Health and Research Council, 1990). There is an increased proportion of the population experiencing reduced capacities and potentially able to benefit from rehabilitation (Granger, 1998). In the light of increased demand, the cost of supplying rehabilitation services has been progressively more scrutinised, and the effectiveness of rehabilitation questioned. The call for accountability has been amplified, particularly over recent decades (Hubbard & Bauer, 1993). A scarcity in resources and an emphasis on cost containment (Lane, 2000) further highlights the need for evaluation of rehabilitation outcomes.

Efforts to measure the effectiveness of rehabilitation have been shown to be fraught with difficulty. It has been said that there was not strong evidence for the initially developed rehabilitation programs (Banja, 1997; Johnston & Hall, 1994), or for the variety of approaches to rehabilitation developed over recent decades (Lafferty, 1996). Issues such as differences in rehabilitation formats and processes, as well as variation in choice of outcome measures and in research standards, have contributed to difficulties in drawing firm conclusions from rehabilitation outcome studies.

Rehabilitation theory has highlighted aspects of rehabilitation likely to contribute to its efficacy: patient motivation (Gage, 1997), a functional approach (Kwakkel, Kollen, & Wagenaar, 1999), and an emphasis on adjustment (Molloy & Garner, 1988). The benefits of a client-centred approach have also been emphasised, in the understanding that it is required for maximum effectiveness and efficiency (Wade, 1999a). The client-centred approach emphasises the importance of patients being involved at the planning, implementation and evaluation stages of rehabilitation. In contrast, an expert-driven approach to rehabilitation emphasises the role of health professionals in identifying rehabilitation goals, prescribing treatment, and evaluating outcomes (Kramer, 1997).

Implementation of a client-centred approach is said to require resources for development and staff training (Elsworth, Marks, McGrath, & Wade, 1999). However, while there is support from the theoretical and ethical literature (Haas, 1995; Sim, 1998), this philosophy has not been regularly translated into practice (Dalley, 1999), nor evaluated (Hammell, 2001). This may be because the implementation of client-centred practice in rehabilitation can be complex, requiring change in practices across a rehabilitation team. Nevertheless, some small studies have suggested that client-centred practice may be effective in rehabilitation (Webb & Glueckauf, 1994).

Rehabilitation outcome evaluation has often been limited in scope. This approach may have contained or reduced costs by failing to reveal patient need in areas not evaluated. For example, although some early studies indicated that there are long-term rehabilitation and support needs for patients with neurological impairment, traditional rehabilitation outcome evaluation has often been limited to the patients' competence in tasks of basic personal care (Cohen & Marino, 2000).

The identification of health goals by rehabilitation patients can provide a focus for intervention, as well as criteria for evaluation (Haas, 1995). Theory has highlighted the importance of rehabilitation programs including client-centred evaluation, so that evaluation includes those that are meaningful for patients (Rosenthal, 1996), although, in practice, patients' views are seldom solicited (Banja, 1997). An emphasis on patient goal identification and patient involvement in outcome evaluation is said to improve motivation and participation for rehabilitation patients, and is understood to be indicative of a client-centred approach.

The trends shown to date in rehabilitation outcome studies give some indication of the stage of recovery when rehabilitation may be most effective for some diagnostic groups. Prognostic signs, indicating potential for rehabilitation and likely long-term rehabilitation needs for some patient groups have been identified. Cost-effective formats for some aspects of rehabilitation have also been highlighted. However, major trends have reflected outcome in only some health domains and are often limited to self-care skills at discharge from rehabilitation, rather than to broader life roles related to subjective health. In other words, the value of rehabilitation in assisting patients to regain health as expressed in return to participation in personally valued activities is essentially unknown.

This study takes a client-centred approach, involving patients in the planning, implementation and evaluation of their programs. Outcome is described at an objective or global level, using the framework recommended by the World Health Organization, and at a subjective level, and takes into account some of those elements said to affect health outcome: diagnosis, cognition, age, and rehabilitation program format. The study is observational as no control group was used. There is an emphasis on describing the client-centred aspects of the rehabilitation process, and in exploring issues related to client-centred rehabilitation outcome evaluation.

The thesis is divided into six chapters. The major themes within the study are introduced in Chapter 1. The review of literature related to rehabilitation theory (Chapter 2) considers theory in relation to health, illness, rehabilitation, outcome measurement and client-centred practice. Rehabilitation outcomes are considered in Chapter 3, with a focus on elements affecting outcomes as well as an analysis of some major outcome studies. Sections covering methodology (Chapter 4) and results (Chapter 5) precede the discussion, conclusions and recommendations (Chapter 6).

CHAPTER 2

LITERATURE REVIEW: REHABILITATION THEORY

As the domains of this study are broad and encompass concepts such as health, illness and rehabilitation, the scope of the literature review necessarily begins with exploration of these and related concepts. The theoretical basis of some rehabilitation practices and models are then discussed, and theory related to client-centred practice is explored.

Broad Concepts Related to Health and Illness

Health is understood to be a complex concept comprising positive elements such as physical and mental wellbeing and negatively stated elements such as the absence of disease (Calnan, 1987). Evolving definitions of health and illness have been forwarded from medical, social science, epidemiological and health planning perspectives, as well as lay perspectives. Measurement of health status and of illness can reflect the perspective of those undertaking measurement. For example, epidemiological researchers may focus on the causes of illness while the social scientists may focus on the impact of illness on quality of life (Australian Institute of Health and Welfare, 2000). The medical ethicist, Hare (1986) stated that disease is related to either biological aspects or to causative factors, but that the experience of the person determines whether or not there is illness. For example, a person may have diabetes (disease) but with appropriate dietary control may not be experiencing illness, and may describe health as good.

Definitions of health and illness can have both explanatory and normative roles. Within a community, a health-related definition can provide a description and can imply the relative value of the described state; furthermore the description and the associated values can change over time (O’Connor & Parker, 1995). Some definitions express a continuum between health and illness at a conceptual level (World Health Organization, 1980).

For individuals, definitions of health and illness can vary within and between life phases, and according to circumstances (Blaxter, 1990). Subjective or lay perspectives of health and illness have been shown to be varied and sophisticated, with factors such as class and economic circumstances influencing individual perception (Calnan, 1987). Culture, age and sex are also said to impact on individual perception of health and illness (Minas, 1995). This implies a need to identify an individual’s health definition at any specific time, as it will be self-defined and related to present circumstances and personal values. Gadamer (1996) described health as “a condition of being involved, of being in the world, of being together with one’s fellow human beings, of active and rewarding engagement in one’s everyday tasks” (p. 113). Parse (1990) stated this more simply “Health is my own living of values” (p. 140).

A study undertaken in the United States by Clark et al. (1996) explored valued life domains in a group of adults (*N* = 29) with an average age of 80 years. During semi-structured interviews, participants reported valuing an ability to adapt and stay healthy, maintain psychological wellbeing, enjoy relationships with others and participate in individually preferred activities. Stuifbergen, Becker, Ingalsbe, and Sands (1990) explored health perception with a group of adults (*N* = 135), all of whom had at least one diagnosed impairment. Participants described the “functional, adaptive, and self-actualizing aspects of health” (p. 18) and 73 % described their health as good or excellent. Participants in these studies appeared to have perceived health as one of the resources required for living a preferred lifestyle rather than related to the presence of disease, impairment or disability. They also appeared to have been able to separate the presence of disease from an experience of illness.

HEALTH

Improved public health actions in the industrialised world, as demonstrated in the availability of clean water, sanitation and nutritious food, along with advances in medical care, has enabled substantial progress in health status for some. These advances are typically measured by changes in mortality and morbidity rates, and average life expectancy. On the other hand, definitions and descriptions of health are usually complex and go beyond such measures.

Definitions of Health

Normative Definitions

Early definitions of health, developed by the World Health Organization (WHO) and recorded in its Constitution, expressed the positive move from health being solely associated with the absence of disease. Health was instead expressed in terms of physical, mental and social wellbeing, not just in the absence of infirmity (World Health Organization, 1946). A more recent definition, released at the first International Conference on Health Promotion in Ottawa, focused on health being a positive expression of human potential, a resource that allowed people to satisfy needs and realise aspirations (World Health Organization, 1986). These definitions would appear to relate best to people in communities in which basic public health measures have been implemented, because for many people the foundations for health can be threatened by the lack of clean drinking water or sanitation (World Health Organization, 2001a). To a great extent, the definitions and philosophies espoused in this thesis are relevant to communities where basic public health issues have been addressed.

Personal Definitions

At the personal level, definitions of health appear to be related to individual life circumstances and values, and are focussed upon the activities a person associates with living a healthy life. A study involving older persons (*N* = 29) by Saltman, Webster, and Therin (1989) explored the understanding of what it meant to be healthy. Participants' ages ranged from 50 to 94 years and approximately one third of the participants had a physical disability. Although interviewed by a medical practitioner, participants described health in non-medical terms, emphasising abilities: to maintain social contacts, explore interests and activities, and to maintain independence and a positive mental state. The perceptions of health appeared to be aligned with the World Health Organization's 1986 statement, with the emphasis on health being a resource that facilitated participation in valued activities.

Activities Associated With Health

In a theoretical paper, Wilcock (1999) described the types of activities required to achieve and to maintain health. The author stated that these activities were closely aligned to those related to “being, doing and becoming” (p.1). Doing refers to those activities that need to be done, such as tasks necessary for survival, as well as those associated with recreation. Being, on the other hand, refers to time dedicated to solitude and reflection and to the enjoyment of the inner life. Bridle (1999) expressed the connection between being and doing in terms of meaning: it is in doing the things that are identified to be of value by the individual that gives them meaning. Becoming holds a sense of the future and implies the integration between the inner life and the activities the person values. Becoming is reflective of a life in process, rather than being lived as a series of fragments. Kirsh (1996) expressed the intrinsic place of individual values in this process: “meaning and purpose in one’s life are linked to the person’s life story, which connects up the actions into an integrating plot” (p. 60).

A randomised controlled trial by Clark et al. (1997) that focussed upon activities associated with health, involved elderly people ($N = 361$), aged over 60 with a mean age of 74.4 years. Participants had been assigned randomly to either a treatment group led by a health professional, a social control group led by a non-professional, or a third non-treatment control group. Health status for a group in this age range could have been expected to deteriorate over the nine-months of the study. However, the group that undertook individualised health promotion activities aimed at enhancing independence and function, demonstrated enhanced health outcomes, which contrasted with those of the group that were involved in social activities, and of the non-treatment group, where decline was reported in health status. The authors suggested that professionally led intervention based on activities chosen by people on the basis of their perceived meaning and relevance can enhance health.

Classification System for Health

Pender (1990) presented a classification system for the expression of health (Table 1), noting that some aspects can be evaluated objectively while others require self-report. Pender’s suggested classification was the result of a literature review, research synthesis and qualitative activities. The classification is in line with the health description of Wilcock (1999), who described health as including aspects of doing, being and becoming. Pender’s classification expands these domains: doing (activities, accomplishments), being (attitudes, affect) and becoming (aspirations). The work of both Pender and Wilcock highlights the individual and complex nature of health status.

Table 1

Classification System for Expressions of Health

AFFECT

SERENITY	HARMONY	VITALITY	SENSITIVITY
Calm	Close to God	Energetic	Aware
Relaxed	Contemplative	Vigorous	Connected
Peaceful	At one with the universe	Zestful	Intimate
Content		Alert	Loving
Comfortable		Fit	
Glowing		Buoyant	
Happy		Exhilarated	
Joyous		Powerful	
Pleasant		Courageous	
Satisfied			

ATTITUDES

OPTIMISM	RELEVANCY	COMPETENCY
Hopeful	Useful	Purposive
Enthusiastic	Contributing	Initiating
Open	Valued	Self-motivating
Reverent	Caring	Self-affirming
Trustful	Committed	Innovative
	Involved	Masterful
		Challenged

ACTIVITY

POSITIVE LIFE PATTERNS	MEANINGFUL WORK	INVIGORATING PLAY
Eating a healthy diet	Setting realistic goals	Having meaningful hobbies
Exercising regularly	Varying activities	Engaging in satisfying leisure activities
Managing stress	Undertaking challenging tasks	Planning energising diversions
Obtaining adequate rest	Assuming responsibility for self	
Avoiding harmful substances	Collaborating with co-workers	
Building positive relationships	Receiving intrinsic or extrinsic rewards	
Seeking and using health information		
Monitoring health		
Coping constructively		
Maintaining a health-strengthening environment		

ASPIRATIONS

SELF-ACTUALIZATION	SOCIAL CONTRIBUTION
Growth or emergence	Enhancement of global harmony and interdependence
Personal effectiveness	Preservation of the environment
Organismic efficiency	

ACCOMPLISHMENTS

ENJOYMENT	CREATIVITY	TRANSCENDENCE
Pleasure from daily living	Maximum use of capacities	Freedom
Sense of achievement	Innovative contribution	Expansion of consciousness
		Optimized harmony between man and environment

From “Expressing health through lifestyle patterns,” by N.J. Pender, 1990, *Nursing Science Quarterly, 3,* p. 118.

In the current study, health is recognised in its objective and self-identified domains. Participants in the study will identify their own health goals, and the description of outcome will include self-perceived and objective measurement.

ILLNESS

The concept of illness has been difficult to define over the centuries. Some conditions that are today recognised as illnesses, for example, epilepsy or some mental illnesses, were at other times grouped with vagrancy and prostitution, and termed deviancy. The cause of deviancy was seen to have various origins, at times as an act of God or the devil, at other times the work of witches. People labelled as deviant were usually treated cruelly and often understood to be less than human, regardless of the designated cause (Wolfensberger, 1972). The label or stigma associated with some conditions led to people being ostracised (Goffman, 1959). With developments in the sciences over the twentieth century, many diseases can now be recognised in relation to their organic or psychological cause. However, in many countries people with a condition such as leprosy may still be marginalised, despite the organic cause of the condition being known and treatment being available.

Fulford (1993) stated that while many illnesses could be linked directly with the causative disease that this is not always the case. Additionally, some illnesses with similar symptoms can have different causes. Other conditions still defy consistent classification, for example, alcoholism and self-inflicted injury. Christiansen (1999) described these as “diseases of meaning” (p. 556). He linked the existence of such conditions to people losing a sense of purpose or meaning in life, and to reduced opportunities to undertake the activities through which their identity is defined. Nochi (1998) described an experience of “loss of self” (p. 869), which can occur after some acquired brain injuries, the effects of which may prevent the person from expressing identity through participation in preferred activities. Christiansen argued that people need to be assisted to undertake activities of personal value and meaning as this can allow expression of identity and is related to health.

In this study, illness, rather than disease, is used to describe ill health. It is a broader term according to Fulford (1993), as it acknowledges the experience of ill health as well as possible disease factors. Dossey (1991) emphasised this broader meaning of illness:

"illness is something that happens to persons, while disease is what happens to organs of the body" (p. 18). However, early models described disease, and these are discussed prior to broader models being introduced.

Models

International Classification of Diseases

The World Health Organization, in publishing the International Classification of Diseases (ICD) (1978), provided a framework for the classification of disease that was based on a medical model. The elements of the ICD model, as shown in Figure 1, identifies the aetiology, pathological process, manifestation of disease; the outcome of disease in this model is recovery or death. The ICD names and explains a disease (Halbertsma, 1995).

Aetiology → Pathology → Manifestations

Figure 1
International Classification of Diseases (ICD)

From, "The ICIDH: health problems in a medical and social perspective," by J. Halbertsma, 1995, *Disability and Rehabilitation, 17*(3/4), p.131.

Halbertsma (1995) stated that the effectiveness of a health care system used to be judged on mortality data, which was related to the ICD. However, with improvements in public health and medical care, more patients survive illnesses associated with disease or major trauma, although may consequently sustain disabilities (Gray & Hendershot, 2000). There was therefore an identified need for a model to describe the unresolved consequences of disease and injury, and the effectiveness of the healthcare interventions provided.

International Classification of Impairments, Disabilities and Handicaps (ICIDH)

The World Health Organization in 1980 developed a model to describe health problems consequent to disease: the International Classification of Impairments, Disabilities, and Handicaps (ICIDH). The model, which is shown as Figure 2, defines three dimensions of difficulty that can be consequent to a state caused by disease or trauma. Definitions for each level are shown in Table 2.

Disease/Disorder → Impairment → Disability → Handicap

Figure 2
International Classification of Impairments, Disabilities, and Handicaps (ICIDH)

From "The ICIDH-2: Developments for a New Era of Outcomes Research," by D. B. Gray and G. E. Hendershot, 2000, *Archives of Physical Medicine and Rehabilitation, 81*, S11.

Table 2
Definitions for the Dimensions of the ICIDH

Impairment	Any loss or abnormality of psychological, physiological or anatomical structure or function
Disability	Any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being
Handicap	Disadvantage for any given individual, resulting from an impairment or disability that limits or prevents the fulfilment of a role that is normal (depending on age, sex, and cultural factors) for that individual

From "*International Classification of Impairments, Disabilities and Handicaps (ICIDH)*," (pp. 27–29), World Health Organization, 1980, Geneva, Switzerland.

Although the ICIDH created considerable interest and has had a high level of use, clinicians have described problems with its application within rehabilitation and have suggested modifications (Halbertsma et al., 2000). Problems identified included: confusion between the disability and handicap scales, inherent difficulties in the handicap category and the negativity of the ICIDH language (Martini, Polatajko, & Wilcox, 1995). To address criticisms, the World Health Organization initiated a revision of the ICIDH in 1990. This resulted in the ICIDH-2 (Beta-1 draft version), which was released in 1997 for field-testing and, subsequently the ICIDH-2 (Beta-2 draft version) in 1999. The final version of the ICIDH-2 (renamed the International Classification of Functioning, Disability and Health [ICF]) was endorsed by the World Health Assembly for international use in May 2001 (http://www.who.int/icf).

The ICIDH-2 model has three dimensions: body function and structure (loss or dysfunction), activity (function of the whole person, for example in self-care activities) and participation (person's involvement in life situations) as depicted in Figure 3. A major focus is the acknowledgement of environmental barriers to participation: these can include physical, attitudinal and policy factors limiting, for example, a person's chance to work or drive a vehicle. Given the limited availability of measures associated with the ICIDH-2 and ICF, most published rehabilitation outcome evaluation studies have used measures relevant to the definitions of the original ICIDH and these will be used in the current study.

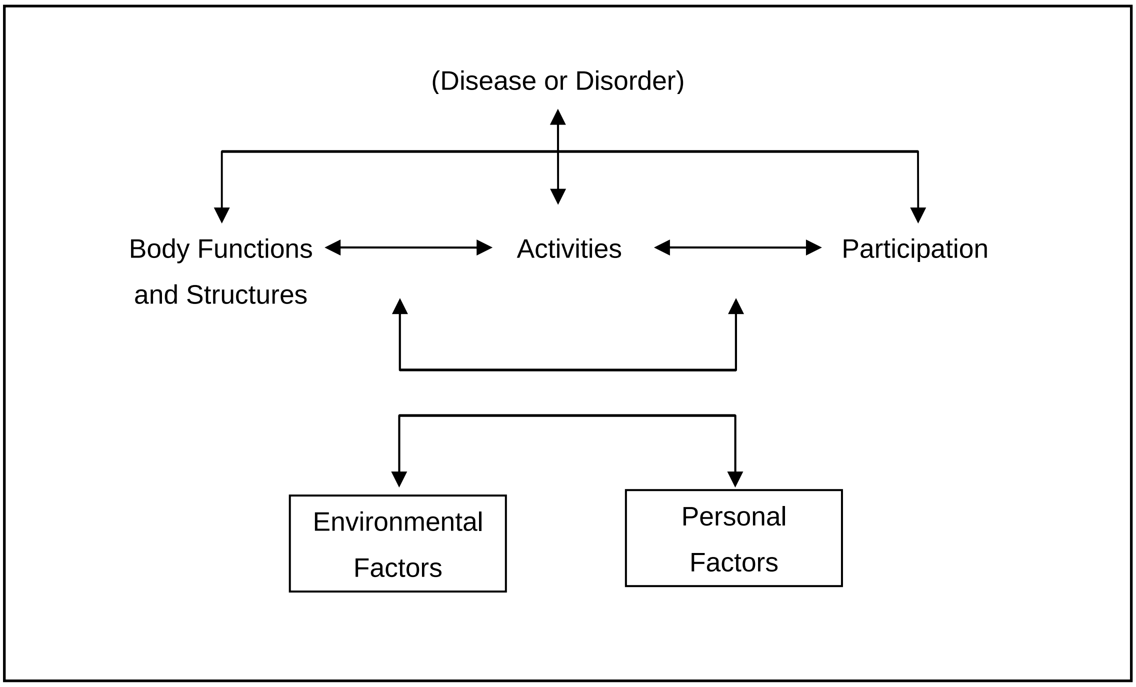

Figure 3

International Classification of Impairments, Disabilities, and Handicaps – 2

From "The ICIDH-2: Developments for a new era of outcomes research," D. B. Gray and G. E. Hendershot, 2000, *Archives of Physical Medicine and Rehabilitation*, *81*, S12.

Current Use of Models

The ICIDH model can be used with the ICD, with information about aetiology of disease or injury being provided through the ICD, and a description of the person's consequent health status being provided through the ICIDH. The language of the ICIDH-2 (activities and participation) is easier to associate with health than the negative terminology of the ICIDH-1, but both describe a person's broader functioning in the community. Despite the difficulties described in the original ICIDH, health and rehabilitation literature has frequently used its definitions as well as its structure to identify parameters for health evaluation, and Wade (1992a) described the ICIDH as a helpful framework in which to place rehabilitation practice.

Application of the ICIDH has been reflected in the extensive research undertaken to develop disability level measures, allowing large multicentre rehabilitation studies to be undertaken with disability level outcomes compared across programs. In investigating the use of health measures in rehabilitation centres (N = 140) in Britain, Turner-Stokes and Turner-Stokes (1997) reported that 88 % of the rehabilitation centres used disability scales to evaluate outcome, but only 18% routinely used handicap measures. Few major studies report handicap level outcome, despite this being said to be an authentic measure of rehabilitation outcome (Harwood, Gompertz, Pound, & Ebrahim, 1997). Disability and handicap level health changes after rehabilitation are described in the current study, as these two levels are said to apply to rehabilitation practice (Jelles, van Bennekom, Lankhorst, Bouter, & Kuik, 1996).

Rehabilitation

The origins in meaning of the word rehabilitation lie in the Latin word *habilitare* "to enable" (Pöldinger & Krambeck, 1987, p. 384). In Medieval Latin the meaning is said to have been "restoration to good health" (Bauer, 1989, p. 18). Current usage appears to have combined the facilitatory and assistive sense of the word with its emphasis on the need for people to participate actively in rehabilitation to improve their health.

EARLY HISTORY

Rusk (1978), a pioneer of medical rehabilitation, stated that the role of rehabilitation was "to maintain a high quality of health and quality of life for people in our society"

(p. 158). Another pioneer, Kottke (1980) stated that rehabilitation medicine was dedicated to “returning the individual to his family, home, and community as a functional member” (p. 1), and that its objective was “the restoration of each patient to become a participating member of his community” (p. 5). Melvin (1989) described this as assisting patients to resume their unique roles in life. Rusk, Kottke, and Melvin emphasised a broad focus for rehabilitation and described its effectiveness from the perspective of patients, and cost effectiveness from the perspective of the community. However, while evaluation of the impact of rehabilitation was recognised as important from its beginning, complex difficulties in measurement have been reported (Fuhrer, 1995; Kane, 1997).

Rehabilitation outcome measures have been developed to evaluate effectiveness, typically by quantifying the level of unresolved disability, which may be a barrier to independence in basic everyday living. Some handicap measures have been produced, and have been used to evaluate outcome in more complex activities. However, frequent use of global rehabilitation outcome measurement, which includes both disability and handicap levels, is relatively uncommon. Furthermore, health outcomes after rehabilitation appear to have been more often defined by health workers, without self-perceived outcome information from those undergoing rehabilitation (Kramer, 1997). This study will describe health changes after rehabilitation in both the global and subjective domains.

DEVELOPMENT OF REHABILITATION PROGRAMS

Medically-based physical rehabilitation programs proliferated after the wars of the twentieth century, with many initial programs aiming to address the needs of the returned servicemen and servicewomen with disability (Kottke, 1980). Other target groups for rehabilitation have since been identified and relevant rehabilitation programs developed. The speciality of rehabilitation for the aged population, for example, began in the 1940s and was initially provided within inpatient and day hospital settings (Brocklehurst, as cited in Butler & Charlton, 1998). The broadening of the target groups for rehabilitation and the expansion of program types and locations, along with an increasing body of literature, have probably all contributed to a change in how rehabilitation is conceptualised, provided, and evaluated.

Bauer (1989), in a text relating management to the rehabilitation process, discussed the strong influence of Wolfensberger (1972) in his development of *normalisation*, which aimed to give people with disabilities opportunities to live a normal life with minimal environmental restrictions. This theory has permeated the provision of care including that of rehabilitation. For example, Hayden, Moreault, LeBlanc, and Plenger (2000) stated that it is the responsibility of rehabilitation "to return persons served to the least restrictive environment possible" (p. 1000). Current government policy and related funding options enable some people with disabilities to access considerable help to return to or remain in the community (Department of Human Services, 1999).

DEFINITIONS OF REHABILITATION

In its definition of rehabilitation, the Australasian Faculty of Rehabilitation Medicine [Victorian Branch] identified aims and scope:

> Rehabilitation is a specialist area of health care that targets people with loss of function or ability from any cause, either congenital or acquired. Its aim is to improve function and/or prevent deterioration of function to bring about the highest possible level of independence, physically, psychologically, socially and economically, to maximise quality of life, and to minimise the long-term health care needs and community support needs of these people (Australasian Faculty of Rehabilitation Medicine [Victorian Branch], 1997, p. v).

Other rehabilitation definitions vary in emphasis, for example, some definitions focus more on the social model of health: "rehabilitation includes all measures aimed at reducing the impact of disabling and handicapping conditions and at enabling disabled or handicapped people achieve social integration" (World Health Organization, as cited in Bauer, 1989, p.19). Still other definitions take a strongly client-centred approach: "the rehabilitation process helps persons with disability to exert a maximum control over their daily lives, thereby increasing their freedom and dignity in the world" (Tam, 1998, p. 366).

Currently in Victoria, the choice of rehabilitation definition appears to depend to some extent on the philosophy of individual rehabilitation program managers, although statutory and funding body requirements, along with internal financial pressures within health facilities, will affect the degree to which the promise of the chosen definition can be fulfilled. The outcome measures chosen by rehabilitation program staff can give a strong indication of the valued outcome for rehabilitation activity (Banja, 1997), and reflect the rehabilitation philosophy being put into practice.

Early rehabilitation programs were developed on a medical model, where decision-making resided with the medical expert (Condeluci, 1992). The medical or expert-driven model of rehabilitation can be recognised in literature when the expert is said to make health-related decisions for the patient, for example, Landrum, Schmidt and McLean (1995) stated that is the primary role of the clinician to sort and prioritise the health issues to be addressed in rehabilitation. The importance of having goals to be addressed in rehabilitation has been stressed (Blackmer, 2000; Cott & Finch, 1990), and an expert traditionally identified these goals. More recently, the patient's own goals and priorities for rehabilitation have been emphasised, and rehabilitation programs that promote the patient's own health goals may be referred to as client-centred.

An individual's preferred rehabilitation outcome may relate to a practical interpretation of what is involved in living a healthy life. Bauer (1989) emphasised the unique nature of each person and the importance of the rehabilitation program being responsive to individual's history, living environment and disabilities, abilities and expectations. Bauer highlighted the need for rehabilitation staff to assist clients to identify and achieve their own rehabilitation goals, in accordance with health preferences.

HEALTH CHOICES AND VALUES

The ability of people to choose or value activities, events and objects is what separates humans from the rest of creation (Kant, 1964). The way in which people make choices is said to be reflective of the nature of the person rather than decided by immediate circumstances. Frankl, a psychiatrist who was a prisoner of war in Auschwitz during the Second World War, observed individuals' capacities to choose priorities even under extreme circumstances:

> Even though conditions such as lack of sleep, insufficient food and various mental stresses may suggest that inmates were bound to react in certain ways, in the final analysis it became clear that the sort of person the prisoner became was the result of an inner decision, and not the result of camp influences alone…It is this spiritual freedom—which cannot be taken away—that makes life meaningful and purposeful (Frankl, 1959, p. 66).

While sudden illness or disability can interfere with a life in process, choices can be made by the person undertaking rehabilitation, despite the stresses and difficulties faced. Spriggs (1998) emphasised the value of decision-making for patients in the light of a recent devastating diagnosis, noting that small decisions related to the present can be the immediate expression of personal autonomy. A participant in a recent study exploring health perception in people with disability stated “Health is about being in control of myself, and making my own decisions. That is the most important thing” (Lindsey, 1996, p. 468).

Caplan (1988) argued that it is the responsibility of the care provider to facilitate the autonomy of the patient, to empower self-management. Despite this, Keith and Hamilton (1997) asserted that current practice indicated that rehabilitation goals are usually set without the views of the patients and their families being requested or considered. Sim (1998) contended that the patient might need paternalistic decision-making until autonomy can be assumed. Sim stressed that there are no discrete measures of competence in decision-making and that a lack of competence in decision-making in one area of life cannot be assumed to represent incompetence in all areas.

Client-focussed decision-making can sometimes be facilitated by the involvement of carer advocates (Pollock, 1993; van Bennekom, Jelles, & Lankhorst, 1995). A carer as advocate can help ensure the patient’s preferences are known although care must be taken to ensure that the advocate chosen is acceptable to the patient and is competent to act as an advocate (Brady, 1997). Research would indicate that appropriate carer advocates would respond with a high degree of agreement to patients’ own responses (Sander et al., 1997; Seel, Kreutzer, & Sander, 1997). However, Perlesz, Furlong, and McLachlan (1992) reported that some families had high level of need in the face of a family member sustaining a disability, and may initially be reluctant to engage in a therapeutic process. Support for the family advocate may be required.

The participants in this study will define subjective health through identifying their own rehabilitation goals, which reflect individualised definitions of health, related in each instance to circumstances and values. Being able to undertake the individually valued activities related to health goals is understood to be expressions of an individual’s regained health, with rehabilitation being the link between illness and health. The study recognises the normative and individualised aspects of health through the scope of measures chosen. An aim of rehabilitation, from the perspective of this study is seen as the facilitation of participants' experience of health, expressed as return to individually preferred activities.

Theory Related to Rehabilitation Practices

Rehabilitation is a complex process (Wade, 1999a) involving patients across age ranges and diagnostic groups, and using many interventions, stages and formats. Theories underpinning some rehabilitation interventions are discussed in this section, prior to a more detailed discussion of the ICIDH and its association with phases of health care. A therapeutic model is introduced prior to a holistic rehabilitation model being explored.

REHABILITATION INTERVENTIONS

Rehabilitation includes a variety of interventions including biomedical (physical), psychological, social, educational and vocational approaches, and a team-based approach which can be used in a range of settings in the clinic or community (Kwakkel et al., 1999). Rehabilitation, therefore, is not a single intervention, but a process (Stason, 1997). Although rehabilitation interventions explored in this thesis are undertaken with the assistance of health professionals, it is acknowledged that many patients do not access rehabilitation (Walker, Gladman, Lincoln, Siemonsma, & Whiteley, 1999), and that many develop their own, often effective, responses to illness or disability.

A common assumption is that health outcome will be enhanced by therapeutic intervention (Falconer, 1997). While clinicians share this assumption, Brummel-Smith (1993) emphasised that, with the diversity of approaches within health disciplines and the tendency to measure limited aspects of health outcome, it is extremely difficult to measure the specific or overall effectiveness of rehabilitation on health. This is further complicated by the knowledge that some health-related problems, such as stroke or brain injury, may resolve spontaneously to some degree (High, Boake, & Lehmkuhl, 1995; Stason, 1997), while increasing impairment and handicap can be inherent in the nature of progressive conditions such as multiple sclerosis (Ko Ko, 1999).

Rehabilitation is a team-based process (Australasian Faculty of Rehabilitation Medicine [Victorian Branch], 1997). The way in which teams are organised varies:

multidisciplinary teams typically comprise a variety of health disciplines that provide specific interventions within well defined boundaries, interdisciplinary teams are characterised by multiple health disciplines working together towards common goals (Blackmer, 2000; Melvin, 1980). However, Strasser and Falconer (1997b) stated that “the team approach is more of an act of faith than a proven strategy” (p. 15). It has also been suggested that some therapists maintain a stronger affiliation to their discipline than to a rehabilitation team (Keith & Hamilton, 1997).

REHABILITATION FRAMEWORK

The International Classification of Diseases (ICD) (WHO, 1978) with its emphasis on acute medical intervention for the treatment of pathology is an important precursor to the rehabilitation process. The International Classification of Impairments, Disability and Handicap (ICIDH) (WHO, 1980) was developed later and emphasises the long-term consequences of disease or trauma. Recent developments within the model return the rehabilitation focus onto the ability of people with disabilities to participate within the community (ICIDH-2 [WHO, 1997] and ICF [WHO, 2001]).

An acute medical phase usually prevails when pathology is being medically treated and to some extent where impairment is being addressed (Willer & Corrigan, 1994), although addressing impairments is sometimes seen as a role of rehabilitation (Barnes, 1999). Conversely, some rehabilitation theorists maintain that only disability and handicap should be addressed during rehabilitation: “prevention, reduction and compensation of disabilities and handicaps” is the aim of rehabilitation not the reduction of impairments (Jelles et al., 1996, p. 377). It appears that the addressing of impairment can fit in either phase of care, depending on the facility involved or perhaps the diagnosis of the patient.

The relationships between the ICD and ICIDH models and health care phases are depicted as Figure 4. The key relationship is temporal, with the models sharing a common starting point.

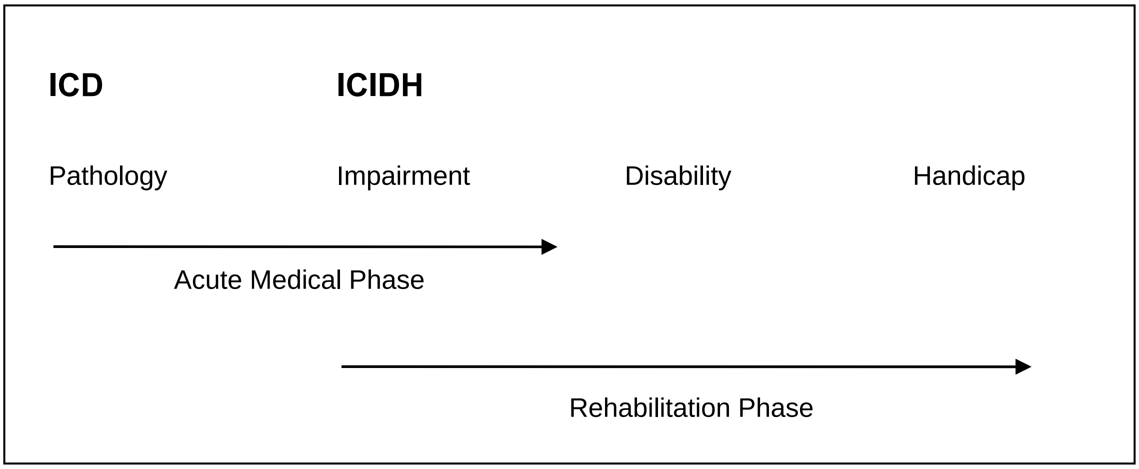

Figure 4

Relationship Between Models of Illness and Health, and Health Care Phases

HEALTH CARE CULTURES

Meier and Purtilo (1994) described the typically differing cultures occurring within acute care, with an emphasis on decision-making by experts and with some necessarily intrusive procedures and rehabilitative care with its emphasis on decision-making and participation by the patient. Given that an individual patient may need to move between these two cultures within an episode of care, issues involved in these transitions require attention. For example, a patient may require orientation to the increased expectation of participation in self-care and therapy on moving from the acute to the rehabilitation setting. Kramer (1997, p. JS51) states “good transitions and continuity must rely increasingly on early planning and on teaching patients to handle situations that occur during the transition”. One of the purposes of the rehabilitation goal-setting process described in the current study is to assist patients in the transition towards the increased decision-making expected in a rehabilitation culture.

It has been reported that a rehabilitative environment in acute settings increases the chance of discharge for frail elderly people (Landefeld, Palmer, Kresevic, Fortinsky, & Kowal, 1995), and that enhanced outcomes can occur when patients are more involved in decision-making in acute settings (Shendell-Falik, 1990). This indicates that there need not always be a sharp contrast between acute and rehabilitation care; effective approaches in the rehabilitation environment could be applied in the acute environment.

Rehabilitation Models

THERAPEUTIC MODEL

Rehabilitation can involve practitioners from many health disciplines including nurses, allied health clinicians and medical personnel. Each health discipline has a repertoire of therapeutic strategies, as do some specialised rehabilitation teams. These strategies are described here within a therapeutic model and relationships between strategies and the ICIDH are explored.

Formal rehabilitation interventions are implemented at a number of levels. The initial approach focuses on reducing impairments through remediation of function, for example, increasing muscle strength or attention span. It is said that remediation of impairments is relevant in rehabilitation provided there is a resultant reduction in disability and most especially handicap (Koch, Widén-Holmqvist, Kostulas, Almazán, & de Pedro-Cuesta, 2000). Subsequently, new skills may need to be developed to lessen the impact of any unresolved impairment, for example, through the development of compensatory strategies such as one handed techniques or diary use. Some strategies may also be required to modify the patient’s environment to lessen the physical and social impact of disability (Barnes, 1999). Finally, Molloy and Garner (1988) stated that “coping with the effects of cognitive, emotional and psychosocial change requires positive psychological adjustment. In many respects this is the most important aspect of the rehabilitation process” (p. 11). Thus, the therapeutic model of rehabilitation includes remediation, compensation and environmental strategies, along with interventions to facilitate adjustment.

Rehabilitation strategies are often implemented in a hierarchical manner, although the starting point, intensity and scope will depend on current knowledge regarding the likely course of the condition, the available resources, and perhaps the level of evidence for rehabilitation strategies. For instance, if a patient sustains a severe stroke, remediation, compensation, environmental modification and strategies to enhance personal adjustment may all need to be considered. On the other hand, if a patient has sustained a serious spinal injury with no likelihood of physical recovery in the lower limbs, then remediation is not possible and emphasis will be on the other strategies.

It can be possible to reduce disability and handicap while impairments remain stable in some patient groups (van Bennekom et al., 1995), for example, those with certain spinal injuries. Conversely, reduction in impairment may not necessarily bring about corresponding change in handicap in patients with some neurological disabilities (Hayden et al., 2000). However, intervention that reduces disability is likely to have some effect on reducing handicap (Heinemann & Whiteneck, 1995).

Factors Influencing Effectiveness of the Therapeutic Model

Context

Though a person may manage to compensate for impairments with the use of specific strategies or equipment within the clinical setting, it is acknowledged that patients with some forms of cognitive disability need to practice skills in the actual environment where those skills are required (Willer & Corrigan, 1994). This is because the generalisation of skills across environments may not occur (Heinemann, Hamilton, Linacre, Wright, & Granger, 1995; Gilbertson, Langhorne, Walker, Allen, & Murray, 2000), and is in fact considered unlikely (Hayden et al., 2000). It is also acknowledged that initial assessment in the patient’s environment enhances treatment planning (Head & Patterson, 1997), and it follows that the effectiveness of subsequent rehabilitation interventions are best evaluated within the patient’s own environment (LeBlanc, Hayden, & Paulman, 2000). From a theoretical perspective, these factors provide strong support for home and community-based rehabilitation as distinct from facility-based rehabilitation.

Relevance

Hayden et al., (2000) emphasised the need for interventions to occur in the patient’s environment so that therapy was relevant to the patient’s needs. Additionally, Hayden et al. emphasised that the patient needed to become “an expert on his or her own condition” (p. 1003) to ensure that such environments and situations are accurately identified. Patient participation in rehabilitation goal setting can help ensure relevance of rehabilitation to individual needs. This is also said to improve outcome: Molloy and Garner (1988) stated that such participation “can significantly enhance the client’s performance and lead to positive change” (p. 10).

Motivation

O’Hara and Harrell (1991) stated that motivation is one of the most important elements in rehabilitation and is “defined as the drive to obtain a desired goal” (p. 16). Relevance and motivation are related, with motivation being crucial to ensure patient participation in a rehabilitation program (Wade, 1999c). The identification of activities that are meaningful to the patient and the subsequent rehabilitation focus on these activities can assist the patient to have sufficient motivation to participate in a challenging rehabilitation program. Focusing on meaningful therapy outcomes can also give patients a sense of hope for the future (Spencer, Davidson, & White, 1997).

Relationship Between Therapeutic Model and the ICIDH

Remediation

Within the ICIDH framework, remedial strategies are typically focussed upon impairments, with the intent being to return function to its status prior to illness or injury. Remediation of a specific impairment typically fits within the practice domain of one health discipline, for example, remediation of muscle weakness related to speech is usually undertaken by the speech pathologist while the physiotherapist would provide remedial treatment if the muscles affected were related to mobility. There is usually a body of literature related to the efficacy of remedial strategies specific to practice within each health discipline (Dalley, 1999).

Compensation

Compensatory strategies, on the other hand, may span disability and handicap levels, and may be provided by several therapeutic disciplines. For example, the occupational therapist and nurse may encourage a patient to use one-handed techniques in everyday activities so the patient can manage self-care (disability level activities) and to resume a working role (handicap level activity), despite some unresolved disability. However, the degree of patient insight may affect the success of compensatory strategies (Crosson et al., 1989; Malia, 1997): a patient able to recognise only an immediate problem with memory may be prompted to use a diary to note down appointments times, but may not carry a diary in case such a situation should arise. Evidence for the efficacy of disability or handicap level compensatory interventions may be located within the literature of health disciplines or as part of the body of literature related to rehabilitation.

Environmental Modification

Environmental modification, related to disability or handicap level intervention, might be provided in an individual's home or may be required by law in the general community, for example the provision of accessible toilets within public buildings. Lack of environmental access can compromise rehabilitation outcome, for example, a person may have the skills to return to work following vocational rehabilitation but be unable to access the workplace due to environmental barriers. Literature related to the success of broad environmental modification may not be found in rehabilitation literature (Keith, 1995), yet the effect of such strategies may impact directly on rehabilitation outcome at the individual level (Barnes, 1999).

Adjustment

Adjustment-related interventions typically relate to handicap level and are relevant to the subjective response to the impact of disability on life roles, (e.g. the student or parent role). Many health disciplines may be involved in providing intervention to facilitate adjustment, although social work and psychology are often the key disciplines involved. A variety of issues are known to impact on adjustment, including the individual's level of anxiety, confidence and level of social supports (Molloy & Garner, 1988). Adjustment is not often measured as part of the rehabilitation outcome evaluation, despite its crucial importance to individuals and the emphasis upon it within rehabilitation theory.

Outcome Measurement within the Therapeutic Model

The outcome evaluation of impairment level remediation may be undertaken within the health discipline providing therapy (Jette, 1995). On the other hand, disability and handicap level evaluation measures the impact of team-based interventions (Jelles et al., 1996). Disability level outcome is particularly relevant to early facility-based rehabilitation, or equivalent bed-substitution programs. However, handicap level outcome evaluation is said to measure the integrated effects of rehabilitation strategies of all types and at each ICIDH level, and gives "a succinct index of general health status" (Harwood et al., 1997, p. 205). Handicap level outcome can also be used to report the effect of many stages of rehabilitative care across several programs accessed by a patient, for example, inpatient, home-based rehabilitation and then outpatient programs. At each stage, handicap status can give an indication of either rehabilitation completion or the remaining rehabilitation interventions required to achieve community reintegration, which is the goal of outpatient rehabilitation (Meier & Purtilo, 1994).

Handicap is measured in the current study via the Reintegration to Normal Living Index (Wood-Dauphinee & Williams, 1987). Disability is measured through the Functional Independence Measure (Hamilton, Granger, Sherwin, Zielenzy, & Tashman, 1987). Taken together, handicap and disability levels describe global health after rehabilitation.

HOLISTIC NEUROPSYCHOLOGICAL MODEL

Ben-Yishay and Prigatano (1990) described a model of “holistic neuropsychological rehabilitation” (p. 400); the model is pertinent to patients with acquired brain injury and has particular relevance to the adjustment aspects of rehabilitation. This model was chosen as it describes the rehabilitative stages for a patient with complex non-resolving impairment likely to impact on broad life roles, and which require personal adjustment.

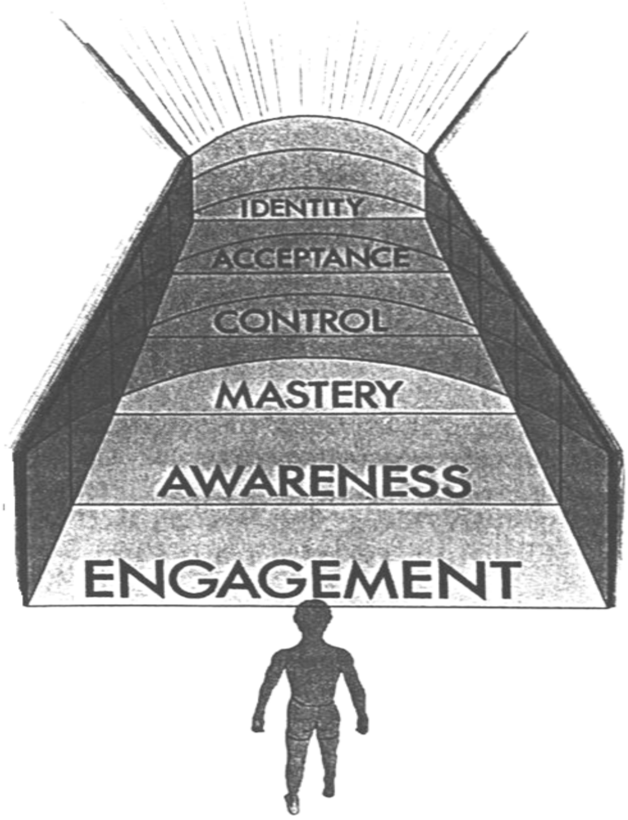

Figure 5
Model of Holistic Neuropsychological Rehabilitation

Source “Cognitive Remediation,” by Y. Ben-Yishay and G. Prigatano, 1990, p. 100. In *Rehabilitation of the adult and child with traumatic brain injury* (2nd ed.) by Rosenthal, Griffith, Bond, & Miller (Eds.), Philadelphia, F A Davis.

The model, shown as Figure 5, has six stages. The first two stages, engagement and awareness, relate to medical issues often associated with neurological injury and describe the patient becoming aware of the surroundings, the difficulties being experienced, and of the need to participate in rehabilitation. The second two stages, mastery and control, are associated with remediation and compensation respectively. The final two stages describe the patient's adjustment: this requires an acceptance of the unresolved disability and the challenging tasks involved in establishing a new sense of self (or identity) appropriate to current life tasks and capacities. The theme of development of a new identity is found in other theoretical literature (Christiansen, 1999) and in self-reports from patients (Remember Me, 1994)**.** Deegan (1988) described patients as actively discovering a new sense of self and sense of purpose "within and beyond the limits of the disability" (p. 11). Deegan stated that "each person's journey of recovery is unique" (p.16) and that service options within rehabilitation programs therefore need to be available for patients.

Prigatano (1991) described therapeutic approaches and choices that could assist with the final developmental stages. The use of psychotherapy is recommended, as is the provision of learning opportunities within groups and indirect methods, such as art and music. The author stated that these opportunities allow patients to develop a new sense of identity and meaning. Christiansen (1999) emphasised the need to create a coherent identity through engagement in activities that are personally meaningful.

Outcome Measurement Within the Holistic Neuropsychological Model

This model extends the need for outcome measurement to the levels of adjustment or identity development. Measurement of these outcomes must include the patient's self-evaluation, as adjustment and identity development are profoundly individual processes. This need to consider patient-perceived outcome and satisfaction with outcome has also been highlighted by Keith (1998). Client-perceived health change is measured in this study through the Canadian Occupational Performance Measure (COPM) (Law et al, 1991/1994). Self-perceived satisfaction with abilities to perform tasks associated with major life roles is measured via the Reintegration to Normal Living Index (Wood-Dauphinee & Williams, 1987).

Theory Related to Client-Centred Practice

EARLY HISTORY AND CONTRIBUTORS

Client-centred practice has been developed across physical and mental health domains, with some of the major contributions to client-centred practice in rehabilitation coming from the field of psychotherapy, while others came from a physical health perspective. Law (1998) emphasised the contrast between the early framework for client-centred practice developed by Rogers (1951) in psychotherapy and the approach taken in rehabilitation that was occurring at the same time. In Rogerian psychotherapy the client’s expertise and decision-making were central features, whereas the early rehabilitation model involved diagnosis being made by an expert who prescribed the treatment that was implemented by health professionals (Law, 1998).

While both the models (client-centred practice and expert-driven rehabilitation) have undergone significant development over subsequent decades, the link between the two have been increasingly emphasised in recent literature (Law, Baptiste, & Mills, 1995). The language in client-centred rehabilitation literature reflects concepts such as respect, enablement, collaboration, and partnership, terms often used in describing the features of client-centred psychotherapy practice. Falardeau and Durand (2002) stated that client-centred practice was based on a philosophy “built around concepts of respect, power and partnership” (p. 135). However, operational statements pertaining to the implementation of client-centred practice in rehabilitation vary in emphasis and scope.

Law (1998) acknowledged the influence of Rogers (1951) who emphasised the notion of respect for patients, and their autonomy within psychotherapy, on the development of client-centred practice in rehabilitation. The interpersonal aspects of care promoted by Rogers are reported to have a major impact on patients’ satisfaction and on their motivation and participation in rehabilitation programs (Keith, 1998). The tension between expert-driven care and client-centred practice is evident within some literature nonetheless (Carvel, 1999; Dalley, 1999); and Strasser and Falconer (1997a, 1997b) state the approach taken in providing rehabilitation may affect the outcomes.

The work of Frankl (1959) in exploring the importance of a person’s sense of meaning has influenced the theoretical framework of client-centred practice in rehabilitation.

Following his experiences as a prisoner of war in Auschwitz, Frankl, a psychiatrist, developed *logotherapy*, sometimes referred to as the Third Viennese School of Psychotherapy (Wong & Fry, 1998). The approach helps clients identify meaning in life, stressing each person's responsibility for choice of tasks and attitudes (Frankl, 1959). Logotherapy is based on the belief that people are capable of self-determination, at least in attitude, when conditions allow little other choice. Consideration of patient choice, and the need to understand the meaning of disability from the patient perspective, is a vital part of the theory of client-centred practice in rehabilitation.

In considering decision-making from a clinical viewpoint, Spriggs (1998) drew together the commonalties between sudden illness or disability, and prison-life, as described by Frankl (1959) and other writers such as Solzhenitsyn (1971). Similar to the prisoners described, patients can lose a sense of the future and experience an unknown future path and identity; to lose opportunities to make at least small choices at that stage can rob the present of its meaning. Spriggs highlighted the importance of patients being given opportunities for decision-making and choice.

The Canadian Association of Occupational Therapists (CAOT) has influenced the development of client-centred practice in the rehabilitation field, particularly through publication of guidelines for client-centred practice. A related outcome measure (Canadian Occupational Performance Measure [COPM], Law et al., 1991/1994) has facilitated an emerging body of research within occupational therapy and across other health disciplines. Fearing, Law, and Clark (1997), using the CAOT framework, explored the issue of respecting and addressing client-identified problems and suggested that this assisted patients to maintain or regain the momentum in life.

Gage (1997), also using the CAOT model, emphasised the importance of respecting the patient's vision of his or her future, and the potential this has to motivate the patient and the team towards collaborative and effective rehabilitation. Gage stated that health care team members have tended to develop treatment goals "through a process of scientifically determining what the average person is likely to accomplish" (p.179). On the other hand, patients "tend to base their goals on returning to what is a normal state for them" (p. 179). Gage suggested that if therapists accept and work towards patients' goals, that this would maintain the patient's motivation and sense of hope.

Goal setting has “become a basic principle of rehabilitation practice” (Haas, 1995, p. S16). Staff at the Rivermead Centre in Britain have contributed practice guidelines for client-identified rehabilitation goals (Wade, 1999c), and have emphasised the associated staff training requirements (Elsworth et al., 1999). The Centre’s structured client-centred philosophy and practices have been well-reported (Davis et al., 1992; McGrath & Davis, 1992; McGrath, Marks, & Davis, 1995; Wade, 1999a, Wade, 1999b).

Bauer (1989) from Australia wrote of many of the principles of client-centred practice in a rehabilitation management text. Bauer drew on the work of Rogers (1980) in emphasising the importance of sensitivity to patients’ needs and for excellence in communication. The importance of harnessing patients’ motivation through accurate identification of patients’ goals and through addressing the challenges within familiar environments, such as the home and workplace was highlighted.

CURRENT POLICY SUPPORT FOR CLIENT-CENTRED PRACTICE

There has been some support for client-centred practice in the acute health sector in recent theoretical literature (Towle & Godolphin, 1999) and in research literature (Coulter, 2002). The value of client-centred approaches in improving the effectiveness and quality of rehabilitation has also been acknowledged (Johnston & Wilkerson, 1992). There is strong support for the implementation of client-centred practice at policy level, for example, recent quality assurance standards, such as the Evaluation and Quality Improvement Program (EQuIP), developed by the Australian Council on Health Care Standards (ACHCS) uses many client-centred principles in its framework for health service quality evaluation. In the United States, the major rehabilitation regulatory authority, the Commission on Accreditation of Rehabilitation Facilities (CARF) requires therapists to document patients’ goals along with evidence of patient/therapist collaboration in treatment planning.

However, it is acknowledged that a client-centred approach within rehabilitation may not be available to people with disabilities in developing countries, where it is estimated that eighty per cent of those with disabilities reside. The World Health Organization has estimated that only one or two per cent of the five hundred million people with disabilities in the developing world have access to rehabilitation of any type (World Health Organization, 2001b).

ETHICAL ISSUES

Collaborative decision-making in health care can raise ethical issues, such as the power and responsibility of patient and professional, their individual rights, and the attribution of relative value to their opinions. Shared decision-making entails the patient's informed consent (Brock & Wartman, 1990), which requires sufficient cognitive capacity from the patient, and the commitment of the health professional to provide appropriate information or education. If a patient is unable to understand the risks or benefits of treatment, the health professional may need to implement appropriate treatment or engage a surrogate decision-maker for the patient, to ensure duty of care.

Using an ethical and theoretical framework, Sim (1998) explored the issues of cognitive and communication impairment in patient decision-making. He acknowledged the need for consensus between rehabilitation staff and patients about rehabilitation goals when there is cognitive impairment, and stressed the need for professionals to respect patients' values. Sim listed the fundamental ethical principles and associated responsibilities guiding the professional in client-centred practice (Table 3).

Table 3
Ethical Principles and Professional Responsibilities Guiding Practice

PRINCIPLE	RESPONSIBILITY
Beneficence	To provide benefits for other people and protect them from harm; a positive requirement to perform certain actions.
Nonmaleficence	To avoid inflicting harm on other people; a negative requirement to refrain from certain actions.
Justice	To distribute benefits and burdens among people in a way that is equitable, based on morally relevant differences or similarities between individuals.
Respect for persons	To treat people with due regard to their individuality and dignity as a person, and to treat people as ends in themselves, not merely as means to an end.
Respect for autonomy	To respect the self-determination of others, in terms of their decision-making and subsequent action.

From “Respect for autonomy: Issues in Neurological Rehabilitation,” by J. Sim, 1998, *Clinical Rehabilitation, 12*, p. 4.

For the health care professional, the first two principles (beneficence and nonmaleficence) require an understanding of the potential effectiveness of treatment strategies, and an ability to communicate this to the patient. The third (justice) places fair distributive responsibilities upon professionals and administrators or policy makers; relative cost-benefit of strategies require consideration (Blackmer, 2000). The final two principles (respect for persons and respect for autonomy) are central to client-centred practice, particularly in regard to rehabilitation goal setting. Kane (1997) emphasised that patient's autonomy is central to good rehabilitation.

Haas (1995) acknowledged collaborative goal setting is not simple: "accommodating the wishes of patients, their families and other professionals during the establishment of rehabilitation goals is one of the most demanding tasks practitioners confront" (p. S18). This and other challenges faced by patients and professionals in the context of client-centred practice are briefly described, along with strategies to address these challenges.

CHALLENGES TO CLIENT-CENTRED PRACTICE

Challenges from the Patient Perspective

Patients may not be willing or able to participate actively in rehabilitation decision-making due, for example, to pain, cognitive impairment, depression or lack of knowledge about their condition or about the rehabilitation process (Haas, 1995). However, patients may be helped to engage in decision-making within rehabilitation. Banja (1997), who emphasised the importance of patient decision-making in rehabilitation, stated that "where the patient's values and aspirations are reasonable, health care ethics will insist that their status 'trumps' the values of others" (p. 68).

Capacity to Participate in Decision-Making

Hobson (1996) emphasised two strategies that can be used to assist decision-making for a patient with cognitive impairment: first, the patient can be offered graded and structured decision-making opportunities; second, an appropriate advocate can assist. High correlation has been reported between significant others and patients' views of rehabilitation need (Sander et al., 1997; Seel et al., 1997). Furthermore, Wood-Dauphinee and Wood (1987) reported there was a higher level of agreement between patients and family members than between patients and health professionals. If a patient advocate were to be required in this study, a family member would be asked to assist.

Communication

People whose recently acquired disability includes communication impairments may have reduced capability to understand the information about the disabling condition or to undertake complex decision-making, such as that required for rehabilitation goal setting. The person has the right to have a rehabilitation program focussed on his or her needs and preferences but may require assistance from a structured process perhaps implemented through a speech pathologist (Hobson, 1996). In the current study, a speech pathologist will be asked to facilitate client-centred, rehabilitation goal setting, where possible with the participation of a family member, should this need arise.

Informed Consent

The importance of patients giving informed consent to a health care provider has been strongly acknowledged in the second half of the twentieth century (Dunn, 2000). Hobson (1996) stated that negotiation of informed consent was a first step in a client-centred process. Involvement in health care decision-making presupposes patients are adequately informed regarding the potential consequences of a care-related decision; this often requires education of patients about their health condition and treatment options (Bowen, 1996). Where doubt occurred regarding a patient’s competency to give informed consent in this study, specialist advice was sought from within the rehabilitation team, and a patient advocate involved as required.

Collaboration

In considering the place of partnerships in health care, Coulter (1999) stressed the need for experts’ contributions to be respected. While Coulter stated there are two experts, medical practitioner and patient, the former role could be recognised in a more generic sense as a health professional, while the latter may be recognised as including some significant other influences (Fearing et al., 1997). The expertise of the health professionals and the patient and family as described by Coulter are shown in Table 4.

Table 4

Expertise of Health Professionals and Patients

HEALTH PROFESSIONAL	PATIENT
Diagnostic techniques	Own experience of the illness
Causes of disease	Social circumstances
Prognosis	Habits
Treatment options	Behaviour
Preventative strategies	Attitudes to risk
	Values
	Preferences

Adapted from “Paternalism or partnership,” by A. Coulter, 1999, *British Medical Journal, 7212*, p. 719.

Coulter (1999) stressed that a health professional with the skill to diagnose a health problem should educate patients about the condition so that informed health care decisions can be made. Stewart et al. (2000) described the importance of patients and clinicians finding common ground in health care planning, and reported improved health status and relatively reduced use of health resources when this occurred.

Collaboration between patients and health professionals can require a high level of judgement and communication skills from the health professional, as well as increased time and resource commitments (Dunn, 2000). The challenges to client-centred practice from the perspective of patients and of health professionals require consideration.

Challenges from the Professional Perspective

A literature review by Sumsion and Smyth (2000) indicated that many challenges to client-centred practice were reported to be related to health professionals’ practice. These challenges included therapist discomfort with differences between patient and professional goals. Nelson and Payton (1997) reported that therapists were only minimally meeting the professional expectation that patients would be involved in goal setting. Sumsion (1993) acknowledged that it requires a high level of skill to set goals collaboratively with patients and that training to increase skills may therefore be required. In the current study initial staff training in client-centred goal setting was compulsory, and peer support across disciplines was made available.

Neistadt (1995) reported that while a structured process was required to ensure patient goals were identified and relevant therapy was planned, that therapists undertook insufficient exploration of patient goals, often relying instead on an informal interview. Neistadt, who surveyed 269 occupational therapists regarding client-centred practice, found that while almost all identified therapy goals with patient input, treatment planning was not necessarily related to the identified goals. Bowen (1996) stated that there should be transparency between rehabilitation goals and therapy for patients. A specific process for facilitating therapy planning related to client goals was used in the current study, and patients were given copies of their therapy plan so that the association between the goals and their therapy was made as clear as possible.

Duty of Care

Patient goals, which would require unsafe therapy activities, would be of great concern to rehabilitation staff and could lead to litigation in some cultures (Hong, Pearce, & Withers, 2000). Therapists would need to refuse to carry out client’s wishes if doing so would place the client at grave risk (Bowen, 1996; Canadian Association of Occupational Therapists, 1997).

The omission of therapeutic input necessary for patient safety raises comparable concerns. An example could be the need for treatment of depression, which although not recognised by the patient, may be life threatening if ignored. The rehabilitation team involved in the current study found that some patients required additional rehabilitation goals to ensure duty of care was addressed. Such team goals were listed along with client goals and related therapy interventions. The additional goals and planned rehabilitation interventions were discussed with the patient.

Resource and Leadership-Related Challenges

Lane (2000) stated that scarce resources and cost containment can be challenges to client-centred practice; the current emphasis on cost containment may therefore compromise its implementation. Nonetheless, Stewart et al., (2000) reported increased efficiency of care demonstrated by reduced diagnostic tests and referrals, in the context of client-centred practice. A lack of overt support from management may also lessen chances of successful implementation, and without strong evidence that client-centred practice is effective, management support may be less likely. Those challenges, along with relevant positive recommendations from the literature, which were incorporated into the current study, are summarised in Table 5.

Table 5

Challenges to Client-Centred Practice and Strategies Implemented

CHALLENGES	STRATEGIES
Cognitive challenge – insight	Graded, structured decision-making in goal-setting
Cognitive challenge – judgement	Involvement of a patient advocate
Communication challenges	Structured process and assistance from a speech pathologist and patient advocate
Decision-making in contrasting care environments, or in the face of pain/depression	Orientation to rehabilitation culture, progressive opportunities for decision-making
Lack of support from health professionals	Staff training, peer support and support from management
Duty of care	Team-based decisions if safety risks. Family members as advocates

Other factors known to impact on client-centred practice and rehabilitation outcome require consideration, as do rehabilitation outcome studies when more traditional processes in expert-driven rehabilitation are used. Relevant studies are discussed in the next section of the literature review.

CHAPTER 3

LITERATURE REVIEW: REHABILITATION OUTCOMES

In this chapter, the context of adult physical rehabilitation will be discussed, along with a brief examination of some of the factors reported to impact on rehabilitation outcome. Issues relevant to rehabilitation outcome measurement will then be considered. Rehabilitation outcome studies will then be reviewed and implications for the current study highlighted, prior to implications drawn from the literature analysis being summarised.

Introduction

With the improvements in health care that have occurred in the industrialised world over recent decades, increased proportions of people are surviving illnesses. For example, in Australia the mortality rate for cardiovascular disease has declined by approximately 60% from 1960/64 to 1994 (Australian Institute of Health and Welfare, 2000), and stroke mortality has decreased by 70 % from 1970 to 1990 in the United States (Dixon, 1997). Many of those surviving illnesses incur some disability, leading to a greater demand for rehabilitation. Furthermore, the increasing prevalence of disability among the younger age groups (Granger, 1998) and an increased prevalence of chronic conditions among the older groups. These changes are reflected in hospital admission data. For example, Dixon cited the United States Centers for Disease Control (CDC) data, which indicated that while 80 % of people entering the acute care system had curable conditions and 20 % had chronic conditions in the 1950s, these proportions had been reversed by the 1990s.

Rehabilitation is said to be a way to enhance health outcomes and facilitate independence (Fuhrer, 1995) and, as a result, to reduce health care costs (Wilkinson, Buhrkuhl, & Sainsbury, 1997). Those accessing rehabilitation can have varied needs, preferences and potential for change, with some patients requiring a brief period of remedial intervention, while others may require more prolonged and complex interventions. A patient’s individual situation, motivation and values are likely to impact on the rehabilitation focus, duration, outcome and cost.

Health outcome is naturally of fundamental interest to the patient and family. Rehabilitation service providers, funding agencies, and government authorities are also likely to be interested in health outcomes, as well as the relative efficiency of the rehabilitation process. Accordingly, there are often expectations for rehabilitation to achieve outcomes from several perspectives, with the potential for outcome expectations to be competing or in conflict (Banja, 1997; Banja & Johnston, 1994; Landrum et al., 1995; Rosenthal, 1996). The process of rehabilitation may be provided, but its outcome measured in different ways, depending on the interests and influence of those involved. Furthermore, Hammell (2001) stated that therapists tend to focus treatment on those areas that will be evaluated as part of outcome assessment, meaning that the choice of assessments in itself may influence outcome.

Factors Influencing Outcome

The individual characteristics of patients undertaking rehabilitation as well as the natural history of specific conditions are said to impact on rehabilitation outcome (Langdon & Thompson, 1999). Additionally, Donabedian (1966) emphasised rehabilitation program related factors that impact on health outcome: structure (space, equipment), processes (format, interventions) and outcome evaluation (scope, timing).

Rehabilitation research literature typically provides information on the diagnosis of the cohort(s) being studied, but individual patient characteristics are seldom discussed in depth. Rarely, if ever, is information offered in rehabilitation research papers regarding the detailed structure of rehabilitation programs. Some information may be provided about the rehabilitation processes involved, although this may not be comprehensive, and details regarding evaluation processes may also be limited. These issues are briefly explored and some general trends related to their impact discussed.

PATIENT CHARACTERISTICS

Diagnosis

The target group for rehabilitation includes paediatric, adolescent, adult and older age groups with acquired or congenital conditions, which could be ameliorated by rehabilitation (Australasian Faculty of Rehabilitation Medicine [Victorian Branch], 1997). The type and severity of the person's condition may impact on the rehabilitation focus as well as on its outcome. However, the measurement of rehabilitation impact can be difficult to extricate from the natural progression of the condition in any particular case (Dikmen & Machamer, 1995; High et al., 1995). Reports on the outcome of rehabilitation are typically specific to a diagnostic group and for a discrete clinical problem for that group (Kane, 1997). However, some studies do describe outcome for a mixed cohort (Bairstow, Ashe, Heavens, & Lithgo, 1997; Heinemann et al., 1995; McGrath & Adams, 1999; Ruchinskas, Singer, & Repetz, 2000). This is the approach taken in the current study as the client-centred process was applied across diagnostic groups within the rehabilitation service.

Individual Characteristics

The age of a person undertaking rehabilitation after brain injury may impact on rehabilitation outcome (Cifu, et al., 1996); similarly gender may impact on rehabilitation outcome after stroke (Lindmark & Hamrin, 1995; Wyller, Sødring, Sveen, Ljunggren, & Bautz-Holter, 1997), as may cognitive status (MacNeill & Lichtenberg, 1997). Furthermore, the immediate impact of sustaining a disability may affect the person's capacity to engage effectively in a rehabilitation program (Playford et al., 2000), as might pain, fatigue or depression (Haas, 1995).

PROGRAM CHARACTERISTICS

Program Focus

Rehabilitation programs can be expected to address different and sometimes conflicting aims if viewed from the perspective of varied stakeholders such as: patients, families, funding bodies, policy makers (Banja, 1997; Haas, 1995). The way in which the focus of the program is set, and the subsequent evaluation of the program in terms of its stated aims gives a strong indication of the values driving the program (Fuhrer, 1995). Some programs are patient-focussed, that is aimed at individual health need as perceived in a normative sense by the health professionals, with outcome measurement reflecting the effectiveness of therapy (Hammell, 2001). Other programs may be said to be more client-centred, that is, strongly focussed on the health needs as perceived by the patient, and evaluated from the patient’s perspective of relevant health need (Dalley, 1999). Rosenthal (1996) argues that both the normative and subjective levels should be targeted and evaluated.

Program Complexity

It is acknowledged that rehabilitation is complex (Hoenig, Horner, Duncan, Clipp & Hamilton, 1999; Strasser & Falconer, 1997a; Wade, 1999a). This complexity may be related to a range of elements involved including: the unique characteristics of the patient; diagnosis; rehabilitation processes; the degree of family support; the previous life roles of the patient and the operation of the rehabilitation team. Although these elements are likely to impact on rehabilitation outcomes, many studies provide insufficient details about such elements, making comparison between studies problematic. For example, it may be assumed that health disciplines work together as a team and focus on agreed rehabilitation goals. However, Strasser and Falconer (1997b) reported that there is little agreement within the rehabilitation field about how teams should function and that the team approach “is more an act of faith than a proven strategy in inpatient medical rehabilitation” (p. 15).

Program Format

While medical rehabilitation programs were initially located within hospital settings, many alternatives to hospital-based programs were developed, such as home-based rehabilitation and single-discipline, domiciliary programs (Butler and Charlton, 1998). Comprehensive team-based rehabilitation programs (Widén-Holmqvist, Pedro-Cuestra, Holm, & Kostulas, 1995), multidisciplinary team-based outpatient programs (Bakheit, Ward, Morris, and Walker, 1996), and subacute rehabilitation programs (Keith, Wilson, & Gutierrez, 1995) also gradually developed. The comparative outcome of alternative programs adds another variable to the overarching question of rehabilitation effectiveness, as there was little strong evidence of the effectiveness of the original programs that were provided (Kwakkel et al., 1999). Victoria’s rehabilitation service system provides a continuum of care model, with choice between programs that provide rehabilitation at differing intensity and in varied formats. A recent evaluation of this model indicated some advantages: decreased length of stay for patients, and favourable reports of client and carer satisfaction (Department of Human Services, 1999).

Team Structure

While team-based practice is said to be an important component of rehabilitation (Diller, 1990; Keith & Hamilton, 1997; Stineman & Strasser, 1997), little study has been undertaken on team practice within rehabilitation and its effect on outcome (Jelles et al., 1996; Strasser & Falconer, 1997b). One study focusing specifically on the overall efficacy of coordinated team-based rehabilitation for patients with severe head injury did show durable treatment gains at follow-up two years post discharge compared to a comparison group which received single discipline follow-up (Semylen, Summers, & Barnes, 1998). As increased cost consciousness is said to be a significant barrier to a team approach (Diller, 1990; Strasser & Falconer, 1997b), there is increased urgency for further evidence of the effectiveness of team-based practice (Wood-Dauphinee, Berg, & Daley, 1994).

Patient Selection

Initial functional status is considered to be a critical factor in predicting health outcome and length of stay (Bode & Heinemann, 2002). However, there are differences between-programs in regard to rehabilitation selection and admission practices, making cross-site comparisons difficult (Kane, 1997). This is made more difficult by the range and scope of outcome measures used, meaning that rehabilitation outcomes for patients with initially different needs are being evaluated in dissimilar ways.

Resource Allocation

Blackmer (2000) stated that health professionals must strike a balance between beneficence and justice when selecting patients or allocating program resources for rehabilitation. Beneficence implies consideration of the potential effectiveness of the desired treatment, while justice entails ensuring fair distribution of finite resources, and may be discussed in terms of efficiency. Neither aspect is simple, and requires exploration prior to decision-making (Health Care Committee Working Party on Ethics and Resource Allocation in Health Care, 1990). Efficiency is typically considered in terms of the minimum resources required to achieve a desired outcome (Rosenthal, 1996).

Timing and Sequencing

The timing of rehabilitation refers to the commencement of rehabilitation relative to critical events such as the precipitating incident, phase of recovery, or readiness for rehabilitation. The time over which rehabilitation is offered is considered to be the duration of treatment, and the order in which treatment is offered is the sequencing (Falconer, 1997). Studies have indicated the advantage of early rather than later rehabilitation (Hall & Cope, 1995). Conversely, studies of people with severe brain injury suggested that rehabilitation, offered after the time during which further gains are currently predicted, may be effective (Tuel, Presty, Meythaler, Heinemann, & Katz, 1992), and that access to periodic rehabilitation intervention over the lifetime may be useful (Olver, Ponsford, & Curran, 1996).

Therapy Type and Intensity

Proponents of rehabilitation sometimes assume that use of strategies and therapies within rehabilitation is evidence-based and will lead to positive outcomes. On the other hand, Falconer (1997) contended that therapeutic strategies tend to be provided largely according to the preference of a clinician. The volume of therapy provided, according to Kramer (1997) is associated with the presence of an able caregiver, or patient advocate. However, over recent years, rehabilitation literature has reflected a need for increasing scrutiny on the impact, efficacy, durability and cost effectiveness of rehabilitation strategies (Banja, 1997, Johnston & Hall, 1994). Currently, the most effective type, dose, intensity and timing of rehabilitation therapy for particular diagnostic groups requires further investigation (Heinemann et al., 1995; Kwakkel et al., 1999).

Customisation

Offering patients choices between rehabilitation programs, and in the focus of therapy, while remaining attentive to their needs and decision-making capacity are elements of client-centred practice. As such practice can involve some less traditional rehabilitation processes, additional challenges may be identified. For example, there is said to be wide variation in methods of goal setting, from team identified goals to client identified goals (Playford et al., 2000). A preliminary study by Webb & Glueckauf (1994) reported that patients involved in client-centred goal setting demonstrated benefits. Playford et al. contended on the other hand, that while patient involvement in rehabilitation goal-setting is acknowledged as important, there is little agreement about how it should be undertaken and, there is "little or no evidence that it is effective" (p. 491). Measuring rehabilitation outcome from a client-centred perspective is a complex and challenging process (Hammell, 2001).

Variations in Outcome Measurement

Outcome measurement can be undertaken by individual health disciplines, the rehabilitation team as a whole, and by the patient and family. However, there is variation in outcome measurement standards (Hall & Cope, 1995). Patients and their families are seldom involved in formal outcome evaluation although may be offered the opportunity to comment on their satisfaction with aspects of the program (Hall & Johnston, 1994). Agreed evaluation standards and processes are yet to be implemented (Barer, 1996), and outcome may be valued differently by the stakeholders involved: patients, families, service providers and policy and funding agencies (Wade, 1992b).

According to Lafferty (1996) outcome evaluation needs to address effectiveness for the patient (achieving its stated objectives: the reduction of disability and handicap), and efficiency (achieving those objectives with the minimal use of resources). Lafferty also stated that these objectives should be met without placing the patient at untoward risk, and that the service provided should be acceptable to the patient. The measurement of outcome from all of these perspectives is complex and requires further consideration.

Outcome Measurement

The goal of outcome research in health is "to distinguish the effects of treatment from improvement resulting from the natural course of the illness" (Kane, 1997, p. JS 21). There is also a need to distinguish between the effects of rehabilitation and the many other factors impacting on outcome (Harwood et al., 1997; Keith, 1995; Dikmen & Machamer, 1995). While these issues may appear self-evident, the complexity and range of rehabilitation programs, therapies within programs, and the variation in the natural course of illnesses contribute to difficulties in ensuring appropriate systems of outcome evaluation.

Wade, Skilbeck, Hewer, and Wood (1984) described necessary elements for appropriate rehabilitation outcome evaluation, recommending research that explores the relationship between rehabilitation outcome (using agreed measures) and rehabilitation processes, such as therapy timing, content and intensity. Yet thirteen years later, Keith and Hamilton (1997) emphasised the similar need for therapy-related details to be identified and documented in rehabilitation related research. Nonetheless, these elements are seldom described in detail in current research literature, and this impacts on the quality and usefulness of studies, as does the quality of some of the measures used in studies.

MEASUREMENT FRAMEWORK

Measures

A plethora of outcome measures have been developed over recent decades by the many health disciplines involved in rehabilitation, particularly measures of impairments and disabilities (Wood-Dauphinee et al., 1994). In reviewing disability measures for physiotherapy, Kidd and Yoshida (1995) noted the ever-increasing number and type of measures developed between 1950 and 1990. Liang (1997) stated that there should be a moratorium on the development of new and better measures and an emphasis instead on providing research data to inform rehabilitation policy development.

When a framework such as the ICIDH is adopted and a relevant, validated and reliability-tested measure is widely used, for example, the Functional Independence Measure (FIM) (Hamilton et al., 1987), valuable information about disability level change can be gained. This has included: predictive information on the functional outcome for people with stroke (Oczkowski & Barreca, 1993; Stineman, Fiedler, Granger, & Maislin, 1998); relationships between specific impairments and resultant disabilities (Stineman, Jette, Fiedler, & Granger, 1997), and likely discharge status across impairment groups (Heinemann, Linacre, Wright, Hamilton, & Granger, 1994).

Wade (1992b) recommended routine targeted measurement be used across programs to allow comparisons between program outcomes. However, rehabilitation studies define and measure outcome in many ways (Lindmark & Hamrin, 1995; Parker et al., 1997), and measure outcomes at varied times after illness or injury (Harrick, Krefting, Johnston, Carlson, & Minnes, 1994), making such comparisons problematic. An attempt will be made to compare the outcomes from the current descriptive study with other rehabilitation studies, although this is likely to prove challenging because of the varied measures and methodologies in use.

Specificity

While there is some evidence for the effectiveness of therapy from certain disciplines, particularly at impairment level, rehabilitation research literature does not necessarily report therapy content, making the identification of the specific elements that are effective, impossible (Hall & Cope, 1995; Walker, Drummond, Gatt, & Sackley, 2000). Furthermore, as the improvement of skills measured at impairment level may not be connected to outcome at a functional level (Kwakkel et al., 1999), outcome measurement needs to focus on functional tasks. Dalley (1999) contended that health disciplines needed to use measures which evaluate the efficacy of their treatment strategies, and use client-centred evaluation to measure the usefulness of the treatment for the person. In other words, both effectiveness and relevance should be evaluated.

Measurement of the efficacy of treatment in many domains relevant to rehabilitation can be difficult. For example, measurement of behaviour change is important, although can be challenging to analyse scientifically (Hall & Cope, 1995). Additionally, there can be difficulty in identifying the element(s) of complex team-based rehabilitation that lead to improvement (Dalley, 1999). For instance, while there are indications that a focussed approach to stroke rehabilitation provided in a stroke unit leads to better patient outcomes than rehabilitation provided in a general medical unit, the reasons for the better outcomes remain unclear (Kwakkel et al., 1999).

Comprehensiveness

Kramer (1997) stated that rehabilitation is an “outcome orientated field” (p. JS54). However, he indicated that rehabilitation program staff tend to measure domains more pertinent to the program than to the patients. Kramer stated that professionals often measure a limited aspect of outcome after a short program, rather than the overall impact of rehabilitation.

A framework for broadly defining outcomes is described by Landrum et al., (1995) who referred to global outcomes (overall objective and subjective recovery at impairment, disability or handicap levels), level specific outcomes (functional independence, return to work) and patient specific outcomes (patient goal-related achievements). This framework, which is described in more detail in Table 6, was suggested as a driver for rehabilitation programs to ensure rehabilitation is “reverse-engineered” (p. 45) to achieve the essential outcomes. This means that the rehabilitation provided is designed to assist the patient achieve specific outcomes at several levels with the therapy plan being developed by working from the desired end point back to the current situation.

Table 6

Outcome Evaluation Framework

Global Outcome	The global outcome is the end result of all clinical issues and treatments expressed in the most general form. It is the result of “patient specific outcomes”, residual impairments, disabilities, and handicaps. It is an expression of the objective recovery achieved, and the subjective perceptions experienced that contribute to a person’s quality of life.
Outcome Levels	Outcome levels are specific categories or groupings of patient problems and conditions that typically occur in the course of rehabilitation and recovery. Examples include achievement of physiologic stability, establishment in the residual environment, and return to productive activity.
Patient-Specific Outcomes	Patient-specific outcomes are the individual goals achieved through recovery and treatment of identified problems specific to the patient and clinical condition. These may be medical, functional, psychological, social, or vocational in nature. The collective result of achieving a group of patient-specific outcomes is typically the achievement of an outcome level.

From *Outcome-orientated rehabilitation*, (p. 44), by P. K. Landrum, N.D. Schmidt, and A. McLean, 1995, Gaithersberg, MD: Aspen Publishers.

This framework for outcome evaluation appears to be very comprehensive but evaluation at so many levels may be difficult to apply in the field of rehabilitation research, and van Bennekom et al. (1995) highlighted the need to achieve a balance between comprehensiveness and conciseness in outcome assessment. Wade (1992b) also emphasised evaluation efficiency stating that, as evaluation is time and therefore resource consuming, measurement should be appropriately targeted.

Kramer (1997) emphasised the need for patients to evaluate the longer term outcome of rehabilitation rather than for providers of rehabilitation to rely solely on outcome assessment at discharge from a rehabilitation program: “we ought to move away from outcome measures based on provider assessment during brief stays towards longer-term patient assessments of changes in their health” (p. JS57). This means outcome measurement needs to be staged over the episode of care, and targeted at health change (Hall, Bushnik, Lakisic-Kazazic, Wright, & Cantagallo, 2001).

Efficiency

Efficiency refers to the effort and cost in relation to a desired outcome (Rosenthal, 1996). Bed-day costs may be reflected as length of stay (LOS), whereas input costs may be reported as the average daily provision of therapy. Heinemann et al. (1995) referred to therapy intensity as the total therapy provided to a patient over a rehabilitation program divided by the number of days spent in the program as therapy intensity. Another efficiency measure may be referred to as a change unit, for example, change in points on the Functional Independence Measure (FIM) achieved over a rehabilitation program, or as recommended by Dixon (1997) cost per FIM change unit.

Rehabilitation occurs in phases across a continuum, with individuals moving across those phases according to their clinical support need (including safety), their potential to benefit, and their social supports. Efficiency indicators (average daily therapy provision and LOS) give some idea of the resources required in each phase. These resources can be described in terms of patient-attributable hours or total therapy hours over the length of stay (number of days spent in a program). The average daily resource requirement in any one program from the continuum is a measure of both therapy intensity with more hours of therapy per day representative of higher intensity, and program efficiency with more hours of therapy over a longer stay indicating lower efficiency. The meaning that can be derived from the length of stay and therapy intensity data in any one program is limited if that is the only efficiency data reported from a rehabilitation episode of care.

Johnston & Hall (1994) argued that efficiency or cost-effectiveness should be considered, but Banja (1997) indicated that there is some debate as to whether efficiency is part of health outcome. In the current climate of cost consciousness and accountability (Blackmer, 2000), some consider efficiency to be essential (Banja &

Johnston, 1994; Hubbard & Bauer, 1993). Corrigan, Smith-Knapp and Granger (1998) had recommended that outcome evaluation include the perspectives of the patient (subjective), professionals (global), and the community (efficiency).

Measurement Framework Used in this Study

Given that the ICIDH is said to be an important framework for rehabilitation practice (Wade, 1992a), this was chosen to guide the evaluation of the global domains said to be relevant to rehabilitation, disability and handicap (Jelles et al., 1996). These domains, especially the handicap domain, provide a measure of global health (Harwood et al., 1997). The Reintegration to Normal Living Index (RNL) (Wood-Dauphinee & Williams, 1987), a handicap level measure, will be used in this study as part of the global health outcome evaluation, along with the Functional Independence Measure (FIM) (Hamilton et al., 1987), a disability level measure.

As rehabilitation research and routine rehabilitation outcome evaluation should be relevant to patients, measurement should include “the results of rehabilitation interventions that are valued by patients” (Tate, Findley, Dijkers, Nobunaga, & Karunas, 1999, p. 496), or as recommended by Rosenthal (1996, p. 9) “meaningful measurement”. The Canadian Occupational Performance Measure (COPM) (Law et al., 1994) is used in this study to evaluate the patients’ subjectively measured outcome. This measure provides information on patients’ subjective health status.

Length of stay and average daily therapy intensity are reported as efficiency factors. Length of stay refers to the total time spent in a rehabilitation program. Therapy intensity refers to patients’ average daily therapy hours, using the method of Heinemann et al. (1995).

OUTCOMES RESEARCH

Methodological Standards

The methodological standards expected in health research are challenging, and Chesnut et al. (1999) asserted that these expected standards have risen over recent years. Nonetheless, high standards are not always achieved. Kwakkel, Wagenaar, Kollen, and Lankhorst (1996) identified eleven key elements requiring attention to ensure internal, external and statistical validity in prognostic studies for stroke. Of the 142 studies the authors reviewed, 64 failed to meet the inclusion criteria, and none of the remaining studies, involving 16,149 patients, met all of the eleven criteria (Table 7). Drawing conclusions regarding prognosis, in this example remains extremely complex, considering the methodological difficulties.

Table 7
Methodological Elements Required for Adequate Research Design

INTERNAL VALIDITY

1. Reliable or valid measurements (dependent variable)
2. Reliable or valid measurements (independent variable)
3. Inception cohort (within set time line)
4. Appropriate end-points observation
5. Control of patient drop-out

STATISTICAL VALIDITY

6. Control for statistical significance
7. Adequate estimation of sample size
8. Control for multicollinearity

EXTERNAL VALIDITY

9. Specification of inclusion and exclusion criteria
10. Description of additional treatment effects during period of observation
11. Cross-validation of the prediction model

Adapted from “Predicting disability in stroke: a critical review of the literature,” by G. Kwakkel, R. Wagenaar, J. Kollen, and G. Lankhorst, 1996, *Age and Aging*, *25*, pp. 480–481.

Statistical Issues in Rehabilitation Research

Matyas and Ottenbacher (1993) stressed the need for rehabilitation researchers to pay attention to the power of studies, and ensure that attempts are made to replicate studies. In reviewing 30 occupational therapy research studies, Ottenbacher and Maas (1999) found insufficient attention had been paid to statistical power, very likely contributing to Type 2 errors[1] and reducing any likelihood of replication of the studies. It was suggested that some of the equivocal results regarding rehabilitation outcome have been due partly to lack of precision in statistical methodology. In this study, sample size was considered prior to commencement of data collection as recommended by Cohen (1988) and statistical issues were examined in light of the type of research being undertaken.

Classes of Outcome Studies

Carney et al. (1999) described levels of evidence within studies (Table 8). While the RCT is said to provide strongest evidence in a study design, the systematic review or meta-analysis can provide strong evidence across studies. Protocols for undertaking systematic reviews and meta-analysis have been documented (Cook, Sackett, & Spitzer, 1995). Access to complex reviews is available from centres for evidence-based practice, such as the Cochrane Collaboration (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996), as well as within peer reviewed journals.

Table 8

Classes of Rehabilitation Outcome Studies

Class I	Well-designed randomized controlled trials (RCTs)
Class II[a]	RCTs with design flaws and multicentre or population-based longitudinal (cohort) studies
Class II[b]	Nonrandomized controlled trials, case-control studies, and well-designed case series
Class III	Case reports, uncontrolled case series, and expert or consensus opinion

From, "Effect of cognitive rehabilitation on outcomes for persons with traumatic brain injury: A systematic review," N. Carney et al., 1999, Journal of Head Trauma Rehabilitation, 14, p. 384.

While the RCT [Class 1] is said to be the gold standard for pharmaceutical and other areas of medical research, "for practical and ethical reasons, this method cannot always be applied in research with clinical populations" (Malec & Basford, 1996, p.198). Trombly, Radomski, and Davis (1998) contended that the RCT is sometimes not a suitable research design on ethical grounds. Although the RCT can provide highly

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[1] Type 2 error refers to a research methodology decision where the significance level is set so high that acceptance of the null hypothesis is likely despite there being a strong likelihood that the experimental hypothesis is true.

specific evidence for a defined patient group, concerns have been raised about the suitability of the RCT for the rehabilitation population where patients often have complex comorbidities. Furthermore, the RCT is said to be a method more suited to exploring problems where there is already some evidence of treatment effectiveness (Tate et al., 1999).

Research Design Used in this Study

This study will describe outcomes in an existing rehabilitation program. Convenience samples of those patients selected for the client-centred goal planning process in either HRP or IRP were used. This was because program protocols relevant to patient selection for the client-centred process for admitted patients were already well established. It was deemed inappropriate to alter these. The establishment of a control group could not be actively implemented on ethical grounds, and there were insufficient patients on the waiting list to establish a non-treatment control group. The study will be a descriptive Class 111 study using the classification system of Carney et al. (1999).

Response to Research Data

Despite increasing research standards, Keith and Hamilton (1997) acknowledged that research findings are often ignored. It has been reported that health practitioners may have little confidence in reported research findings or have difficulty transferring findings into daily practice (Pollock, Legg, Langhorne, & Sellars, 2000). It would appear therefore that, while outcome related research may be valued at a theoretical level, there are challenges for the field in ensuring that research is adequately designed, understandable and transferred into clinical practice (Kennedy, 2000).

Service improvements would require commitment to practice change in the light of research findings. As this study will describe the outcomes for an existing program, it is likely that the results may be of interest to the rehabilitation staff involved. This may increase the likelihood of recommendations that arise from the study, and are relevant to increasing the quality of the rehabilitation service, being implemented. The descriptive study may also provide recommendations for future practice and research relevant to client-centred rehabilitation.

SUMMARY

Complex difficulties were described in this section in relation to rehabilitation outcome evaluation, from the perspective of variation within the target groups, rehabilitation processes and differences in the standards and scope of outcome measurement, as well as design and methodological elements. The many perspectives from which outcome can be evaluated, along with the copious number of outcome measures available, were acknowledged. These factors can impact on the quality of outcome studies undertaken in the field.

The more detailed review that follows emphasises the major factors impacting on rehabilitation outcome, and explored in a variety of study designs. The studies selected for review investigate or describe outcomes for adults after rehabilitation, and are biased towards studies exploring the outcome for patients whose disability is likely to affect broad life roles. There is an emphasis on identifying trends within rehabilitation practice as well as on outcome findings. Given the broad focus of the current study, the literature review is necessarily broadly based, although studies were selected with the rehabilitation cohort under investigation in mind.

Review of Outcome Studies

The review is grouped into studies that investigate or describe rehabilitation outcome with particular reference to:

- patient characteristics (diagnosis, age, and cognition);
- rehabilitation program structure (team practice, program format);
- rehabilitation processes (interventions, their intensity and sequencing);
- rehabilitation outcome evaluation (admission practices, follow-up);
- customised rehabilitation (goal-setting, therapy planning, evaluation).

PATIENT CHARACTERISTICS

Diagnosis and Age

Although rehabilitation outcome is usually measured within diagnostic groups, the effect of other variables such as age can also be considered. The impact of age in relation to likely comorbidities and the subsequent impact on health were emphasised by Wilkinson et al. (1997). On the other hand, Heruti et al. (2002) suggested that older patients might be less likely to receive rehabilitation services, or be provided with shorter rehabilitation programs. There has also been some evidence to suggest that older rehabilitation patients may receive less intensive therapy due to age-related bias among rehabilitation professionals (Rybarczyk, Haut, Lacey, Fogg, & Nicholas, 2001).

Reeder, Rosenthal, Lichtenberg, and Wood (1996) studied the effect of age on functional outcome for rehabilitation inpatients (*N* = 365) after traumatic brain injury (TBI). All patients were offered a comprehensive rehabilitation program, which included traditional health disciplines, but details of the rehabilitation program in terms of therapy content, duration or intensity and team-related variables were not discussed. Outcome was measured using the Functional Independence Measure (FIM) (Hamilton et al., 1987) and the Disability Rating Scale (DRS) (Rappaport, Hall, Hopkins, Belleza, & Cope, 1982). Age was found to have no impact on functional outcome, as measured on the FIM or DRS, when results were controlled for cause and severity of injury. The authors found that the strongest predictor of outcome was functional status at admission to rehabilitation.

Cifu et al. (1996) reported dissimilar findings to Reeder et al. (1996) when investigating the effect of age on rehabilitation related functional gains for patients (*N* = 531) with TBI. Outcome measures again included the FIM and DRS, and additionally the Rancho Los Amigos Levels of Cognitive Functioning Scale (Malkmus, Booth, & Kodimer, 1979). The relationship between age, functional gains, cost and discharge destination for patients was explored. Results indicated that functional recovery varied between age groups in degree as well as in rate, with older patients achieving a lower level of functional recovery and requiring a longer time in rehabilitation to achieve it. The rehabilitation costs for older patients were consequently higher.

While these two studies may appear to have somewhat contrasting results, this may be related to the emphasis within the studies. Reeder et al. (1996) reported that patients with TBI demonstrated functional improvement, which was associated with their functional status on admission to rehabilitation, and independent of their age. These authors suggested therefore that age should not be a consideration in terms of patients' capacity to benefit from rehabilitation. Cifu et al. (1996) stressed the costs associated with the functional gains achieved, and recommended that consideration be given to less intensive rehabilitation for older patients being provided in alternative settings.

Cifu, Seel, Kreutzer, and McKinley (1999) examined functional outcome for patients (*N* = 375) undergoing inpatient rehabilitation after spinal cord injury (SCI). Three triads of 125 patients were matched for age (18-34, 35-64, 65+) and injury characteristics. Rehabilitation was provided by traditional disciplines according to the standards set by the (American) Committee on Accreditation of Rehabilitation Facilities; these standards refer to therapy availability, intensity and disciplines involved. Functional outcome was measured using the FIM, and length of stay and discharge destination was examined. Functional scores at discharge varied significantly between the three age groups investigated; younger patients demonstrated greatest functional change and the greatest rate of change. Additionally, discharge destination outside the private residence varied significantly between the groups; the younger age group’s likelihood of discharge home rather than institutionalisation being 30:1, the middle group 6:1 and the older group was 3:1. Nonetheless, 75% of the older patients were discharged home.

The research by Cifu et al. (1999) was similar to that of Cifu et al. (1996) in that disability outcome within age groups was considered in association with rehabilitation cost. However, although patients in both studies were likely to have complex life role changes as a result of their injuries, rehabilitation outcome for both groups was considered only at disability level, with no evaluation exploring the effect of rehabilitation on handicap, nor the costs associated with handicap change. Additionally, no data on the availability of social supports that may be critical to discharge destination were collected, although such data may have further explained some of the variation in discharge destinations between age groups. Neither of the studies considered the impact of rehabilitation on patient adjustment or evaluated rehabilitation from the patients’ perspective.

In the current study, age will be considered an independent variable and its association with disability and handicap level change will be described, along with its association with client-perceived outcome. The cohorts will be considered in relation to the primarily older age-group involved; ten-year age ranges were considered likely to be sufficient to be indicative of the expected variation in health status with age noted by

Wilkinson et al. (1997). As there is also a preference for relatively equal numbers within the cohorts, a broad younger cohort, with the other groups comprising 10-year age ranges will be used. This is similar to the approach taken by Dodds, Martin, Stolov, and Deyo (1993) and Coulter (2002). Age will also be discussed in association with length of stay and therapy intensity, as these two factors pertain to the efficiency of rehabilitation as explored by Cifu et al. (1999).

Diagnosis and Cognition

There are many studies that examine the effect of cognitive impairments on rehabilitation outcome, and impaired cognition is generally associated with poorer rehabilitation outcomes (Ruchinskas et al., 2000). A simple cognitive screen might be the only formal measure of cognition administered to patients within a rehabilitation program, and cognitive screening is highly recommended (Heruti, et al., 2002). Indications of cognitive impairment on screening should be given weight (Zwecker et al., 2002), as should observational reports from rehabilitation staff when planning discharge requirements (Hajek, Gagnon, & Ruderman, 1997).

There is evidence to suggest that some of the outcomes valued within rehabilitation outcome, such as ambulation, are less dependent on cognition than other more complex cognitive skills, such as safety awareness (Ruchinskas et al., 2000). Reliance on tests of motor skills might therefore lead to an overestimation of patients’ abilities (MacNeill & Lichtenberg, 1997). This would indicate the need for a variety of cognitive assessments, including observation of patients’ ability to undertake complex tasks within familiar environments (Parker et al., 1997).

Heruti et al. (2002) recommended the use of the Mini Mental State Examination (MMSE) (Folstein, Folstein, McHugh, 1975), or the Cognitive FIM as cognitive screens. These researchers found the two screens to be highly correlated ($r = .85$, $p < .001$) on admission to rehabilitation in a cohort of stroke patients ($N = 336$). As the FIM cognitive scale was being scored on admission for all patients being admitted to rehabilitation, it was decided that this would be the screen used in the current study.

Stineman et al. (1998) investigated the outcomes for patients with stroke ($N = 26{,}339$). Distinctions were drawn between likely disability level outcomes for patients within groups with specific FIM score clusters across the 18 FIM domains on admission, and between likely rehabilitation and resource needs prior to rehabilitation admission and on discharge. Stineman et al. reported that a FIM cognitive admission score of 30 or more was likely to be associated with disability level independence on discharge.

In the rehabilitation service in which this study is to be undertaken, the cognitive FIM is the only cognitive measure routinely applied to all patients, as there are not sufficient resources to administer in-depth cognitive assessment to all patients. It was therefore decided to use this screen as the indicator of cognitive impairment in the same way as Stineman et al. (1998). The association between two cognition-related cohorts (patients with FIM scores less than 30 and those with scores greater than 30) will be analysed to describe associations between changes on measures of global and subjective health status, and with therapy intensity and length of stay. However, it is acknowledged that the analysis of cognitive status and disability change would be somewhat confounded by the use of the cognitive FIM as the screen and the FIM change for disability change. That aspect of the multivariate analysis therefore could not be reported with any confidence.

PROGRAM CHARACTERISTICS

Program Format

While rehabilitation was initially facility-based, alternative program formats developed quickly (Butler & Charlton, 1998). Evaluation of rehabilitation programs has been a continuing theme in the literature with comparisons often being made between outcome attributable to rehabilitation offered in different formats.

Widén-Holmqvist, de Pedro Cuesta, Möller, Holm, and Sidén (1996) explored home-based rehabilitation in a pilot study in Sweden that described outcomes and cost for people (*N* = 15) with stroke. The researchers reported that the results were sufficiently encouraging to justify further exploration. Koch, Widén-Holmqvist, Kostulas et al. (2000) subsequently undertook a single blind RCT examining outcome at six months. Patients (*N* = 78) with moderate neurological impairments after stroke were assessed using a range of impairment, disability and resource-related measures. Results indicated that home-based patients demonstrated no less benefit than reported for those provided with traditional facility-based rehabilitation. Koch, Widén-Holmqvist, Wottrich et al.

(2000) emphasised the partnership that therapists and patients formed when rehabilitation was provided in the home setting, and described potential advantages to the patients' sense of autonomy.

Bairstow et al. (1997) explored an Australian home-based rehabilitation program for patients with diverse diagnoses (neurological, fracture, amputation, and arthritis). Outcomes were described for the group ($N = 282$) discharged early to home-based rehabilitation: patient and carer goal achievement, patients' general health, as measured on the General Health Questionnaire (Goldberg & Williams, 1988), and patient/carer satisfaction. Patients were reported to achieve 90 % of the rehabilitation goals set by staff, patients and caregivers, general health was maintained or improved by 66 % for patients and 61 % of caregivers, and over 90 % of both patient and carer groups reporting high satisfaction with the service. Length of stay was markedly reduced and costs reduced by 89 %. Patients and their caregivers were reportedly keen to access early discharge from facility-based services through the home-based program, and caregivers reportedly assisted with therapy.

While the Swedish studies indicated that outcome was no worse for patients with stroke who undertook home-based rehabilitation, the Australian study, (Bairstow et al., 1997) indicated positive health outcomes for the broad client group in terms rehabilitation goal achievement and general health. The inclusion of a commonly used outcome measure in the Bairstow et al. study would have facilitated comparison with other descriptive rehabilitation studies.

Tinetti et al. (1999), with a RCT design, investigated the relative rehabilitation outcome for older patients ($N = 304$) at six and twelve months post hip fracture (defined only as fracture requiring surgical repair). One group was offered a multicomponent home-based program (comprising physiotherapy, occupational therapy, and rehabilitation nursing, and environmental modification). The other group was primarily provided with physiotherapy at home. Outcome was measured by administration of a battery of performance-based measures including self-reported capacity in self-care and home-care activities. It was reported that there was no significant difference in outcome for the two groups in either self-care or home management at 6 or 12-month follow-up. The research design added credence to the results reported, although the broad definition of hip fracture would make comparative studies problematic, as does the lack of standard disability measures and broader health measures.

There were comparable outcomes reported between alternative programs in the studies reported by Koch, Widén-Holmqvist, Wottrich et al. (2000) and Tinetti et al. (1999). However, the measures used varied, as did the timing of evaluations. The current study will use validated global health outcome measures, and client-centred measures for between group comparisons for participants in cohorts related to different rehabilitation programs, as well as for age, cognition and diagnosis. General information regarding comparative program costs will be considered in terms of patients' length of stay in a rehabilitation program, as undertaken by Bairstow et al. (1997).

Team Structure

The structure of rehabilitation teams and the type and amount of intervention provided can vary widely (Ballinger, Ashburn, Low, & Roderick, 1999). However, rehabilitation studies often report little detail of team structure, although it may reflect the domains of treatment potentially available to a group of patients being studied. Nevertheless, the presence of team members does not necessarily guarantee that therapy will be provided, as disciplines may be insufficiently resourced to provide an optimum level of treatment (Hanspal et al., 1994).

Beech Ratcliffe, Tilling, and Wolfe (1996) documented wide variation in patterns of care for patients (N = 2,390) accessing inpatient rehabilitation after stroke, across six European countries. The authors reported that the care a patient received was dependent on the practice of the admitting facility, and that the range of care offered suggested that some patients were likely to have received insufficient services while others received more than were required. The indicators for therapy that were extracted from patient records included: an identified site of paralysis as a proxy indicator for physiotherapy or occupational therapy, and a speech or swallowing problem for speech therapy.

Reported results from the Beech et al. (1996) study indicated that by no means all patients needing therapies were provided with them. The report indicated that between 44% and 90% of those needing physiotherapy were provided with it, up to 65% of patients identified as needing occupational therapy received it, while up to 59% of those identified as needing speech therapy received it. In some hospitals no occupational therapy or speech therapy services were provided. The authors contended that wide variation is inevitable given the lack of consensus about the types and patterns of care that are effective in terms of health impact and cost effectiveness. The study highlighted the difficulty in comparative studies, as rehabilitation comprises different services in different settings. In the absence of outcome data related to team composition and therapy provision, however, concepts of optimal treatment team composition cannot be considered.

Baskett, Broad, Reekie, Hocking, and Green (1999) in a randomized controlled trial (RCT) explored the outcome for patients with stroke (*N* = 100). The control group received traditional rehabilitation in a day hospital or outpatient setting; patients attended two or three times per week for five hours per visit. Therapy included two specific and commonly used therapy techniques: the Bobath technique (Bobath, 1978) and Motor Relearning process (Carr & Shepherd, 1987). Members of the experimental group were visited weekly by a physiotherapist or occupational therapist, who set goals and planned an intervention program with the patient. This program focussed on a functional approach and family caregivers were trained to assist patients in their home-based therapy program. Status was evaluated at intake, six weeks, and three months using the Motor Assessment Scale (Carr, Shephard, Nordholm, & Lynne, 1985), Modified Barthel Index (Shah, Vanclay, & Cooper, 1989), Hospital Anxiety and Depression Scale (Zigmond & Smith, 1983), and standardised tests for upper limb strength and dexterity. Carer stress was measured on the General Health Questionnaire-28, (Goldberg & Hillier, 1979). Participants and their carers were interviewed regarding their expectations of rehabilitation, and later regarding their evaluation of its outcome.

Baskett et al. (1999) found that at baseline, six weeks and three months, neurological, physical and activity of daily living levels were similar in both groups. Additionally, there were no significant differences between the groups at three months in regard to anxiety and depression nor caregivers' stress, although levels in both aspects were of clinical concern. Carer satisfaction with the home program was 53 %, but 36 % for the outpatient group. This study offers some support for home-based therapy with the involvement of carers, although the frequency of therapist availability for program monitoring needs to be acknowledged. The authors recognised the possibilities for home-based patients being more involved in selection of a range of activities which are "appropriate to their disability, and suit the emotional and social needs of that person" (p.31). It seems that when this is the case, results are no worse than when traditional therapy is offered and patient and carer satisfaction is higher.

These two studies give some indication of the range of interventions available, and of the differing therapist practices, including the role of therapists in training and enabling roles, and of family members in therapy roles. In contrast to the studies described in relation to the age of rehabilitees by Cifu et al. (1996), the study by Baskett et al. (1999) used a broad scope of outcome evaluation, including emotional and general health outcome and carer stress measures. The current study will also use a range of measures, and the team configuration used will be that considered most appropriate for the varied rehabilitation target group typically admitted.

Timing and Sequencing

Rehabilitation is traditionally offered soon after medical stability is achieved following a precipitating event, such as stroke, trauma or surgery. Rehabilitation instigated at time more distant from this event has received a small but interesting focus in the literature. Widén-Holmqvist et al. (1993) reported increased quality of life for patients with stroke (*N* = 20), who were provided with community-based rehabilitation focusing on leisure activities, one to three years after their strokes. Patients undertook interviews regarding their current abilities, activities undertaken and dependence on others. Results indicated that three quarters of the people had changed their interest and activity patterns since their stroke. While three quarters of the cohort reported some dependence on others, this was not perceived to be problematic. However, three quarters of the participants reported decreased access to community-based leisure activities. In the current study, clients will be asked to identify their own rehabilitation goals, giving them the opportunity to acknowledge the importance of community-based activities on admission to rehabilitation.

Tuel et al. (1992) explored the effect of rehabilitation for patients (*N* = 49) with severe brain injury, instigated after the period when physical improvement is predicted. These patients were readmitted for further rehabilitation more than one year from the date of injury; "the study group was selected to minimise the possibility of spontaneous improvement" (p. 367). Changes in functional skills were recorded on Barthel's Index (BI) (Mahoney & Barthel, 1965), and although little improvement was expected in physical skills, the majority of patients showed improvement in self-care and mobility skills. The authors suggested that although patients with severe head injury are discharged with lower levels of function, they might be capable of significant improvements a long time after the initial rehabilitation admission.

In an Australian study (*N* = 103) by Olver et al. (1996), patients' outcomes were compared at two and five years after a severe traumatic brain injury. A structured questionnaire covering injury severity, functional ability and psychosocial domains was administered. Results indicated that some problems worsened between two and five years after injury: neurological, cognitive and behavioural issues, and employment status. Other areas, such as daily living activities and resumption of recreational pursuits had improved although mobility remained relatively unchanged. The authors acknowledged those patients' readiness for rehabilitation could have varied due to the types of disability and the patients' emerging insight. It was recommended that interventions be offered at the phases of recovery and adjustment when the patient is most ready to engage in rehabilitation. The structured goal-setting process used in the current study may allow patients to identify problem areas from across life domains that are currently meaningful, so that rehabilitation can be focussed on those goals.

Therapy Type

Research has been undertaken to explore the impact of intervention from a health discipline on patient outcomes, as well as the comparative impact of specific strategies as there is a diversity of therapy methods used within health disciplines (Ballinger et al., 1999). Such diversity can make comparative studies difficult, particularly when details of treatment methods may not be reported.

Walker et al. (1999), in a single blind RCT (*N* = 185) investigated the effect of providing occupational therapy to community-based clients, commencing one month after stroke. The intervention group received home-based occupational therapy focusing on independence in personal and instrumental activities of daily living (ADL); the control group received no occupational therapy treatment. Patients were assessed pre and post using a range of motor, disability and handicap measures as well a general health measure: General Health Questionnaire 28 (GHQ 28) (Goldberg & Hiller, 1979), administered at six months after stroke; carers' outcomes were evaluated using the Carergiver Strain Index (Robinson, 1983). The intervention group at review had significantly higher scores on the ADL scale and showed statistically significant progress on the disability and handicap measures; carer strain was reduced significantly. However, significant change was not reported on the GHQ– 28, which indicated that overall health change across all the levels of the ICIDH (impairment, disability and handicap) was not reflected in this measure; it was therefore not considered useful and not included in measurement tools for the current study.

A RCT by Gilbertson et al. (2000) investigated the effect of a brief domiciliary occupational therapy program for patients (*N* = 138) discharged from hospital after stroke. Patients were assessed after a six-week therapy program and again at six months post discharge, using the Nottingham Extended Activities of Daily Living (EADL) Scale (Nouri & Lincoln, 1987) and Barthel's Index (Mahoney & Barthel, 1965). Intervention comprised therapy tailored to address patient identified goals, along with therapist arranged provision of related community services. After six weeks' treatment, the intervention group showed significantly higher scores on both measures, although this had reduced to a non-statistically significant level at the six months follow-up review. The review at six months post discharge therefore indicated a lack of durability in ADL gains.

In a retrospective study, Freburger (1999) explored the outcome for patients with stroke (*N* = 6,342) in relation to physiotherapy provision. The amount of physiotherapy provided was extracted through cost analysis of service types, and outcome was defined by discharge destination. It was reported that increased utilisation of physiotherapy services, provided by either a physiotherapist or physiotherapy assistant, was associated with a greater probability of discharge home and with decreased overall costs for the episode of care. While the absence of a control group makes it difficult to distinguish the treatment effect from the natural course of the condition, the large cohort gave a strong indication of association. However, there was no indication of the basis on which patients were selected for physiotherapy services, or whether patients were receiving other therapies that may have affected the outcome. In the current study, global and subjective health outcome will be measured with the acknowledgement that many health disciplines will have contributed.

Wagenaar et al. (1990) used an alternating treatment design to explore differences in effect of two physiotherapy techniques: Neuro-developmental treatment (Davies, 1985, 1990) and the Brunnstrom method (Brunnstrom, 1970). The study involved seven patients who began treatment five to nine days after stroke onset with each treatment phase lasting five weeks. Functional recovery was tested weekly using Barthel's Index (Mahoney & Barthel, 1965) and the Action Research Arm Test (Lyle, 1981). The authors acknowledged that these two treatment methods had contrasting theoretical bases and different intervention strategies, yet after the full application of intervention phases, no difference in efficacy was reported between the methods.

Neither Wagenaar et al. (1990) or Freburger et al. (1999) conveyed details of other interventions that may have been provided by other health disciplines, although a variety of treatment approaches and evaluation methods was demonstrated in the Walker et al. (1999) and Gilbertson et al. (2000) studies. Nonetheless, in most rehabilitation programs several health disciplines provide treatment of variable or unknown efficacy with these treatments impacting on rehabilitation outcome. In the current study, the overall impact of therapeutic interventions from all disciplines will be described by change on measures related to the relevant levels of the ICIDH, and on client-perceived measures.

Therapy Intensity

The intensity of the rehabilitation provided may have an impact on health outcomes. However, it is difficult to discern rehabilitation intensity in most rehabilitation outcome studies, apart from in those that investigate therapy intensity specifically. Heinemann et al. (1995) studied the effect of therapy intensity, in two groups of rehabilitation inpatients, one with traumatic brain injury (TBI) (*n* =140) and the other with spinal cord injury (SCI) (*n* =106). Intensity was defined as the total hours of therapy provided to the patient divided by number of days the patient was a rehabilitation inpatient (length of stay). Change in status was measured at disability level using the Functional Independence Measure (FIM) (Hamilton et al., 1987). Outcome was not found to be related to therapy intensity from any discipline for the SCI cohort, and only the intensity of input from psychology had any association with functional gain (in cognition) for the TBI cohort. The authors acknowledged that the results could have been influenced by the patients’ natural recovery or by the limitations of the FIM. The results are limited by use of a single measure, which has an acknowledged ceiling effect (Westerkam, Cifu, & Keyser, 1997). Any effect of therapy intensity on more complex activities, or on adjustment, was not reported. In the current study therapy intensity will be calculated using the same method as Heinemann et al. and an analysis of association between therapy intensity and patients’ age, cognitive status, diagnostic group and program format will be undertaken.

In contrast to the Heinemann et al. (1995) study, a meta-analysis of recent controlled studies (nine studies, $N = 1051$) indicated that higher intensities of therapy were associated with a small but statistically significant improvement in ADL function of inpatients after stroke (Kwakkel, Wagenaar, Koelman, Lankhorst, & Koetsier, 1997). However, when the quality of the studies was measured against the Potsdam standards[2] for eta-analyses, methodological problems were reported, with only 3 of the studies achieving 7 out of the 16 recommended methodological criteria and the rest of the studies scoring less. A lack of contrast in the amount of therapy offered between experimental and control groups was a particular problem. Given the likely matching of therapy offered between regional experimental and control groups and the methodological problems, the results would have to be accepted with extreme caution.

Carney et al. (1999) undertook a systematic review investigating the effect of therapy intensity on the outcome of cognitive rehabilitation for people with traumatic brain injury (TBI). The authors found varied definitions of cognition and many different outcome measures being used (91 different measures in 23 studies). They commented that many of the measures used captured specific cognitive skills in a clinical setting but not necessarily a person’s ability to use those skills in everyday activities, and of the 23 studies reviewed, “no studies evaluated the link between cognitive tests and health outcomes” (p. 304). There was therefore no “strong and sufficient evidence” (p. 304)

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[2] In 1994, twenty scientists from nine countries reassessed the status of meta-analyses and systematic reviews of RCTs. An overview of good practice for meta-analyses of observational studies, along with guidelines for the meta-analyses of RCTs, was produced and disseminated (Cook, Sackett, & Spitzer, 1995).

found for the effectiveness of cognitive rehabilitation on health outcomes, regardless of the intensity of therapy offered.

This group of studies again indicates the complexity of rehabilitation, with differences between and within rehabilitation cohorts and variation in strategies used as well as in outcome evaluation. It seems that there is extreme difficulty in assessing specific and global health outcomes in relation to therapy intensity. In this context, therapy intensity will be considered as an element for consideration in the current study, but not as a major factor, given the paucity of available evidence for comparison and the other methodological problems cited.

Customisation and Collaborative Goal-Setting

Rehabilitation that is customised to individual needs and preferences might be referred to in the literature as client-centred or “tailored” (Webb & Glueckauf, 1994, p. 186). Client-centred rehabilitation is reflective of a philosophical stance, which emphasises respect for patient autonomy, and implies the need to understand the patient’s values, especially when negotiating treatment goals. In primary health care, client-centred practice is said to be particularly related to communication and the finding of common ground between clinician and patient when negotiating treatment options (Stewart et al., 2000). These researchers reported that health outcomes were improved, and the process more efficient, when patients perceived that health care planning had been collaborative.

Rehabilitation can be customised at many levels, and can include the provision of rehabilitation therapies in the person’s own environment, collaborative goal setting and treatment planning, and client-based outcome evaluation. Customisation is said to increase patients’ motivation towards their rehabilitation (Meier & Purtilo, 1994). The philosophical statements reflecting a client-centred or customised approach to rehabilitation are often made, but operational statements relevant to the philosophy are not often to be found in the literature. Furthermore, the degree to which an aspect of customisation is implemented into a program is seldom reported, unless customisation is specifically being explored.

Neistadt (1995) did find that while some health professionals (*N* = 269) set goals with patients, almost half had not collaborated effectively enough to ensure the goals were specific enough to use as a basis for collaborative treatment planning. Another study by Northen, Rust, Nelson, and Watts (1995) reported that only 10% of the health professionals (*N* = 30) discussed the possibility of collaboration with their patients. Some studies have considered the impact of aspects of client-centred practice, such as goal identification and goal-related planning.

Client-Centred Goal Identification

Ponte-Allan and Giles (1999) investigated the effect of a client-generated functional goal statement on rehabilitation outcome. The retrospective study involved two groups of patients with stroke (*N* = 46) matched on admission FIM score, age, gender and side of lesion. Medical charts were reviewed to indicate which patients had identified functional independence goals. While there were no statistically significant differences between the groups in their admission FIM scores, there were significant differences on discharge, and those without functional goal statements had significantly longer length of stay.

The potential for those with cognitive impairment to be challenged in generating functional goal statements as well as carrying a poorer prognostic sign associated with cognitive impairment was acknowledged. It was unfortunate that the between groups comparison of subjects did not include the Cognitive FIM scores as this could have provided information on cognitive impairment. The study suggests that the generation of a functional goal statement by patients may be associated with better disability level outcome. The involvement of patients in goal setting is central to client-centred rehabilitation practice (Wade, 1999d), and may be a way to facilitate patient motivation within rehabilitation (Wade, 1999c). The preliminary study by Ponte-Allen and Giles indicated that when patients set functional goals enhanced outcomes might follow.

Client-Centred Therapy Planning

Webb and Glueckauf (1994) randomly assigned 16 patients with traumatic brain injury to two groups; one group had high involvement (HI) in goal-related planning and the other group low involvement (LI). The HI group worked with a therapist to develop goal-orientated therapy tasks and timelines and met with the therapist weekly for one hour to review goal-related progress. The LI group was involved in less intensive and less structured treatment planning. After eight weeks of intervention and after a further 16 week non-intervention period, outcome for both groups was measured using Goal Attainment Scaling (GAS) (Kiresuk & Sherman, 1968). Results indicated that both the HI and LI groups significantly improved on goal-related tasks from pre-testing to post-testing, but that the HI group maintained their progress at two-month review whereas the LI group regressed to the pretesting level.

These two studies (Ponte-Allan & Giles, 1999; Webb & Glueckauf, 1994) suggest that involvement in goal setting and perhaps goal-related planning might affect rehabilitation outcome. It is of interest though that, while goal identification without specifically related rehabilitation focus was associated with a better outcome in the Ponte-Allan and Giles study, the converse was suggested by the results of the Webb and Glueckauf study. In that study, only the group with both goal identification and intensive goal-related planning maintained gains. As details of goal-planning activities during rehabilitation were not reported in the Ponte-Allen study, it is difficult to judge whether or not this occurred. The current study will involve a goal-setting process to identify client-preferred goals, a specific focus on client-identified goals in therapy, and regular feedback to patients regarding goal-related progress.

A small study by McGrath and Adams (1999) explored the association between goal planning and levels of anxiety and distress. The study suggested that involvement in structured goal planning might reduce patients' anxiety, in the short and longer terms, although it was acknowledged that improvement in competence over the period might also have affected patients' anxiety levels. As it can be part of a complex process with many other aspects, any impact of goal planning on rehabilitation outcome may be difficult to identify. In the present study, health change is therefore described over a broad range of parameters, and associations with some major factors reported.

Class 1 Studies on Client-Centred Goal Planning

Wade (1999d) undertook a review of 13 RCT studies, which used "a patient-centred goal-planning approach to rehabilitation" (p. 37). The target groups for these studies were from the acute and rehabilitation sectors and included studies examining the reduction of disability and handicap, as well as studies exploring the management of pathology (for example, diabetic/dietary issues) or impairment (for example, range of movement/muscle strength). The results were generally reported positive change, and are included as Appendix 2. In one of the studies, Kennedy, Walker, and White (1991) undertook observational mapping of patients with spinal cord injury in a 20-bed rehabilitation unit. The authors reported that patients who had spent 60 % of their time disengaged from therapy prior to goal planning reduced this to 46 % of their time, perhaps indicating that involvement in goal planning may increase motivation to engage in therapy.

From the studies reviewed by Wade (1999d) it appears that goal planning may have an impact on rehabilitation outcome, however Wade acknowledged the variation in focus and scope of the studies and the need for further study on the impact of goal planning on rehabilitation outcome. The current study will describe the associations between change on a range of health measures in the context of client-centred team-based rehabilitation. The study will recognise patients' involvement in rehabilitation goal identification, planning related to rehabilitation goals, and evaluation, as aspects of client-centred practice. No attempt will be made to try to separate any associations with the component processes.

Effects on Outcome

Neistadt and Marques (1984) and Neistadt (1987) undertook two early studies (N = 17, N = 4) and assessed outcome after providing occupational therapy tailored to address patient-identified goals. Neistadt (1995), in summarising the outcomes of the research, stated that the patients in the first study had ceased progressing towards goals set by therapists prior to the new approach being implemented. After client-centred intervention, patients demonstrated "statistically and clinically significant gains in their abilities to perform or direct self-care and community living skills" (p. 428). Within this group, 58.8 % of the clients returned to the community and a further 23.5 % were on waiting lists for community placement, although none had community discharge plans when goals had been set by the therapists. In the second study, patients reportedly took more responsibility in directing their own care after undertaking a client-centred program.

Trombly et al. (1998) described the achievement of self-identified functional goals for patients with TBI (*N* =16) who received outpatient occupational therapy services. Patients identified goals related to activities of daily living (ADL) on the Canadian Occupational Performance Measure (COPM) (Law et al., 1994). Status at admission and discharge was measured using the Independent Living Skills Evaluation (Johnson, Vinnicombe, & Merrill, 1980) and the Reintegration to Normal Living Index (RNL) (Wood-Dauphinee & Williams, 1987); goal achievement was measured using Goal Attainment Scaling (GAS) (Kiresuk & Sherman, 1968). Status was reviewed four to eight weeks after discharge. Patients achieved 86.6 % of their goals as reported on the GAS, outcome also included statistically significant improvement on COPM performance scores and RNL scores. Improvements were maintained, although not extended, over the non-treatment period as reported by both participants and significant others, suggesting that improvements were associated with the therapy provided. Although the sample size was relatively small, significance was achieved on each of the measures used, but without a control group attribution could not be assumed.

Each of the studies (Neistadt, 1987; Neistadt & Marques, 1984; Trombly et al., 1998) examined outcome for a small group of patients. Studies point towards a change in focus when patients identify their own therapy goals. Trombly et al. included client goal achievement as part of a broader outcome evaluation. The current study acknowledges the importance of clients identifying their own goals and of measuring progress towards those goals, it also includes the same handicap level measure (RNL) as Trombly et al.

OUTCOME EVALUATION

Admission Practices

Some studies investigate the outcome for people of one diagnostic group admitted for treatment and rehabilitation regardless of the severity of their condition or the presence of other medical conditions. Other studies consider outcome for patients selected for rehabilitation according to varied criteria, for example, severity of the condition, functional status or ability to pay. The outcome trends reported in such studies must therefore be considered in relation to the basis on which patients of a particular diagnostic group are admitted. Admission criteria are often not fully documented within studies, however, making comparisons difficult.

In Copenhagen, patients with stroke (*N* = 1197) were admitted to a neurological unit for acute and rehabilitative care; patients were admitted regardless of stroke severity, age and their condition prior to the stroke. A high proportion of patients diagnosed with stroke was admitted (88%) (Jørgensen et al., 1995, Parts 1 and 2). Severity was measured using the Scandinavian Neurological Stroke Scale (Scandinavian Stroke Study Group, 1985), and ADL outcome was assessed with Barthel's Index (Mahoney & Barthel, 1965) measured at discharge and at six months post discharge. Team-based rehabilitation was initiated on admission to the designated neurological unit with nurses, occupational therapists and physiotherapists using the Bobath technique (Bobath, 1978). Part 1 of the study reported the distribution of stroke severity cohorts: mild - 41%, moderate - 26%, severe -14%, and very severe -19%.

Jørgensen et al. (1995, Part 2) reported outcomes associated with each of the severity-related cohorts. Best ADL function was achieved within 5 weeks for 95% of surviving patients with mild stroke, 9 weeks for 95% of surviving patients with moderate stroke, 16 weeks for 95% of those surviving severe stroke, and 17 weeks for 95% of those surviving very severe strokes. Further exploration of outcomes for available participants in the Copenhagen Study (Pedersen, Jørgensen, Nakayama, Raaschou, & Olsen, 1997) showed that the addition of the Frenchay Activities Index (Holbrook & Skilbeck, 1983), administered six months after rehabilitation discharge, gave a broader description of functional outcome after stroke. The current study will describe changes in global and subjective health measures after client-centred team-based rehabilitation. Follow-up could not be undertaken within existing resources, although it would have added to the study.

Rossi, Forer, and Wiechers (1997) reviewed the progress of 4,440 patients selected for rehabilitation after a (first) stroke. In contrast to practice in the Copenhagen Study, patients were not admitted to a stroke unit, but to an acute hospital and then selected patients were admitted to rehabilitation. The relationship between the commencement of rehabilitation, length of stay and outcome, in terms of disability level and discharge destination was explored. The investigators described three cohorts admitted to rehabilitation. One group (62%) admitted to rehabilitation within 14 days of stroke onset, with a low level of disability and a relatively short length of stay, had a probability of discharge back to the community of 76%. Another group (26%) admitted to rehabilitation within 15-35 days of onset, with a higher level of disability had a probability of return to the community of 65 %. The final group (12%) admitted to rehabilitation 35 days post onset had a probability of discharge to the community of 67%.

Although criteria for rehabilitation admission were not recorded, it seemed that patients who were more severely disabled were transferred to rehabilitation later. However, Rossi et al. (1997) stressed the need to prevent unnecessary complications associated with prolonged acute hospital stay. The authors recommended that patients, who, due to medical complications or stroke severity, cannot benefit early from intensive rehabilitation, be given the opportunity to access less intensive (and less expensive) rehabilitation. This recommendation offers some support to the approach taken in the Copenhagen Stroke Study where all patients had the opportunity to be admitted to a unit with an appropriately intensive rehabilitative approach from the outset.

These studies highlight the importance of patient admission and selection protocols in relation to outcomes described. At the time of the current study, admission practices to a new bed-substitution rehabilitation program (home-based rehabilitation) were being consolidated whereas those for the inpatient rehabilitation program were well established. There was also variation between the two programs in regard to selection for the client-centred process (p. 77). It is acknowledged that these two features may influence the profiles of the two program-related cohorts in the study.

Follow-Up

Long term follow-up studies of patients with severe brain injury have exposed their profound needs for social rehabilitation and emotional support, despite their comparatively good functional improvement. Thomsen (1984, 1992) studied the late psychosocial outcome for 40 patients with very severe head injury (as indicated by a period of post-traumatic amnesia of at least one month). Patients were followed up 10 to 15 years after injury in the first study, and again at 20 years after injury. Results in the first study indicated that although people who sustained very severe head injury exhibited functional improvement, two thirds showed permanent personality and emotional changes and only 7% were employed. The most profound disability reported in both studies was in the psychosocial domain; two thirds of patients had no social contact outside their close family. A more recent, but similar long-term study by Koskinen (1998), reported similar findings with social isolation being reported by patients and high levels of stress reported by relatives.

Niemi, Laaksonen, Kotila, and Waltimo (1988) reviewed 46 patients, aged less than 65 years, four years after stroke. It was reported that 98 % had returned home, 87 % had regained independence in everyday activities and 54 % had returned to work, yet 83 % of the sample reported decreased quality of life. The authors emphasised the need for rehabilitation to address domains associated with quality of life, particularly in terms of support, education, and facilitation of the patients' adjustment to disability.

A study by Harrick et al. (1994) considering outcome for patients ($N = 21$) three years after severe brain injury corroborated the study by Thomsen (1984), reporting improvement in functional status but increased loneliness and depression. Dijkerman, Wood, and Hewer (1996), who considered the outcome at one year for patients with stroke ($N = 57$), reported long-term psychological and cognitive sequelae and a reduced level of activity. Nilsson, Anianssonm, and Grimby (2000) confirmed these long-term problems of stroke survivors ($N = 68$), and also discussed the support needs of families of people who have stroke. A recent Australian study ($N = 119$) by Hodgkinson, Veerabangsa, Drane, & McCluskey (2000) reported that psychosocial disability was the best indicator of likely need for services in the longer term.

An exception to later psychosocial outcome evaluation was found in a study undertaken by Teasell, McRae, and Finestone (2000), who investigated the social factors and associated outcomes for young patients (16-49 years) with stroke ($N = 83$), three months after rehabilitation discharge. At review, only 10 of the 64 patients who were employed or studying at the time of stroke had resumed those activities. Approximately half the patients reported anxiety and one third reported anger/hostility. These results, reported relatively soon after rehabilitation, and indicating a high level of psychosocial stress suggested that psychosocial problems could be identified as early as three months after rehabilitation discharge.

These studies, which evaluated long term outcome for people with neurological disability, indicated improvement in functional abilities but persistent difficulties in the psychosocial domain. These problems, which have been reported regularly since the Thomsen study in 1984, can be identified at least as early as 3 months after discharge from rehabilitation and endure as long as 20 years (limit of study range). Rehabilitation for patients in the psychosocial domain has been regularly recommended in long-term follow-up studies, yet psychosocial status is infrequently explored at rehabilitation discharge or reported as an emphasis of rehabilitation intervention. In the current study, aspects of psychosocial outcome are measured through relevant domains on the Reintegration to Normal Living Index (Wood-Dauphinee & Williams, 1987). The handicap level evaluation can also give an indication of longer-term rehabilitation need that may be addressed through subsequent rehabilitation programs.

Implications of Studies Reviewed

Concerns raised in rehabilitation literature regarding difficulties in measuring outcome were borne out in this literature review. There was often insufficient information reported within studies to gauge the therapy type, intensity and sequencing involved. Details of patient characteristics were often limited, as was information on the availability of post discharge supports. Many different rehabilitation outcome measures were used, and there was also variable practice regarding the timing, scope and quality of evaluation. These factors make it difficult to interpret the results reported as well as to compare outcomes between programs.

Reports varied as to the impact of age on rehabilitation outcome. In this study therefore, age will be treated as an independent variable and its association with change in health measures will be described. While literature related to alternative rehabilitation programs suggested that there was little difference in outcome for patients who were provided with alternative programs, there was variation in the ways such studies were undertaken and little strong evidence for the programs established earlier. In this study, health changes for patients in alternative rehabilitation programs will be reported and compared. Cognitive status will be treated as an independent variable as there is some evidence that cognitive status, particularly on admission, may be predictive of outcome. Many of the studies reviewed explored the outcomes for patients within diagnostic groupings and this practice will be followed for the between-groups comparisons, with diagnosis being treated as an independent variable.

The evidence of association reported between therapy intensity and outcome in the studies reviewed was extremely weak. Length of stay data was sometimes reported in association with the cost of rehabilitation, and at others used along with therapy intensity data and disability level outcome to estimate rehabilitation efficiency. In this study, therapy intensity and length of stay will be treated as intervening variables rather than major factors, and associations between them and the changes in health measures will be described.

Studies that explored rehabilitation team composition and activity reported wide-ranging differences. In this study, the defining element for the team will be its implementation of a client-centred philosophy through a structured client-centred, team-based rehabilitation process. Aspects of this process, such as the number and types of goals set by participants will be described. Initial reports on client-centred practice in rehabilitation suggest that it may be associated with positive health change after rehabilitation. This study will describe changes on health-related measures after client-centred, team-based rehabilitation. Changes in measures of both global health and subjective health will be described.

CHAPTER 4

METHOD

This study describes changes on health measures for patients participating in client-centred, team-based rehabilitation. The developmental work and results of an earlier small pilot study are briefly discussed in this chapter, prior to the presentation of the rationale and methodology for the current study.

Preliminary Development and Pilot Study

Literature relevant to client-centred practice was reviewed before a structured client-centred, goal-planning process was introduced within occupational therapy (OT) in a regional rehabilitation centre. Measures that assisted in goal planning and outcome evaluation were identified and reliability testing was undertaken. The pilot study described the outcome of therapy from a client-centred perspective, and explored the influence of client-centred practice on therapists' attitudes and philosophy in a qualitative framework. Carer strain was also described.

PILOT STUDY

The current investigator undertook the pilot study in collaboration with OT staff. The observational study involved outpatients ($N = 7$) who had sustained neurological impairment; diagnoses included stroke, acquired brain injury and spinal injury. The Reintegration to Normal Living Index (RNL) (Wood-Dauphinee & Williams, 1987) and the Canadian Occupational Performance Measure (COPM) (Law et al., 1991/1994) were used to facilitate goal identification on admission. The RNL also provided data on handicap status and the COPM provided data on patients' self-perceived performance on tasks related to their therapy goals and satisfaction with that performance. The measures were readministered at discharge. Rating on these measures was undertaken with both the treating therapist and an independent therapist assessor to determine interrater reliability. The Carer Strain Index (CSI) (Robinson, 1983) was administered to primary carers at admission and discharge to measure change in carer stress.

Although it was a very small descriptive study, and the data recorded on the COPM was analysed with a non-parametric test (Wilcoxon signed-rank test), analysis showed that the self-rated performance change reported by the patients was statistically significant (p = .035, α = .05). Performance change was significantly associated with satisfaction with goal-related performance change when analysed on the Pearson Product Moment Correlation (r = .922), and strong interrater reliability was reported. While handicap reduced clinically, change did not reach a statistically significant level, nor did the reduction in carer strain as reported on the CSI. These results could not be directly attributed to the client-centred approach as there was no control group, nor randomisation.

Therapists participated in focus groups during the study, and their reports on the experience of using the client-centred process were also recorded in reflective journals. The transcripts from the focus groups and reflective journals were content analysed following the guidelines of Patton (1980). In this qualitative aspect of the study, therapists reported that patients involved in structured goal planning demonstrated commitment to therapy and that some developed improved insight into their individual levels of functioning, which may have been associated with the goal planning and review process. Therapists also reported increased satisfaction with their own practice, and stated that they believed therapy was more relevant and thorough when patients were involved in goal identification in comparison to when intervention was therapist-driven. The goal setting process was seen as part of therapy, facilitating the patient’s engagement and clarifying the purpose of the interventions provided.

The pilot study also highlighted areas requiring attention. Therapists reported that one measure, the CSI, was unnecessary within the goal setting process. Another measure, the (RNL) required modification, as patients’ difficulties associated with communication and nutrition were not canvassed within the measure. The importance of therapist training in the goal-identification process was acknowledged. It was also recognised that patients needed to be orientated to the goal planning process, to facilitate their participation as well as to minimise the likelihood of their expectations being raised unrealistically.

The structured client-centred process initiated in OT and described in the pilot study was seen to have potential merit in quality improvement within the broader rehabilitation program. A multidisciplinary committee was therefore formed to develop the process for use within team-based rehabilitation.

DEVELOPMENT OF THE CLIENT-CENTRED PROCESS WITHIN REHABILITATION

A multidisciplinary implementation committee was established that comprised senior representatives of health disciplines and was chaired by the investigator. Change management was complex as implementation required variation within some firmly established processes and relationships: assessment protocols, case conferencing and care coordination. The tasks undertaken by the committee included development of an implementation plan, modification of the RNL, staff training, and the development of a patient selection process. The structured goal-planning process was introduced in the inpatient rehabilitation program and a process review occurred after thirty patients had been involved. The review comprised focus groups, individual feedback and quality assurance projects. Recommendations for changes made by the rehabilitation team through the review were included as appropriate. The process gradually became consistent across rehabilitation programs (inpatient and home-based) in terms of the measures included and therapy planning, although it differed in client selection protocols.

The differences in patient selection for client-centred goal planning were related to the gradual development of the process within the Inpatient Rehabilitation Program (IRP) and the adoption of the refined process within the more recently instigated Home Rehabilitation Program (HRP). The development of the HRP had been funded by the Department of Human Services as an inpatient bed-substitution program of equal standing to the IRP (Department of Human Services, 1999). The HRP was intended to be similar to the program described by Widén-Holmqvist et al. (1995) as a rehabilitation program provided “as an alternative to sustained rehabilitation in hospital” (p. 43).

On receiving a referral, the rehabilitation team, based on their collective clinical judgement, would decide whether the patient would be rehabilitated in RHP and receive client-centred goal planning, or be rehabilitated in IRP and receive client-centred goal planning only if judged clinically appropriate by the IRP team. Within the IRP, clients were selected for inclusion on the basis of indicators developed through a quality assurance project, whereas all HRP patients were to be included in the client-centred process. The broader rehabilitation team, in consultation with program managers and rehabilitation and allied health managers, had decided the inclusion policies for the programs.

The development of the client-centred process had taken several years, as was the case at the Rivermead Centre in England, where a somewhat similar practice was developed (Davis et al., 1992). Once the process was being used in a consistent manner it was possible to implement a formal research project. It was seen as important to explore the process as collaboratively developed by the rehabilitation staff, since the process as it stood was seen as clinically appropriate.

It was recognised that a randomised-controlled trial would have been the most powerful research design to use to investigate the effectiveness of the client-centred approach. However, random allocation to client-centred, team-based rehabilitation could not have been achieved without changing the selection processes developed by the IRP and HRP teams. The establishment of a control group was not possible on ethical grounds. Two of the measures (RNL and COPM), when used for goal planning, engendered an expectation of a client-centred approach. It was not seen as ethical to set up this expectation in a vulnerable group recently admitted to rehabilitation after a traumatic event, and then not fulfil that expectation. This aspect was emphasised by Sim and Wright (2000). An RCT was therefore not possible.

Furthermore, it would not have been possible to establish a control group within the same facility from those not selected for client-centred, team-based rehabilitation by routine protocols, as the control group would almost certainly been contaminated by the effects of the process development on staff. Jelles et al. (1996) had noted that in situations of organisational change within the same service, the control group and experimental group were likely to influence each other. There was insufficient time and resources to consider a comparison with routine care, at disability and handicap levels, for patients at another facility.

Studies that could have been used to compare global and subjective health change for a varied diagnostic group participating in traditional or expert-driven rehabilitation with the client-centred team-based approach to rehabilitation as used in this study were not identified in the literature. Some small studies exploring client-centred practice were identified, but these were either limited to a single therapy type or a single diagnostic group. With a lack of preliminary evidence, a descriptive study was seen as an appropriate first stage in researching the approach (Malec & Basford, 1996).

It was decided to undertake the observational study, where changes on global and subjective health measures for patients participating in client-centred, team-based rehabilitation could be described. Subgroups within the rehabilitation cohort that were linked to some of the major factors said to impact on rehabilitation (diagnosis, age, cognitive status, program format) would allow exploration of any differential associations between changes on health measures and those factors. Associations with factors related to rehabilitation efficiency (length of stay and therapy intensity) were also to be considered. Aspects of client-centred practice, such as the type and distribution of health goals identified by patients were also to be described, and where possible compared with descriptions in other studies. Finally, given the strong evidence reported for admission disability status being a strong indicator for disability discharge status, this association was to be explored, along with such associations on the other measures.

The relevant health service ethics committee cleared the research proposal, as did the university ethics committee (Ethics clearances attached as Appendix 3). Once both clearances were given, further staff training occurred and data collection commenced.

Research Methodology

RESEARCH FOCUS

The study that follows describes changes on health measures for patients participating in client-centred, team-based rehabilitation. Health change is measured from the perspective of a global definition of health, through disability and handicap level evaluations, and from the perspective of subjects' own health definitions by subjects' self-reports. Associations between health changes and some factors reported to have an impact on rehabilitation outcome are also explored. These factors include each subject's diagnoses, age, cognitive status and the format of the programs to which the subject is admitted. Therapy intensity and subjects' length of stay within rehabilitation are described, along with the number and type of subjective health goals set by subjects.

PROBLEM STATEMENT

Although rehabilitation theory suggests that client-centred practice may be preferred on ethical and efficacy grounds, there have been few studies that explore client-centred rehabilitation. This observational study will describe global and subjective health changes for those participating in client-centred, team-based rehabilitation.

BROAD RESEARCH HYPOTHESES

There will be significant positive change in rehabilitation patients' global health status after participation in client-centred, team-based rehabilitation as demonstrated by reduction in handicap and disability.

There will be significant positive change in rehabilitation patients' subjective health status after participation in client-centred, team-based rehabilitation as demonstrated by progress towards individually identified rehabilitation goals and satisfaction with progress towards those goals.

OPERATIONAL DEFINITIONS

Global health, for this study, is defined as the aspects of the ICIDH measured at handicap level by the Reintegration to Normal Living Index (RNL) (Wood-Dauphinee and Williams, 1987), and at disability level by the Functional Independence Measure (FIM) (Hamilton et al., 1987).

Subjective health for this study is defined by a description of those activities and roles identified as important by individuals. These are the subjects' rehabilitation goals, listed during the structured goal-identification process. Subjective health is measured via the performance and satisfaction domains of the Canadian Occupational Performance Measure (COPM) (Law et al., 1991/1994).

Rehabilitation is defined as a process that is designed to effectively and safely facilitate improvement in the health status of a patient who has sustained illness or injury, and who is medically selected as capable of benefiting from rehabilitation.

Team-based rehabilitation is defined as rehabilitation provided by the group of health professionals thought to be appropriate for the rehabilitation target group, and including allied health professionals (such as physio, speech and occupational therapists, social workers, dietitians, prosthetists and psychologists), and medical and rehabilitation nursing staff. The team is required to provide rehabilitative treatment collaboratively by sharing information and working towards shared rehabilitation goals.

Client-centred rehabilitation is defined as a rehabilitation process in which the patient has the opportunity to set rehabilitation goals through a structured process, has opportunities to understand the options and rationale for treatment, likely outcome and time frames. There is also the opportunity for patients to evaluate rehabilitation outcome from a personally defined health perspective.

Goal planning refers to the aspects of client-centred rehabilitation that include goal identification and negotiation of therapy plans.

Rehabilitation patients include those from the Inpatient Rehabilitation Program (IRP) and the Home Rehabilitation Program (HRP), with neurological or orthopaedic diagnoses, with or without significant cognitive impairment and from across the age groups admitted to rehabilitation.

Age-related cohorts were distributed as follows: one young cohort (< 50 years), and four cohorts for the 51 – 90 year range, each cohort consisting of those in a ten year range.

Significant cognitive impairment is defined as a level of 30 or fewer points on the cognitive component of the FIM.

Diagnosis is defined as neurological or orthopaedic.

Therapy intensity is defined as the average number of hours of allied health input per day received by a subject in individual therapy, calculated by dividing the total therapy time received during a patient’s rehabilitation program by the number of days the patient was in the program. Group therapy, supervised activities and therapist travel time was not to be included in the calculation.

Length of stay (LOS) refers to the total number of days the subjects spends in a rehabilitation program.

STATISTICAL HYPOTHESES

The two overarching research hypotheses are multifaceted, acknowledging the complexity of the health construct and the rehabilitation process. Nonetheless, statistical hypotheses couched in non-directional terms can be extrapolated for each of the research hypotheses. The following hypotheses have been listed as null hypotheses. This list refers only to the main effect of four factors of the analysis; however, the two, three, and four factor interactions will be explored and evaluated.

Null Statistical Hypotheses Relevant to Research Hypothesis 1

Null Hypotheses Related to Change in Handicap

H_o 1. There will be no change in subjects’ level of handicap after team-based rehabilitation as measured on the RNL pre and post intervention.

H_o 2. There will be a no difference in handicap level change between subjects with neurological diagnoses and those with orthopaedic diagnoses, as measured on the RNL pre and post intervention.

H_o 3. There will be no difference in handicap level change between subjects without significant cognitive impairment compared to those with cognitive impairment, as measured on the RNL pre and post intervention.

H_o 4. There will be no difference in handicap level change for those receiving rehabilitation at home compared to those receiving facility-based rehabilitation as measured on the RNL pre and post intervention.

H_o 5. There will be no difference in handicap level change between subjects of different ages as measured on the RNL pre and post intervention.

Null Hypotheses Related to Change in Disability

H_o 6. There will be no change in subjects' level of disability after team-based rehabilitation as measured on the FIM pre and post intervention.

H_o 7. There will be a no difference in disability level change between subjects with neurological diagnoses and those with orthopaedic diagnoses, as measured on the FIM pre and post intervention.

H_o 8. There will be no difference in disability level change between subjects without significant cognitive impairment compared to those with cognitive impairment, as measured on the FIM pre and post intervention.

H_o 9. There will be no difference in disability level change for those receiving rehabilitation at home compared to those receiving facility-based rehabilitation as measured on the FIM pre and post intervention.

H_o 10. There will be no difference in disability level change between subjects of different ages as measured on the FIM pre and post intervention.

Multivariate analyses will allow consideration of other combinations of these variables (diagnosis, cognitive status, rehabilitation format, and age) for both handicap and disability change, and will also be reported.

Null Statistical Hypotheses Relevant to Research Hypothesis 2

Null Hypotheses Relevant to Change in Performance

H_o 11. There will be no change in subjects' level of goal-related performance after team-based rehabilitation as measured on the COPM pre and post intervention.

H_o 12. There will be a no difference in goal-related performance change between subjects with neurological diagnoses and those with orthopaedic diagnoses, as measured on the COPM pre and post intervention.

H_o 13. There will be no difference in goal-related performance change between subjects without significant cognitive impairment compared to those with cognitive impairment, as measured on the COPM pre and post intervention.

H_o 14. There will be no difference in goal-related performance change for those receiving rehabilitation at home compared to those receiving facility-based rehabilitation as measured on the COPM pre and post intervention.

H_o 15. There will be no difference in goal-related performance change between subjects of different ages as measured on the COPM pre and post intervention.

Null Hypotheses Relevant to Change in Satisfaction with Performance

H_o 16. There will be no change subjects' level of satisfaction with goal-related performance after team-based rehabilitation as measured on the COPM pre and post intervention.

H_o 17. There will be a no difference in satisfaction with goal-related performance change between subjects with neurological diagnoses and those with orthopaedic diagnoses, as measured on the COPM pre and post intervention.

H_o 18. There will be no difference in satisfaction with goal-related performance change between subjects without significant cognitive impairment compared to those with cognitive impairment, as measured on the COPM pre and post intervention.

H_o 19. There will be no difference in satisfaction with goal-related performance change for those receiving rehabilitation at home compared to those receiving facility-based rehabilitation as measured on the COPM pre and post intervention.

H_o 20. There will be no difference in satisfaction with goal-related performance change between subjects of different ages as measured on the COPM pre and post intervention.

Multivariate analyses will allow consideration of other combinations of these variables (diagnosis, and cognitive status, rehabilitation format, and age), and goal-related performance change and satisfaction change.

Other Associations to be Considered

H_o 21. There will be no association between change in handicap, disability, goal-related performance and satisfaction with goal-related performance change for subjects.

H_o 22. There will be no association between therapy intensity and change in subjects' handicap, disability, goal-related performance and satisfaction with goal-related performance.

H_o 23. There will be no association between the level of change in handicap, disability, goal-related performance and satisfaction with goal-related performance, and length of stay in rehabilitation.

DELIMITATIONS

The sample was restricted to patients from Ballarat Health Services and to patients from two rehabilitation programs within that service. The results could not therefore be generalised to other rehabilitation populations.

Only those patients selected for the client-centred process by the routine protocols used by the respective clinical teams were included; results could not be generalised on that basis to other rehabilitation cohorts.

The goal planning process was not appropriate within some cultural groups, or in situations where basic health needs were yet to be addressed.

LIMITATIONS

It was not ethically possible to establish a control group; therefore, the absence of a control is a limitation.

It was not possible in the context of agreed selection protocols to implement randomisation, and this was a limitation to the study.

The decision to discharge patients was made by the clinical team, and would possibly be subject to variable pressures, such as rehabilitation waiting lists. A quicker discharge could have affected the degree of change in health status in some instances.

The patients admitted had variable potential to benefit, different health conditions and varying contextual challenges, making the likelihood of these special situations being evident as statistical outliers.

There was no longer-term follow-up of the subjects to test the durability of change in health scores.

Those involved in the research were from a clinical rather than a research team, and this may have affected involvement in the process as demonstrated in varied commitment to data collection.

PURPOSE OF THE STUDY

The purpose of this descriptive study is to explore the theory of client-centred practice within rehabilitation, which holds that involvement of patients in the planning, implementation and evaluation of their program will be associated with positive change in global and subjective health. The study also provides an opportunity to describe associations between health change and some other factors said to impact on rehabilitation, as well as to describe the types of health goals considered important by rehabilitation subjects.

SUBJECTS

Rehabilitation patients participating in this study were from two rehabilitation programs: the Inpatient Rehabilitation Program (IRP) and the Rehabilitation in the Home Program (HRP) designed as a bed-substitution program for IRP, at a provincial rehabilitation service. Patients were typically referred for rehabilitation from either local or metropolitan health services. Clinical indicators for rehabilitation generally include medical stability, potential to benefit from rehabilitation, and safety. The judgement regarding medical stability resided with the specialist physician. The physician, in consultation with the rehabilitation team considered the potential benefit of rehabilitation, in one or other program. Safety issues for patients potentially appropriate for HRP were routinely assessed through a home-visit undertaken with an occupational therapist.

As acknowledged, the two programs had different routine practices for the inclusion of patients in client-centred goal planning, but once selected within either rehabilitation program, patients were approached to request involvement in the study. Patients were given written information about the study (Appendix 4) and those willing to proceed were asked to sign a written consent form (Appendix 4).

STUDY DESIGN

The study is observational, describing changes on global and subjective health measures for patients participating in client-centred, team-based rehabilitation. Global health is measured at handicap level via the Reintegration to Normal Living Index (RNL) (Wood-Dauphinee and Williams, 1987) for handicap, and at disability levels via the Functional Independence Measure (FIM) (Hamilton et al., 1987) for disability.

Subjective health is measured via the Canadian Occupational Performance Measure (COPM) (Law et al., 1991/1994) using the performance and satisfaction domains.

The study also used a between groups design to describe any variation in change scores associated with some factors said to impact on rehabilitation. The subgroups used for multivariate analysis were related to the following:

- diagnosis (neurological or orthopaedic);
- cognition (no/minor cognitive impairment [cognitive FIM score of equal to or above 30], major cognitive impairment [cognitive FIM score of less than 30] (See p. 56);
- age (less than 50, 51-60, 61-70, 71-80, 81-90 years) (See p. 55);
- program (IRP or HRP).

Two other factors related to rehabilitation efficiency as described by Lafferty (1996), one related to the duration of the rehabilitation program (length of stay [LOS]), and the other, to the average therapy time per day (therapy intensity) were explored. Therapy hours attributable to individual therapy, and not including group therapy, supervised activities, or travel time were recorded on a data base that was based on the National Allied Health Casemix Committee guidelines (NAHCC, 2001). Data on therapy intensity for each participant was calculated by dividing total hours of therapy by the number of days spent in a rehabilitation program. It is acknowledged that average therapy hours may have been affected by the relative number of weekend days in any admission, given that individual therapy is seldom provided in the relevant programs on weekends. However, it was seen as within the convention to use this formula following the work of Heinemann et al. (1995).

Two of the measures administered pre rehabilitation intervention promoted the client-centred philosophy and provided structure for the goal identification process: the RNL, which was used to assist in health problem identification, and the COPM, used in health goals identification and in establishing the priority of health goals. These measures established the expectation of a client-centred approach. The two measures also provided some of the change data: the RNL for handicap, and the COPM for subjective health. The Functional Independence Measure (FIM) (Hamilton et al., 1987) had previously been identified by rehabilitation management as the preferred disability measure for both the inpatient and inpatient bed-substitution program, and was used as the disability measure in this study.

After a health professional had administered the RNL, FIM and COPM, and the patients had identified rehabilitation goals, health workers planned and negotiated therapy intervention plans, which were documented along with projected times for goal achievement, on the Goal Planning Tool (GPT) (Mac Phail, 1995). Copies of the measures (RNL, FIM, and COPM) and the GPT are included as Appendix 5.

MATERIALS

Measures used in this study were relevant to global health within the ICIDH framework (handicap and disability levels), and to subjective health status. The goal-planning tool was developed to facilitate the focus of team-based therapy upon subjects’ rehabilitation goals. A description of all materials follows.

Global Health Measures

Handicap Level: The Reintegration to Normal Living Index (RNL)

The RNL, which was developed by Wood-Dauphinee and Williams (1987), is a handicap level measure (Wade, 1992a) and is client-centred (Pollock et al. (1990). It is used to measure self-perceived performance in life roles, and the level of satisfaction with that performance. Keith (1998) had strongly recommended that such an approach be adopted as part of rehabilitation outcome evaluation. The authors of the measure defined reintegration to normal living as “the reorganisation of physical, psychological, and social characteristics of an individual into a harmonious whole so that one can resume well-adjusted living after an incapacitating illness or trauma” (p. 492). This measure is therefore relevant to the understanding of health explored by Clark et al.

(1996) and Stuifbergen et al. (1990), who found people able to experience health through participation in valued activities despite the presence of disability. The original eleven-domain index includes eight daily functioning items and three perceptions of self items, all of which are scored using a 10-centimetre visual analogue scale. The subjects are asked to rate how accurately each descriptive statement describes their own situations, with low ratings indicating that subjects have problems with achieving roles to their satisfaction.

The RNL has been demonstrated to have substantial interrater reliability, excellent internal consistency (Chronbach's $\alpha > 0.9$) and is moderately responsive (Wood-Dauphinee, Opzoomer, Williams, Marchand, & Spitzer, 1988). Construct validity was reported as good when compared with a validated quality of life index (Wood-Dauphinee et al., 1988). Rater agreement is higher between patient and significant other ($r = 0.62$) than between patient and health professional ($r = 0.39$) (Wood-Dauphinee et al., 1988). Given the authors' findings regarding rater agreement, it was decided that when possible a carer or advocate, rather than a health professional, would assist clients who were unable to complete the RNL independently. Use of the RNL has been reported in studies with clients sustaining spinal cord injury (Daverat, Petit, Kermoun, Dartigues, & Barat, 1995), and traumatic brain injury (Trombly et al., 1998).

Limitations in the RNL were identified through the pilot study, in that it did not include communication and nutrition domains (p. 76). Furthermore, the focus of questions at handicap level were thought likely to be difficult for recently disabled inpatients with cognitive impairments, and who had not yet experienced the impact of their disabilities within their own environments. Modifications were made to the RNL after contact with the principal author (S. Wood-Dauphinee, personal communication, September 1, 1998). The measure was extended to include the missing domains with the assistance of the most relevant therapists: speech pathologists and dietitians. As the two additional questions were framed in a similar format to the other eleven questions, it was unlikely that validity and reliability would be affected (M. Reynolds, personal communication, October, 1998).

Prompting statements were added to the RNL to enable inpatients to reflect on their abilities before their illnesses, prior to self-rating their current abilities. These questions were added to give cognitive structure and were never intended to be included in data analysis. The RNL data to be analysed was the same for the IRP and HRP subgroups.

Disability Level: The Functional Independence Measure (FIM)

The FIM (Hamilton et al., 1987) is a functional scale measuring disability (Cohen & Marino, 2000) and burden of care (Granger, 1998). The FIM has been reported to have impairment specific dimensions as well as more generic motor and cognitive sub-scales and an overall disability level scoring capacity (Stineman et al., 1997). The 18 FIM items cover ability in self-care, sphincter control, mobility, locomotion, communication and social cognition, and are scored with an ordinal rank scale, response categories ranging from 1 to 7 for each item. A score of 1 indicates total dependence whereas a score of 7 indicates independence; total scores can therefore range from 18 to 126.

In summarising the measurement characteristics of the FIM, Jette (1997) stated that the FIM has good internal consistency, is responsive to patient change, high interrater reliability and adequate reducibility for aggregate use. Jette also acknowledged that the prediction of patterns of difficulties using the FIM is an indication of its validity and sensitivity. Other aspects of the FIM characteristics have been reported: reliability across settings, raters and patient groups (Ottenbacher, Hsu, Granger, & Fiedler, 1996) and construct validity (Heinemann, Linacre, Wright, Hamilton, & Granger, 1993). In reviewing several disability measures, Cohen and Marino (2000) stated that the FIM has the highest reliability, validity and responsiveness of the commonly used disability measures. Then again, FIM rating is said to be vulnerable to bias, and training and vigilance are required within services using it (Wolfson, Doctor, & Burns, 2000). The measure is subject to ceiling effects, particularly if used with an outpatient population (Hall et al., 2001; Stineman et al., 1996).

The FIM has been used to evaluate outcomes for rehabilitation inpatients (Stineman et al., 1996), and with specific diagnostic groups such as stroke (Hajek et al., 1997; Oczkowski & Barreca, 1993). It has also been used for rehabilitation and follow-up evaluation of patients with spinal cord injury (Müslümano et al., 1997), and to predict length of stay for rehabilitation inpatients (Grimby et al., 1996). Scores have recently been adapted for use in a prospective payment system for inpatient rehabilitation in the

United States (Stineman et al., 1998), as well as for a measure of rehabilitation efficiency (Rossi et al., 1997).

The extensive research carried out using the FIM, as well as its acceptance in the rehabilitation field is said to be a strength (Jette, 1997). In the facility within which the current study was undertaken, the FIM is the disability measure used for the inpatient program (IRP) and the inpatient bed-substitution program (HRP), as the two programs were understood to be of equal standing. As trained staff would be administering the FIM to all patients as part of routine care, it was used as the disability measure in the study.

While some studies have questioned the validity of using the total FIM score (Ravaud, Delcey, & Yelnik, 1999), recent studies have used the total score to demonstrate change in disability status and rehabilitation efficiency (Rossi et al., 1997; Westerkam et al, 1997). Ring, Feder, Schwartz, and Samuels (1997) argued that the summated FIM score "is a simple, practical and efficient measure of function" (p. 630) and that FIM change score can be analysed though an ANOVA as was planned for the current study. While some researchers hold that Rasch analysis should be used in analysis of FIM scores (Velozo, Kielhofner, & Lai, 1999), others express concern about the appropriateness of this (Dickson & Köhler, 1996). The summated FIM score was to be used in this study to measure disability level change as respected opinions vary as to the need for data transformation.

Subjective Health Measures

Canadian Occupational Performance Measure (COPM)

The COPM, developed by Law et al. (1991/1994) is client-centred (Neushaus & Miller, 1995), and can assist in the self-identification and importance rating of individuals' problems or goals in the domains of self-care, productivity and leisure. It is designed as an outcome measure, which can capture self-perceived change in clients' goal-related performance and satisfaction with that performance (Russell, King, Palisano, & Law, 1995). The COPM is administered through a semi-structured interview that covers four basic steps: identification of goals, and then grading of goal-related activities in terms of self-perceived importance, performance, and satisfaction with that performance. While importance, performance, and satisfaction are each rated on a scale of one to ten on admission to rehabilitation, only the performance and satisfaction components are rated at discharge.

Pilot testing had indicated that the measure was easy to use (Law, Polatajko, et al., 1994). However, further exploration by Toomey, Nicholson, and Carswell (1995) indicated that not all therapists found this to be the case. McColl, Patterson, Davies, Doubt, and Law (2000) reported that the COPM is useful as therapists use a semi-structured interview to assist in problem identification. Such structure may have been enhanced in this study through using the RNL prior to the COPM. Further, McColl et al. stated that ease of use was related to the level of therapist training and therapists' adherence to a client-centred philosophy, as well as to therapists' skill in administering the measure at an appropriate time and in a flexible way. Training in use of the COPM was seen as important in this study and was compulsory for staff prior to their involvement in goal-identification with subjects.

The COPM is reported to have construct validity, criterion validity and high clinical utility for community-based clients as well as facility-based patients (McColl et al., 2000). The reliability of the COPM is acceptable for both performance and satisfaction components .80 and .89 (Bosch, cited in McColl et al., 2000). It is reported to be responsive to changes in patient performance (Law, Polatajko, et al., 1994; Wressle, Samuelsson, & Henriksson, 1999). The COPM has been used in mental health settings (Waters, 1995), physical rehabilitation settings (Mew & Fossey, 1996), community settings (Toomey et al., 1995), geriatric and paediatric settings (Law, Polatajko, et al., 1994) and palliative care (Norris, 1999).

Previous studies using the COPM reported significant change on both aspects of the measure (performance and satisfaction with performance) after therapy, but reported greater change in the satisfaction component (Bodiam, 1999). Significant correlations between the performance and satisfaction scores were reported by McColl et al. (1999) [$r = .68$, $p < .01$]; and between performance and satisfaction change scores by Bodiam (1999) [$r = .69$, $p < .01$].

The COPM has been used in this study to assist in the identification of patients' rehabilitation goals at the assessment phase of rehabilitation. Problems identified by patients on the RNL were to be reframed into aspirations and listed on the COPM as subjective health goals. For example, an individual identifying a mobility problem may reframe a health goal as “being able to use a wheelchair safely enough to access my granddaughter’s school to resume reading sessions”. Previous studies reported a range of goals being identified via the COPM. For example, Bodiam (1999) reported that 46% of goals related to productivity and leisure and 54% to self-care for her sample of 17 neurological patients, while McColl et al. (1999), studying 61 community-based patients, reported 54% of their goals to be related to productivity and leisure and 46% related to self-care.

The COPM has been used in this study as an evaluation tool through which the patient self-rates change in performance and satisfaction with performance on goal-related tasks at discharge from rehabilitation. The COPM scores the clients’ self-perceived ability to undertake preferred activities after rehabilitation, indicating a patient’s subjective health status. The COPM reporting format was adapted, with the authors’ permission to suit the needs of the rehabilitation service’s health information requirements.

The Goal Planning Tool (GPT)

The GPT was developed to assist rehabilitation team members plan and document therapy objectives relevant to patients’ health goals, and was also used to structure case review discussions. In this study, the information captured on this tool related to the target activities necessary for the achievement of subjects’ goals, relevant aim dates and designated responsibilities. Hard copies of the goal-planning tool were available for the clients and family members as well as rehabilitation team members, which gave rehabilitation staff and subjects the opportunity to compare progress made with that initially predicted by staff.

Rehabilitation staff had acknowledged that while the patient was best placed to identify rehabilitation goals, the rehabilitation team would use their knowledge and skills to plan the intervention required to assist in the achievement of those goals. Most of the therapy required to address subjects’ goals was shared across several health disciplines, and required collaborative documentation between team members. When other rehabilitation interventions were necessary for the achievement of the subject’s own goals or if interventions were necessary for duty of care, these were listed on the GPT as team goals, and were negotiated with the subject and family.

Information from the Rivermead program (Davis et al., 1992) informed the development of the GPT as did the work of Hammell (1994a; 1994b); more recent work by Randall and McEwan (2000) supported the approach taken. When the use of the GPT was reviewed by staff in a focus group, some staff stated that the tool had particular application for two client groups: orthopaedic clients displaying anxiety regarding their rehabilitation and its likely outcome, and neurological clients displaying difficulty with insight. Additionally, the tool gave staff a structure through which to educate subjects about the likely outcome for challenging goals.

PROCEDURE

Staff Training

Training in the goal-planning process had been compulsory for rehabilitation staff prior to the commencement of the study, and further training was provided for those involved in the data collection. Those staff members were also supplied with a booklet giving background information and step by step guidelines to the data collection process (Appendix 6). The investigator arranged meetings with staff during the data collection period so that there could be opportunities for collaborative problem solving and for anecdotal feedback regarding the process. It was emphasised throughout the study that research was being undertaken in the context of a client-centred philosophy and that involvement in the goal planning process should cease if it became in any way distressing for a patient.

Patients’ Orientation to the Goal Planning Process

Any patient undertaking goal planning was provided with information about the implications of involvement, and staff and patient roles within the process. Staff explained that it might not be possible to assist the patient to achieve all goals identified, but that realistic information about likely goal achievement and timelines would be given.

Consent

Patients were given verbal and written information about the research being undertaken and signed a consent form.

Goal-Identification, Therapy Planning and Outcome Evaluation

Rehabilitation staff facilitated goal-identification and discharge reviews with subjects and consequently collected all the data. While occupational therapists were primarily involved in data collection in the early months of the study, other health disciplines were progressively involved over the one-year period: physiotherapy, speech pathology, prosthetics, and occasionally medical personnel. Therapy planning using the GPT required involvement of all members of a patient’s rehabilitation team to help ensure that rehabilitation interventions were related to patient goals. All patients were assessed at admission and discharge with the FIM as per program protocols (team-based completion within 72 hours of admission and within 24 hours of discharge).

Data Management

Data was stored in a locked metal filing cabinet within the rehabilitation facility, and any electronically stored data could only be accessed via use of the investigator’s password.

Rehabilitation Interventions

Interventions were expected to be related to the subjects’ rehabilitation goals. Staff from health disciplines made decisions about the intensity and sequencing of intervention for patients (regardless of inclusion or exclusion from the study). Discharge from a program was arranged according to team consensus about safety and appropriateness. Intervention relevant to longer-term client-identified rehabilitation goals could be provided through an outpatient program if required.

Illustrative Case Examples

Case 1

A 68-year-old lady who sustained a stroke was admitted to the IRP with a high level of disability (total FIM admission score was 69/126). Many basic skills related to physical function had been affected: ability to transfer in and out of bed, on and off a chair, dress independently, walk. Cognition was reported to be slightly affected (FIM cognitive score was 31/35). The subject identified many handicap level problems on the RNL; these were related to mobility at home, restriction in recreational and social interests and family role. The subject's rehabilitation goals included regaining independence in personal care tasks, recreational tasks and mobility. An important rehabilitation goal for the subject was to return to old-time dancing. Given the severe and likely long-term nature of the subject's physical restrictions, team goals were also identified. These included referral for education and counselling on an individual and family basis. Rehabilitation interventions were provided focusing on all the goals identified, with the subject, physiotherapist, occupational therapist and rehabilitation nurses taking most responsibility within therapies. The tasks to be undertaken and timelines relevant to the six rehabilitation goals identified by the subject were recorded on the GPT, with therapy provided at a mean rate of 2 hours 42 minutes per day over the 50 days of the program.

On discharge from IRP, the subject's disability level had reduced (FIM discharge score 101/126 whereas 69/126 on admission) and self-rated handicap on the RNL had improved from a mean score of 4/10 to 4.7/10, still a high level of handicap. The subject recognised progress towards some self-identified health goals as recorded on the COPM; for example, self-rated performance and satisfaction with performance related to self-care had improved from 2/10 and 1/10 to 6/10 and 8/10 respectively. However, minimal self-rated change was recorded in relation to other important goals, such as resumption of household tasks and dancing. Given the severe remaining health problems recognised by the subject, outpatient therapy was required, focusing on further physical, functional and adjustment issues. The subject had made very reasonable progress when measured on the traditional rehabilitation outcome measure (FIM change 32 points) at discharge from IPR, but her self-evaluation reflected profound issues, including difficulties with fulfilment of family, community and social roles. Despite the rehabilitation still required, the subject reported a relatively large change in satisfaction with performance on goal-related tasks (1.67/10 on admission to 5.83/10 on discharge).

Case 2

A 69-year-old man was admitted to the HRP after an orthopaedic injury. His level of disability was not high and related to difficulty with some transfers and climbing stairs (total FIM score, 105/126; cognitive FIM score 35/35), although self-rated handicap was moderately high (RNL mean score, 5.2/10). The health goals recorded on the

COPM related to mobility within the home environment and associated strength and endurance. The physiotherapist worked with the subject at home providing physical and functional therapy at a mean rate of 32 minutes per day over the 19-day rehabilitation program. At discharge, the subject’s disability had reduced marginally (FIM discharge score 110/126 whereas 105/126 on admission), and handicap had also reduced (RNL mean score of 5.2/10 on admission to 7.3/10 on discharge). The subject recorded positive change in self-rated health associated with the three rehabilitation goals recorded on the COPM, in terms of both his task-related performance and satisfaction with performance: self-rated performance and satisfaction with performance had improved from 4.7/10 and 4.7/10 to 7.3/10 and 7/10 respectively.

The two cases illustrated the difference in rehabilitation focus for different subjects, related to the initial health problem (diagnosis), and in the way in which subjects conceptualised health. Neither age nor cognitive status differed markedly for these two subjects. Case 1 had a neurological diagnosis affecting her ability to undertake preferred complex life roles, whereas the second subject identified narrower health goals related to indoor mobility. For both subjects there were physical safety issues needing to be addressed in rehabilitation, but only for the first subject was there a need for more intensive therapy as well as complex long-term planning, community-based rehabilitation and a focus on adjustment. The satisfaction change scores would not have been easily predicted from the other data but appeared related to subjects’ individual sense of progress. The information from each of the measures used (FIM, RNL and COPM) was important in planning and evaluating the individual programs.

Participants Selected

A total of 54 patients were recruited for the study over one year: 35 from HRP (90% of admissions) and 19 from IRP (8% of admissions). Of those recruited, 25 (46%) had a neurological diagnosis and 29 (54%) orthopaedic. Only 12 (22%) had cognitive impairment, while 42 (78%) were without cognitive impairment. The age-related subgroups were distributed as follows: less than 50 years – 10 (19%); 51–60 years: 2 (4%); 61–70 years: 17 (31%); 71–80 years: 13 (24%); 81–90 years: 12 (22%).

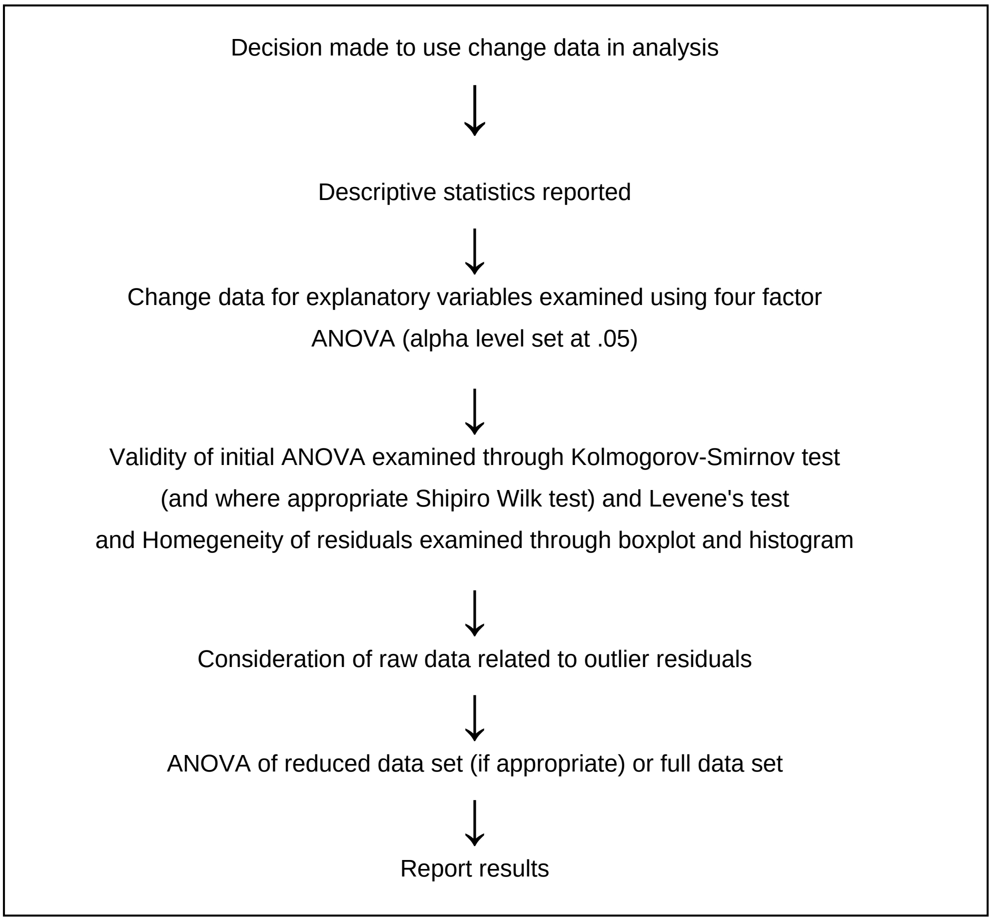
Data Collection

Data was typically collected via the RNL and COPM within one week of the subject consenting to inclusion in the study; FIM data was collected earlier according to routine protocol. Post intervention, data (FIM, RNL and COPM) was collected as close as possible to discharge (usually within several days). In a small number of IRP cases involving subjects requiring major home renovations, extra time was allowed prior to re-administration of the RNL and COPM to provide an opportunity to manage goal-related tasks in their own (modified) environment.

For most subjects, pre and post intervention data was collected in a one-hour session, but for some subjects more than one session was required due to severe communication and/or cognitive difficulties. While all subjects were measured on the FIM, one subject was unable to complete the COPM and 12 subjects were unable to complete the RNL. Advocates were involved where appropriate, although they were not always available to assist. Administration of the RNL was abandoned for some subjects, who found it too confronting and distressing so soon after sustaining disabilities. Of the 54 subjects, 41 completed all measures pre and post intervention. Data was entered into the SPSS package for analysis.

Initial Considerations Regarding Analysis of Data

The data were considered from perspectives of normality of distributions and research hypotheses. Reference was made to theoretical aspects of outcome evaluation and to previous studies reviewed. Change data related to dependent variables was analysed rather than repeated measures analysis of admission and discharge data, because assumptions of normality regarding the distributions of pre and post scores could not be met (nor were there constant variances) despite attempting several data transformations. Flow charts (Figures 6 and 7) were developed as templates for the analyses.



Decision made to use change data in analysis

↓

Descriptive statistics reported

↓

Change data for explanatory variables examined using four factor ANOVA (alpha level set at .05)

↓

Validity of initial ANOVA examined through Kolmogorov-Smirnov test (and where appropriate Shipiro Wilk test) and Levene's test and Homegeneity of residuals examined through boxplot and histogram

↓

Consideration of raw data related to outlier residuals

↓

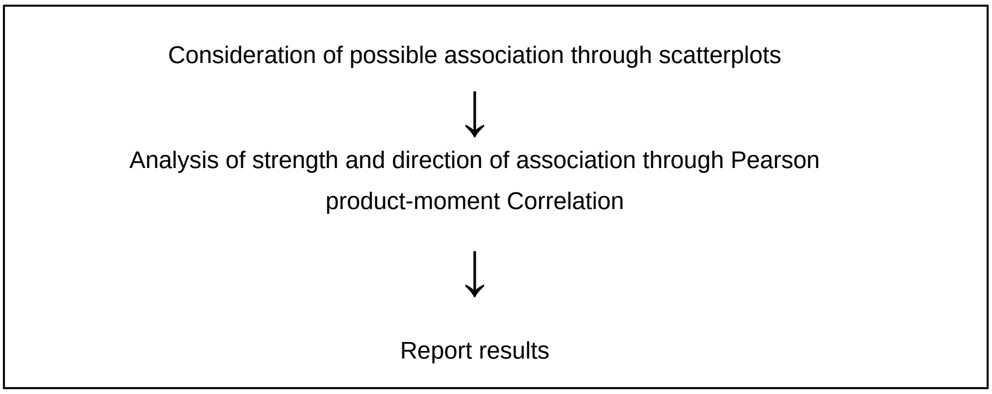
ANOVA of reduced data set (if appropriate) or full data set

↓

Report results

Figure 6

Analysis of Data Related to Each of the Dependent Variables



Consideration of possible association through scatterplots

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Analysis of strength and direction of association through Pearson product-moment Correlation

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Report results

Figure 7

Analysis of Associations Between Changes in the Main Variables

The results of these analyses are reported in the next chapter.

CHAPTER 5

RESULTS

This study describes change on health measures for subjects participating in client-centred, team-based rehabilitation. Data was collected at handicap and disability levels (global perspective) and from subjects' own reports (subjective perspective). Subject selection methods and subject descriptions are first discussed in this chapter. The profiles of subjects within subcohorts are then described, prior to results of the multivariate analyses being reported, firstly focusing on descriptive statistics, then discussed in relation to the statistical hypotheses and the two research hypotheses. Associations between admission status and change on each health measure are reported, and client-centred aspects discussed.

Description of Subjects

SUBJECT SELECTION

To be selected for this study, patients were admitted to an inpatient rehabilitation program (IRP) or home-based, bed-substitution rehabilitation program (HRP) at the regional health service. The clinical team made admission decisions based on their collective clinical judgement, that patients would either be rehabilitated as inpatients and receive client-centred goal planning, if this was judged as clinically appropriate, or be rehabilitated as home rehabilitation patients and receive client-centred goal planning.

Over the one-year of the study 54 subjects were selected for client-centred, team-based rehabilitation and therefore included in the study: 35 from the HRP (90% of all HRP admissions) and 19 from IRP (8% of all admissions). Several subjects from the inpatient program who were initially selected for client-centred, team-based rehabilitation and thus included in the study did not complete the process due to health problems or to a therapist's reluctance to administer post rehabilitation measures. Only one selected patient declined inclusion in the study, but two other patients were excluded. One of these patients had an unstable medical condition leading to rehabilitation program interruptions and another patient's primary diagnosis was psychiatric, making inclusion in the defined diagnostic subgroups problematic.

Some of the 54 subjects were unable to complete all four measures involved in the client-centred process and subsequently in the data collection, although all subjects were rated on the disability measure. One subject was unable to complete the subjective health measure, and twelve subjects either found the handicap measure challenging or the therapist believed it to be overly confronting for the patient and carer. Forty-one subjects completed all four measures.

DISTRIBUTIONS OF SUBJECTS INTO SUBGROUPS

Subjects are first described in relation to subgroups linked to the independent or explanatory variables (diagnosis, cognition, age and program format), as well as interrelated subgroup memberships, for example, diagnostic distributions within programs. Two intervening variables (therapy intensity and length of stay) are also described, prior to the relationships between subgroups and client-centred factors being examined. Descriptions of the independent variables and intervening variables are on p. 87.

Diagnostic Factor Distribution

In the subacute physical rehabilitation service in which the study is based, the patients were divided into two diagnostic subgroups: neurological and orthopaedic. The study cohort was fairly evenly distributed across diagnostic categories: 25 (46%) had neurological diagnoses and 29 (54%) orthopaedic.

Cognitive Factor Distribution

Subjects with cognitive impairment (as reflected by a FIM cognitive score of less than 30) were poorly represented in the sample. Only 12 of the 54 patients (22%) had a cognitive FIM score of less than 30. The high percentage of subjects in the cognitively intact subgroup may have been related to the quality of the cognitive screening, or to the sensitivity of the screening instrument. The cognitive FIM score as a cognitive screen has been given some standing in the absence of in-depth cognitive assessment (Hajek et al., 1997; Heruti et al., 2002). However, it does not have the sensitivity of in-depth cognitive testing.

Age Factor Distribution

Given the age range within the cohort it was considered appropriate to compare health changes for young adults, with those for older subjects (Cifu et al., 1996). The ten-year subgroups for those over 50 years was chosen to allow sufficient range for the likely increase in comorbidities with age (Wilkinson et al., 1997), and to provide information on any possible age-related variations in subjective health goals.

Subjects were distributed in age-related subgroups as follows: > 50 years: 10 subjects (19%); 51-60 years: 2 subjects (4%); 61-70 years: 17 subjects (31%); 71-80 years: 13 subjects (24%); 81-90 years: 12 subjects (22%). The distribution is shown in Figure 8.

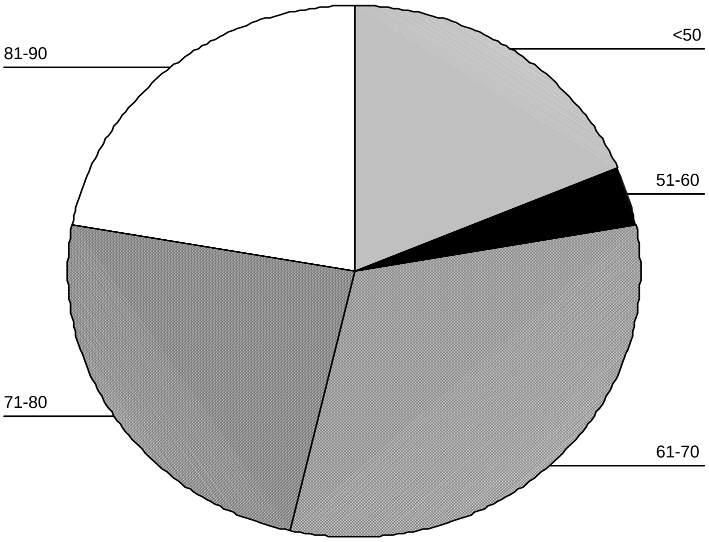

Figure 8
Distribution of Subjects within Age-Group Cohorts

Program Factor Distribution

Of the 54 subjects selected for the study 19 (35%) were from the IRP and 35 (65%) from the HRP. However, the subjects from the IRP represented 8% of admissions to that program for that year, while the 35 HRP subjects represented 90% of admissions.

The large difference in proportional samples from the two programs may have reflected differences in the groups being admitted to each of the programs. HRP was a relatively new program at the time of the study, and data collected as part of this study indicated that there might have been different admission practices being developed for HRP in comparison to those for IRP. Descriptive data indicated that this might be the case, although that was not clear when the research was proposed and the hypotheses written.

Furthermore, the different selection protocols for client-centred, team-based rehabilitation between the programs were likely to have had an impact, with RHP patients being automatically included, and IRP requiring active inclusion into a process seen by some members of the team as time consuming. It may also be likely that the long-term and contextual focus that client-centred goal planning encourages was challenging for clinicians in a facility-based program with high throughput demands.

Interrelationships Between Subgroups

Diagnosis/Cognition

While there was relative balance between the diagnostic subgroups across the whole cohort (46% neurological, 54% orthopaedic), there was, not unexpectedly, a higher representation of neurological subjects than orthopaedic subjects in the cognitive impairment subgroup. Nine (36%) of the 25 neurological subjects were in the cognitive impairment subgroup, compared to 3 (10.3%) of the 29 orthopaedic subjects (Figure 9).

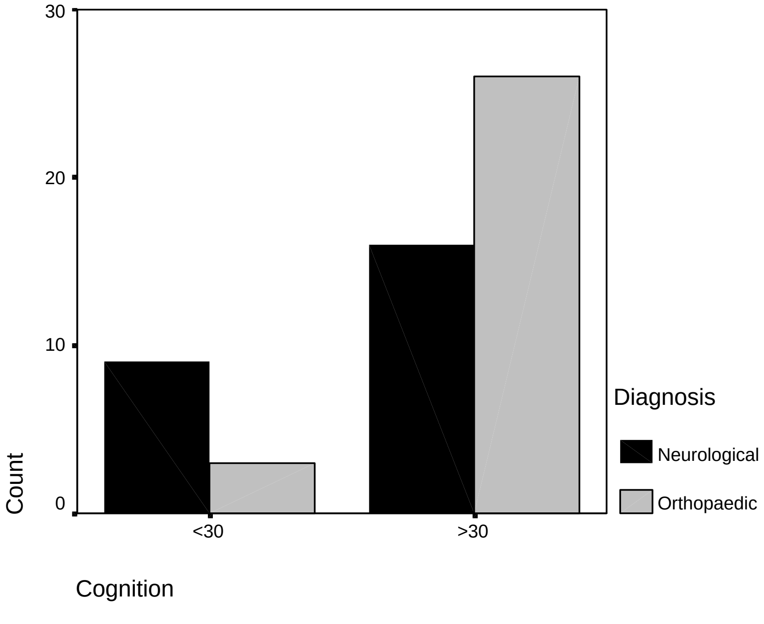

Figure 9

Distribution of Subjects of Different Diagnoses Across Cognitive Cohorts

The uneven distribution of cognitively impaired subjects between diagnostic subgroups is not surprising given that neurological patients admitted to rehabilitation not uncommonly have had a stroke with some resultant cognitive impairment. It is somewhat unexpected, however, that more of the neurological subjects were not reported to be cognitively impaired, and that a relatively higher proportion of the orthopaedic subgroup was not impaired. Given the age distribution of the sample, with 46% of subjects aged between 71 and 90 years old, more subjects might have been expected to demonstrate some cognitive decline.

Diagnosis/Age

Relatively more neurological subjects were in the youngest age cohort, in contrast to the higher proportion of orthopaedic subjects in the three older cohorts (Figure 10). Consideration of the raw data indicated that younger neurological subjects were likely to have had severe neurological damage and subsequent disruption to many aspects of their lives. These subjects identified complex and varied subjective health goals.

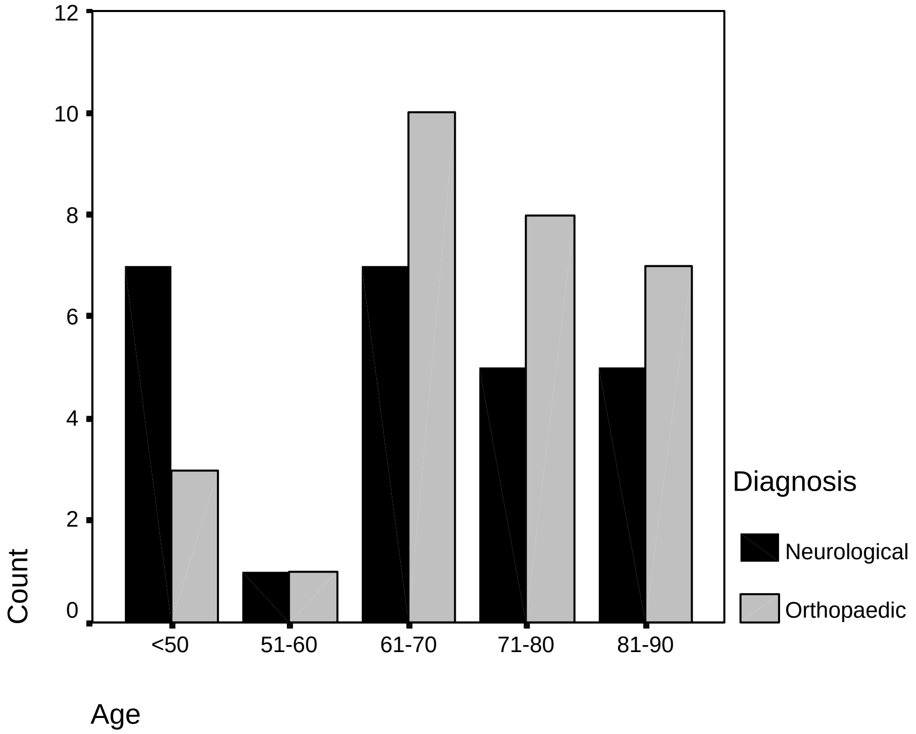

Figure 10

Distribution of Diagnostic Groups Across Age-Related Cohorts

Diagnosis/Program

Orthopaedic subjects were more strongly represented in the HRP: 25 (86%) of the 29 orthopaedic subjects were in HRP and 4 (14%) in IRP, whereas 15 (60%) of the neurological subjects were from IRP and 10 (40%) in HRP, as shown in Figure 11. The orthopaedic bias in the HRP sample (which represented 90% of admissions to that program for the year) may also have been associated with the tendency of some physicians to admit patients with less intensive rehabilitation needs to the HRP. This is reflected in the disability measure (FIM) admission scores: the mean FIM admission scores for the IRP patients in the sample was 81.21 and 106.65 for HRP patients. A higher level of handicap as indicated by the RNL score in the IRP cohort compared to the HRP cohort was reported on the RNL (IRP *M* 63.26, HRP *M* 72.63).

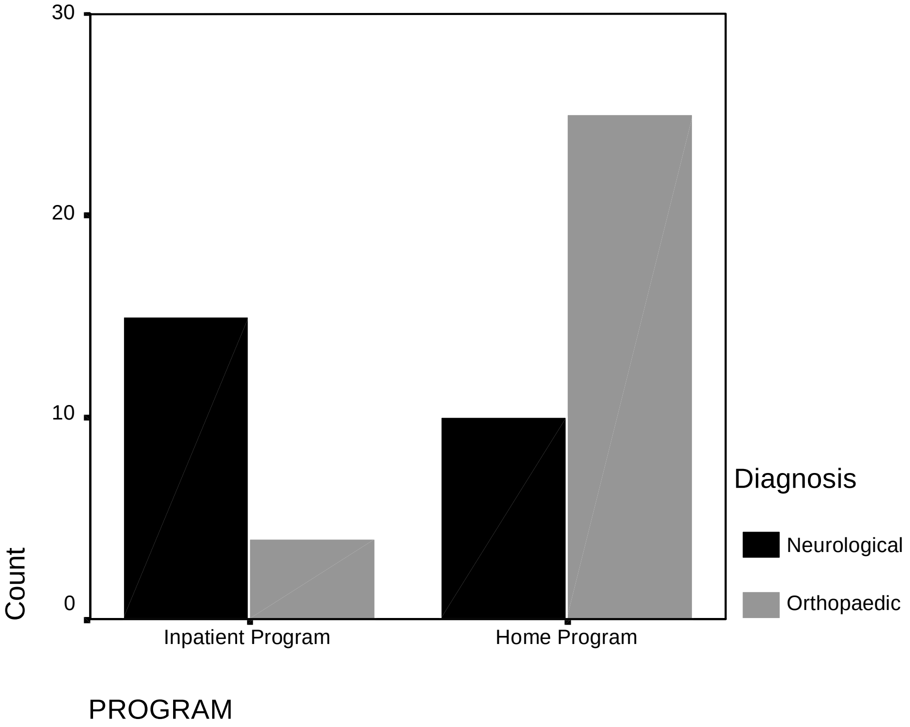

Figure 11

Distribution of Subjects Across Diagnostic and Program Cohorts

Cognition/Age

Those with cognitive impairment were most highly represented in the youngest and oldest cohorts (Figure 12). As noted, the youngest group was found to be inclusive of younger neurological patients, and it is likely that some patients affected by dementia are included in the oldest cohort, along with patients with stroke.

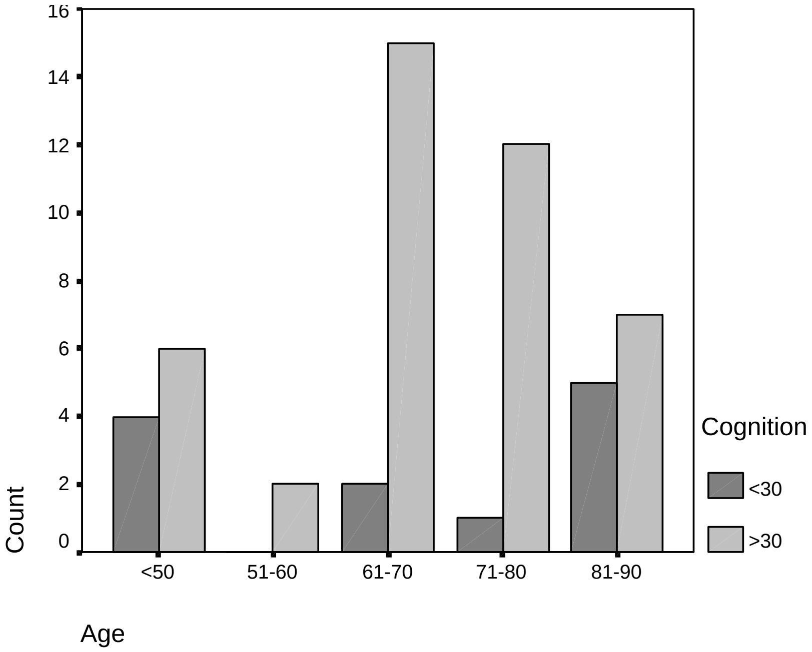

Figure 12
Distribution of Subjects Across Cognition and Age-Related Cohorts

Cognition/Program

There were six subjects with cognitive impairment in each program. Six of the subjects had very low motor FIM scores in addition to low cognitive FIM scores, and five of these subjects were admitted to the IRP.

Program/Age

There was wider variation in group size in age-related subgroups in the HRP compared to the IRP (Figure 13).

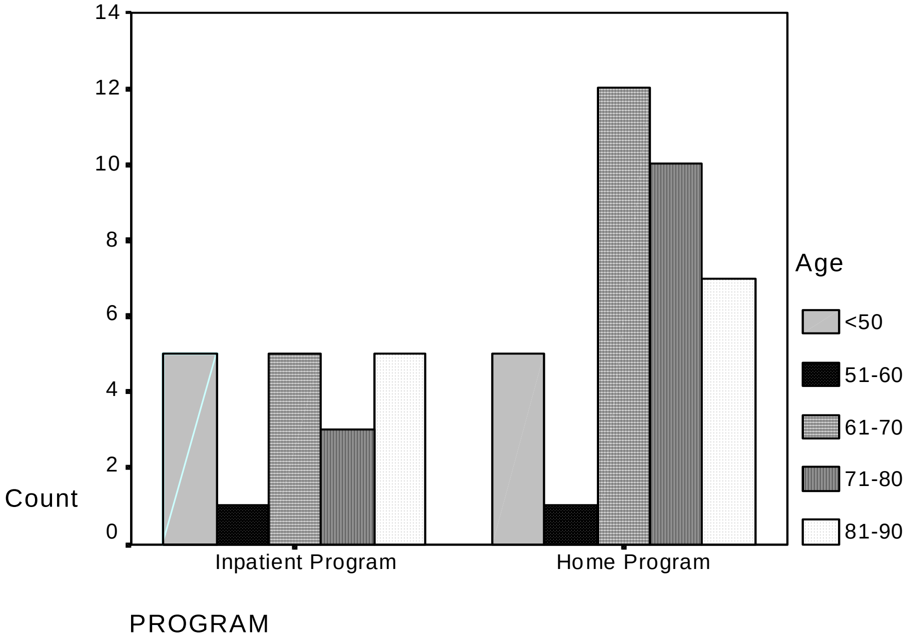

Figure 13
Distribution of Subjects Across Program and Age-Related Cohorts

Sex Distribution

Data was collected, but not analysed, on the distribution of males and females within the programs and diagnostic groups. The distributions appeared skewed due to the relatively greater number of female orthopaedic patients in the sample; these patients were reflected also in the higher number of female HRP patients. Distributions are shown in Tables 9 and 10.

Table 9

Distribution of Males and Females Within Programs

			Sex		
			Female	Male	Total
Program					
	Inpatient Program	Count	10	8	18
		% of Total	18.9	15.1	34.0
	Home Program	Count	23	12	35
		% of Total	43.4	22.6	66.0
Total		Count	33	20	53
		% of Total	62.3	37.7	100.0

Table 10

Distribution of Males and Females Within Diagnostic Groups

			Sex		
			Female	Male	Total
Diagnosis					
	Neurological	Count	14	10	24
		% of Total	26.4	18.9	45.3
	Orthopaedic	Count	19	10	29
		% of Total	35.8	18.9	54.7
Total		Count	33	20	53
		% of Total	62.3	37.7	100.0

ADMISSION STATUS ACROSS COHORTS

Diagnosis/Admission Status

Neurological subjects had a higher level of disability, as reported on the FIM (*M* = 87.42 [SD 23.49]) compared to orthopaedic subjects (*M* = 106.83 [SD 9.32]. Handicap was also higher for neurological subjects as reported on the RNL (*M* = 60.83 [SD 17.87]) than for orthopaedic subjects (*M* = 76.27 [SD 13.33]). The range in disability admission scores is broader for neurological subjects than for orthopaedic (Figure 14);

the range for handicap scores was more similar although the orthopaedic subjects mean handicap score was higher than that of neurological subjects (Figure 15).

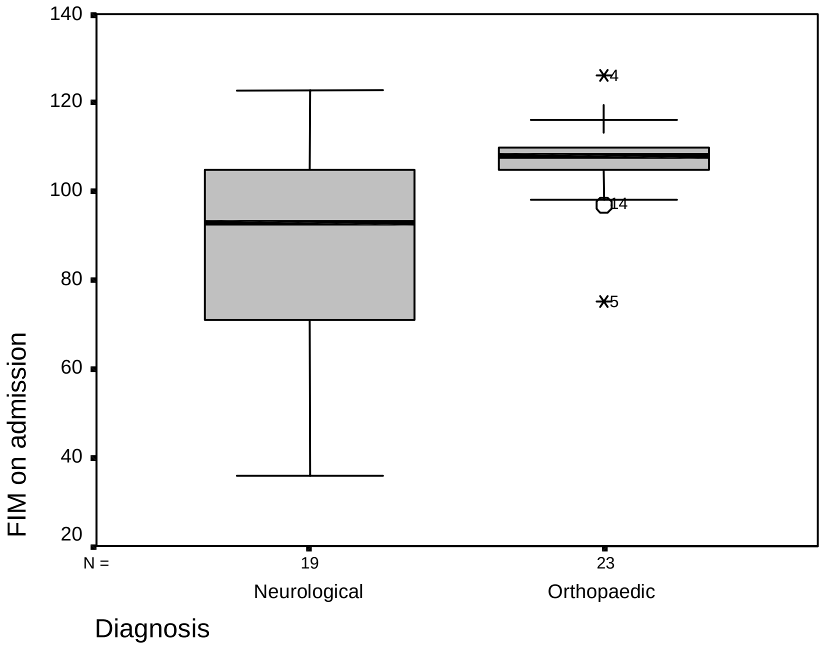

Figure 14

Range of Disability Admission Scores Within Diagnostic Cohorts

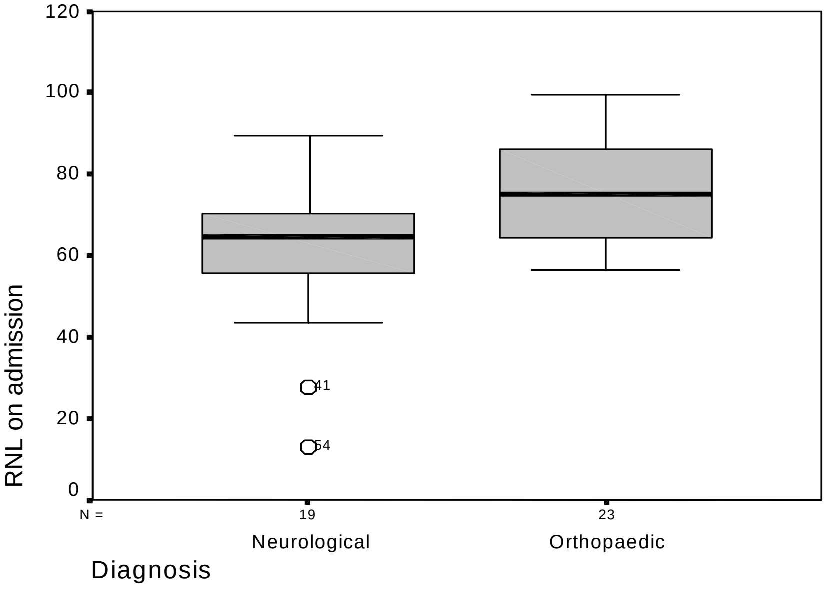

Figure 15

Range of Handicap Admission Scores Across Diagnostic Cohorts

Cognition/Admission Status

Those selected for the study who were cognitively impaired had higher levels of disability and handicap on admission (Table 11).

Table 11

Mean Disability and Handicap Admission Scores According to Cognition

COGNITION		FIM ON ADMISSION	RNL ON ADMISSION
<30	Mean	83.33	59.6923
	N	12	10
	Std. Deviation	23.85	19.4786
>30	Mean	101.81	72.2837
	N	42	32
	Std. Deviation	14.69	15.5776
Total	Mean	97.70	69.2857
	N	54	42
	Std. Deviation	18.58	17.2111

Age and Admission Status

The level of disability as indicated by the mean admission FIM score was fairly evenly distributed across age cohorts except for the oldest group (81–90 years). The level of handicap indicated by the RNL scores on admission indicated a gradual increase in handicap with age in the four older cohorts (Table 12), giving an indication of the broader range of subjective health goals likely in the older subgroups as problem areas increase. The boxplot (Figure 16) shows a wide range of FIM scores represented in the oldest cohort, though the range in RNL scores for that cohort is less marked (Figure 17).

Table 12

Distribution of Disability and Handicap Admission Scores for Age-Related Groups

AGE		FIM ON ADMISSION	RNL ON ADMISSION
<50	Mean	104.83	71.8590
	Std. Deviation	18.69	9.4318
51–60	Mean	100.00	82.3077
	Std. Deviation	8.49	10.3346
61–70	Mean	101.43	71.3736
	Std. Deviation	14.37	15.2954
71–80	Mean	103.09	68.1818
	Std. Deviation	13.82	13.3502
81–90	Mean	81.67	62.7778
	Std. Deviation	27.85	27.2384

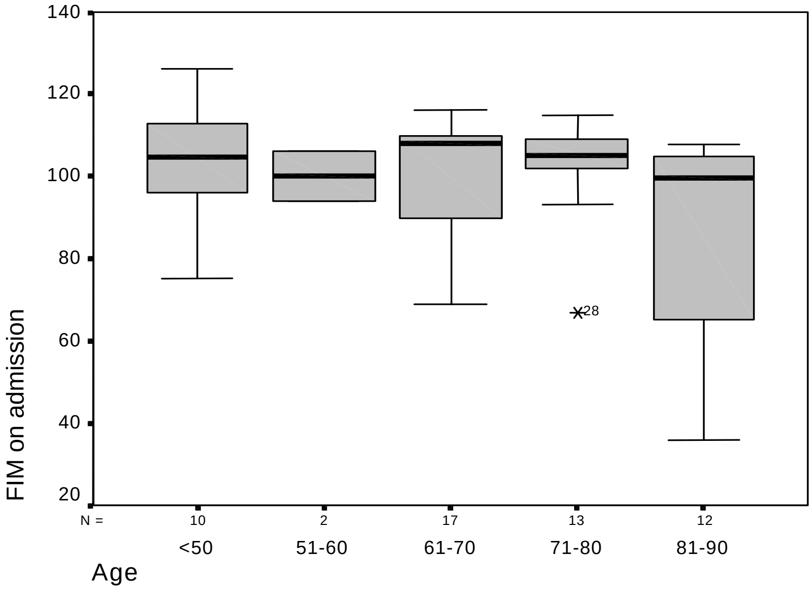

Figure 16

Range of Disability Admission Scores Within Age-Related Cohorts

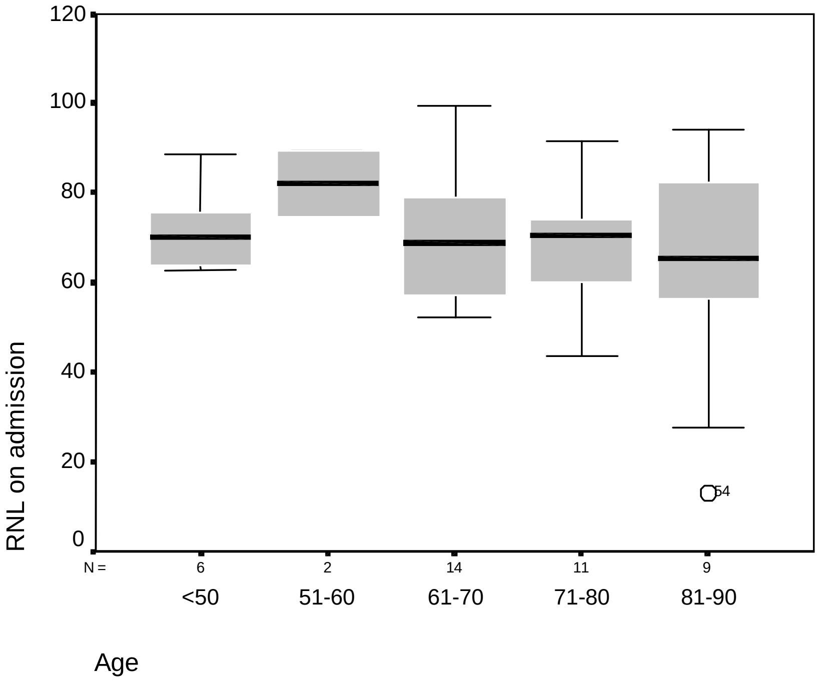

Figure 17
Range of Handicap Admission Scores Within Age-Related Cohorts

Program/ Admission Status

Those selected from the IRP had a higher level of disability as measured on the FIM (M = 81.21 [21.89) compared to those selected from HRP (M = 106.66 [SD 7.06]). Handicap was also higher on admission for those in IRP on the RNL (M = 63.26 [20.72] compared to HRP (M = 72.64 [14.26]).

INTERVENING FACTORS

Patients admitted to subacute rehabilitation (IRP or HRP) are those thought to be ready and with the potential to benefit according to the clinical judgement of the rehabilitation team. In order to be discharged, patients were collectively judged to have no further potential to benefit from rehabilitation at the level provided in IRP or HRP, but perhaps ready for a community-based program or even a more acute program. As individuals move through rehabilitation phases according to their clinical support need (including safety), their potential to benefit, and their social supports, discharge from a rehabilitation program may not have been only linked to functional status.

The resource required to progress each patient from entry to exit is reflected in patient-attributable hours (total therapy hours) over the length of stay (number of days spent in a program). The average daily resource requirement (average therapy hours per day) is a measure of therapy intensity (more hours of therapy = higher intensity), and program efficiency (more hours of therapy over a longer stay = lower efficiency). The meaning derived from length of stay and therapy intensity resource quantities in any one program is limited if that is the only efficiency data reported for an episode of care. Additionally, the quality and reliability of the therapy intensity data would not have been considered adequate to be included in multivariate analysis had this been appropriate. Therefore, descriptive information follows, and associations are summarised in Table 15 (p.118).

Descriptive statistics are reported for therapy intensity and length of stay data, prior to any significant associations between these variables and major factors being discussed.

Therapy Intensity: Diagnosis

There was variation in therapy intensity provided across diagnostic groups (M =1.89 hours [SD .79] for neurological subjects, M =1.03 hours [SD .66] for orthopaedic subjects). However, there was a wide variation in therapy intensity among neurological patients, and the lower average intensity for orthopaedic subjects was exaggerated upwards by three subjects who received a very high therapy intensity.

Therapy Intensity: Cognition

Those with cognitive impairment were provided with higher therapy intensity (M 1.92 hours [SD .79]) compared to subjects without (M 1.29 hours [.80]).

Therapy Intensity: Age

The highest average therapy intensity was provided to the youngest cohort (M = 1.6 hours [SD .89]); the oldest cohort received a wide range of therapy intensity but at a lower average daily provision (M = 1.49 hours [SD 1.00]). Details of therapy intensity across age-related cohorts are in Table 13.

Table 13

Mean Therapy Intensity (Hours) for Age-Related Cohorts

AGE		HOURS
<50	Mean	1.6110
	Std. Deviation	.8874
51–60	Mean	1.2000
	Std. Deviation	.5515
61–70	Mean	1.4494
	Std. Deviation	.7471
71–80	Mean	1.2562
	Std. Deviation	.8380
81–90	Mean	1.4842
	Std. Deviation	1.0030

Therapy Intensity: Programs

Trends were apparent with therapy intensity across the subgroups, with higher intensity of therapy being associated with IPR (*M* 2.14 hours per day [SD .80]) compared to HRP (*M* 1.04 hours per day [SD .60]). IRP skewed to higher intensity levels, while RHP had a more normal distribution. Probably a ceiling with maximal therapy intensity modified by resource capacity.

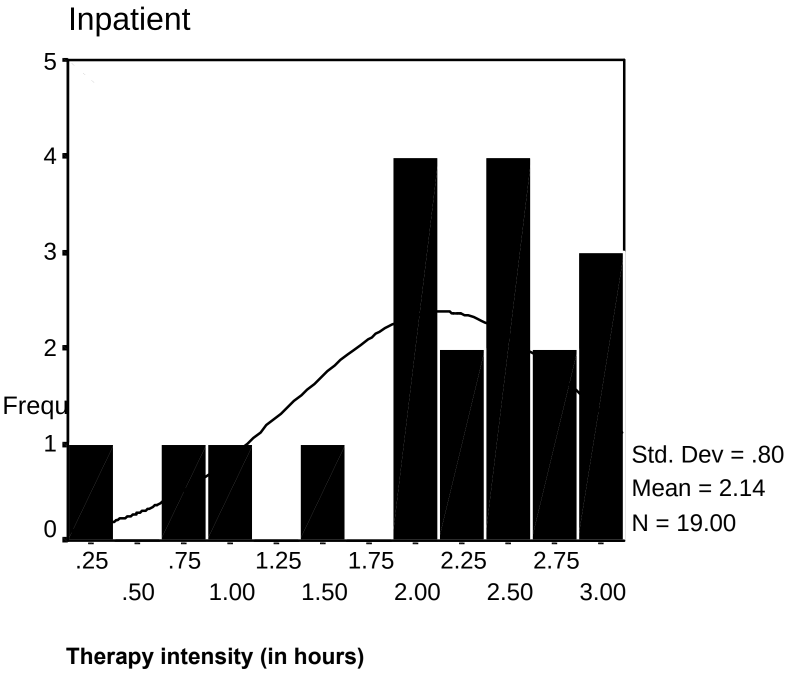

Figure 18

Therapy Intensity (Hours) Within IRP

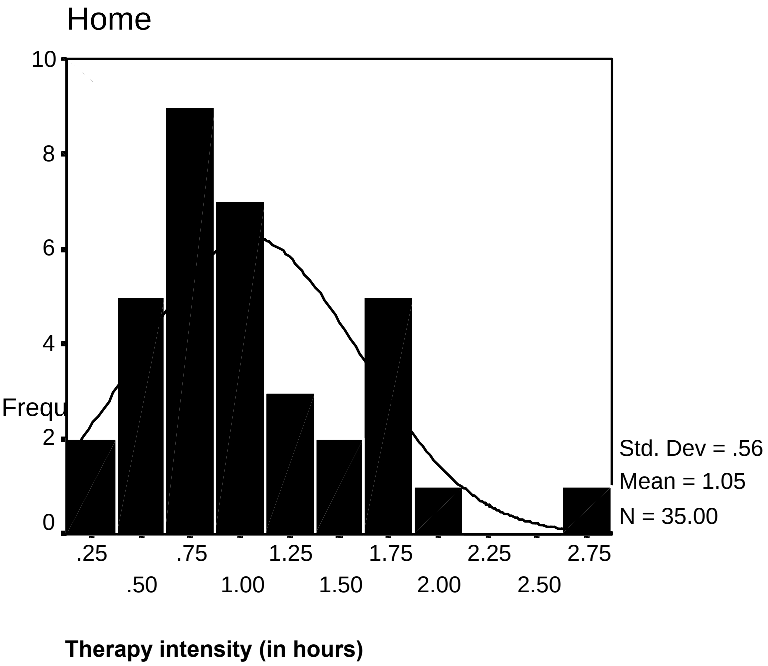

Figure 19

Therapy Intensity (Hours) Within HRP

Therapy Intensity: Associations

Scatterplots relevant to possible associations between therapy intensity and the dependent variables were examined. Where association appeared likely, the data was analysed using the Pearson Product Moment Correlation. There was a significant association between disability change and therapy intensity (*r* = .574**, *p* = <.0005). There was a very weak negative correlation between therapy intensity and change in satisfaction with performance (*r* = -.272*, *p* = .049). See results in Appendix 7.

Length of Stay: Diagnosis

Longer programs were associated with neurological diagnoses (*M* 36.60 days [SD 4.05]), compared to orthopaedic (*M* 24.79 days [SD 3.40).

Length of Stay: Cognition

There appeared to be a striking difference in LOS between subjects with different cognitive status: subjects with normal cognition (*M* 25.71 days [SD 2.07]), subjects with reduced cognition (*M* 46.17 days [SD 9.36).

Length of Stay: Age

There was variation in length of stay across the cohorts (Table 14) and a wide range of variation in the youngest and oldest cohorts (Figure 20).

Table 14
Average Length of Stay (Days) for Age-Related Cohorts

AGE		DAYS
<50	Mean	37.5000
	Standard Deviation	29.6245
51–60	Mean	32.5000
	Standard Deviation	4.9497
61–70	Mean	27.7647
	Standard Deviation	13.5025
71–80	Mean	23.5385
	Standard Deviation	11.3477
81–90	Mean	34.6667
	Standard Deviation	28.5604

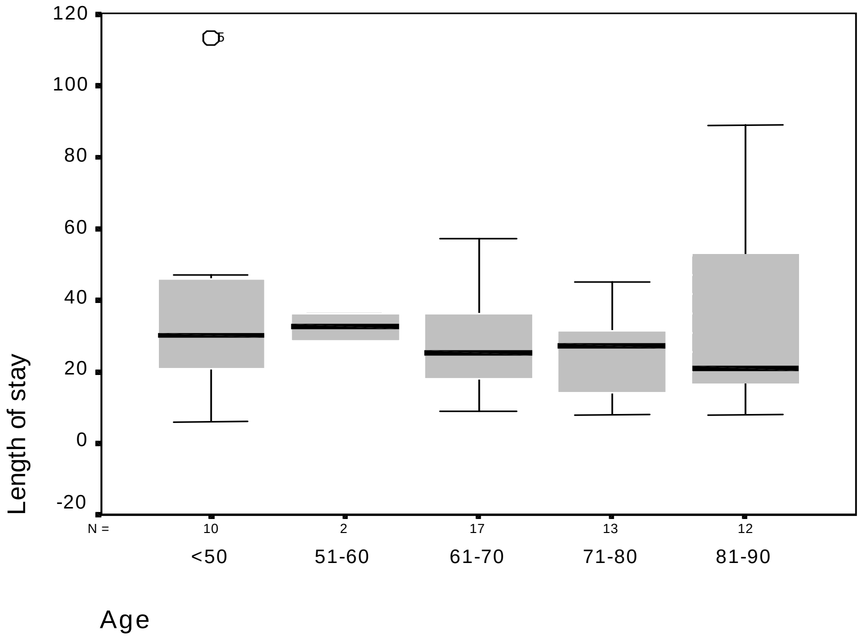

Figure 20

Range of Length of Stay (Days) for Age-Related Cohorts

Length of Stay: Program

Examination of length of stay data and plots indicated that subjects remained longer in the IPR (*M* 44.39 days [SD 6.05] than HRP (*M* 22.60 days [SD 1.94]).

Length of Stay: Associations

Length of stay and disability change and length of stay and handicap change varied significantly and positively, indicating that patients who stayed longer improved more both in terms of handicap (*r* = .305*, *p* = .050) and disability (*r* = .651**, *p* = <.0005). Results are in Appendix 7.

Table 15

Descriptive Statistics Relevant to Therapy Intensity, Length of Stay and Major Factors

MAJOR FACTOR	MEAN THERAPY INTENSITY (HOURS)	STANDARD DEVIATION (HOURS)	MEAN LENGTH OF STAY (DAYS)	STANDARD DEVIATION (DAYS)
Diagnosis				
Neurological	1.89	.79	36.60	4.05
Orthopaedic	1.03	.66	24.79	3.40
Cognition				
Normal	1.29	.80	25.71	2.07
Impaired	1.92	.79	46.17	9.36
Age				
< 50 years	1.61	.89	37.50	29.62
51-60	1.20	.55	32.50	4.95
61-70	1.45	.75	27.76	13.50
71-80	1.26	.84	23.54	11.35
81-90	1.48	1.00	34.67	28.56
Rehabilitation Program				
Inpatient	2.14	.80	44.39	6.05
Home	1.04	.60	22.60	1.94

CLIENT-CENTRED ASPECTS

Feedback from Staff

As noted in Chapter 4 (p. 94), feedback was sought from rehabilitation staff during training and progress meetings during the study. The themes from staff feedback follow.

- There were opportunities within the goal planning process to orientate patients to the participatory nature of rehabilitation.
- It can require more skill to assist patients to identify their own health goals than to set goals for them, as suggested by Law et al. (1990).
- The structure within the goal planning process was beneficial.
- Handicap level assessment on admission can indicate patients' preferred premorbid activities, and suggest their subjective health definitions.

- Handicap level assessment on discharge can provide information on unmet rehabilitation needs.
- Subjective health goals were kept in focus through use of the GPT in case reviews.
- Some rehabilitation patients appeared to gain insight during rehabilitation programs, with more accurate self-rating being apparent to therapists.

Number of Goals Set by Subjects

Subjects varied in the number of rehabilitation goals that they identified (range 1 -10). A total of 258 rehabilitation goals were identified by the cohort (*n* = 53). The majority of subjects identified between three and six goals (Median 4.5 [3, 6]). The range of goals identified is shown in Figure 21.

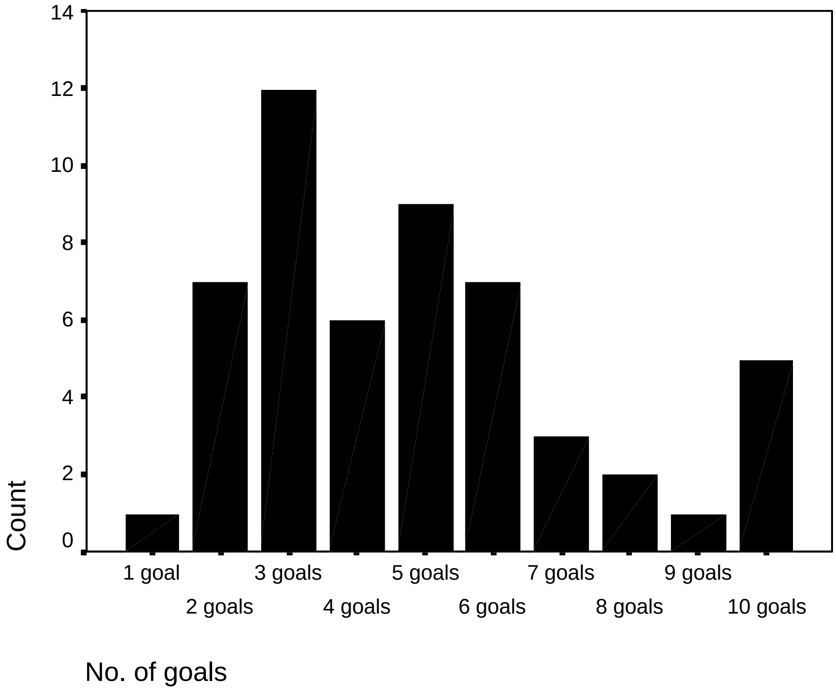

Figure 21

Range in the Number of Goals Set by Subjects

Number of Subjective Health Goals Identified by Patients Across Cohorts

Participants with neurological diagnoses set more subjective health goals on average than those with orthopaedic diagnoses, and those with cognitive impairment set more goals than those without. The average number of goals set decreased with age, and more goals were set by participants admitted to IRP than HRP. The mean number of goals identified by subjects in different cohorts is summarised in Table 16.

TABLE 16

Number of Subjective Health Goals Identified Across Cohorts

MAJOR FACTOR	MEAN NO. OF GOALS	STD. DEVIATION
Diagnosis		
Neurological	5.28	3.00
Orthopaedic	3.34	1.93
Cognition		
Impaired	5.00	3.01
Normal	4.71	2.38
Age		
< 50 years	6.60	2.72
51–60 years	5.50	3.54
61–70 years	5.00	2.62
71–80 years	4.70	1.75
81–90 years	2.92	1.68
Rehabilitation Program		
Inpatient	5.63	3.11
Home	4.31	2.01

Types of Goals Set by Subjects

Subjects varied in the types of goals they identified. Only six subjects (11.3 %) set goals related only to impairment or disability, 39 subjects (73.6 %) set disability and handicap goals, and 8 (15.1 %) set goals relating only to handicap. McColl et al. (2000) and Bodiam (1999) reported the types of therapy-related goals identified by patients via the

COPM; goals could be grouped into two categories: self-care goals and productivity/recreational goals. Goals identified by participants in this study can be similarly grouped and the comparative distributions are tabled (Table 17).

Table 17

Distribution of Goals According to Type from Recent Studies

STUDY	GOALS RELATED TO SELF-CARE	GOALS RELATED TO PRODUCTIVITY OR RECREATION
Chan and Lee (1997)	56%	44%
Bodiam (1999)	54%	46%
McColl et al. (2000)	46%	54%
Current study	42%	58%

The grouping of goals using ICIDH categories (impairment, disability and handicap) or by simple activity (self-care) and complex activity groupings (productivity/recreation) highlights the range of goals set by patients. It is apparent from the studies cited that broad-based measurement would be required if outcome evaluation is to capture the domains identified as important by patients.

Therapy Intensity Related to Rehabilitation Goals

Those subjects identifying more rehabilitation goals appeared to receive relatively higher therapy intensity. A weak but significant association was reported after a Pearson product-moment correlation ($r = .377^{**}$, $p = .005$).

Changes in Scores on Health Measures

The four outcome measures were related to four dependent variables: the Reintegration to Normal Living Index (RNL), measuring handicap; the Functional Independence Measure (FIM), measuring disability; the Canadian Occupational Performance Measure (COPM), measuring two aspects of subjective health.

Results are first reported in relation to the four dependent variables: two associated with global health (handicap and disability), and two associated with subjective health (performance on goal-related tasks and satisfaction with performance). Results of analyses of association between changes in dependent variables are reported along with analyses of association between admission status and health change.

Change data from each of the measures were examined using a four factor ANOVA: the factors relating to subjects' diagnosis, cognitive status, age and program membership. The alpha level was set at .05, except when there was a need to establish a more conservative alpha level as occurred when the Levene's test of homogeneity of variance was highly significant. The strength of association or effect size, which Tabachnick and Fidell (1996) describe as "the amount of total variance in the dependent variable that is predictable from knowledge of the levels of the independent variable" (p. 53) was reported as the eta squared (η^2) score. The strength of effect was reported as indicated by Cohen (1988).

The validity of each ANOVA was examined by analysis of normality, through the Kolmogorov-Smirnov (and where appropriate Shapiro-Wilks) Test and Levene's Test. Homogeneity of the residuals was examined through consideration of boxplots and histograms. Consideration was then given to the appropriateness of using the full data set. This process is summarised in the flow chart (Figure 22).

Full results of each ANOVA analysis, including Levene's test and normality and homogeneity plots are included as Appendix 7.

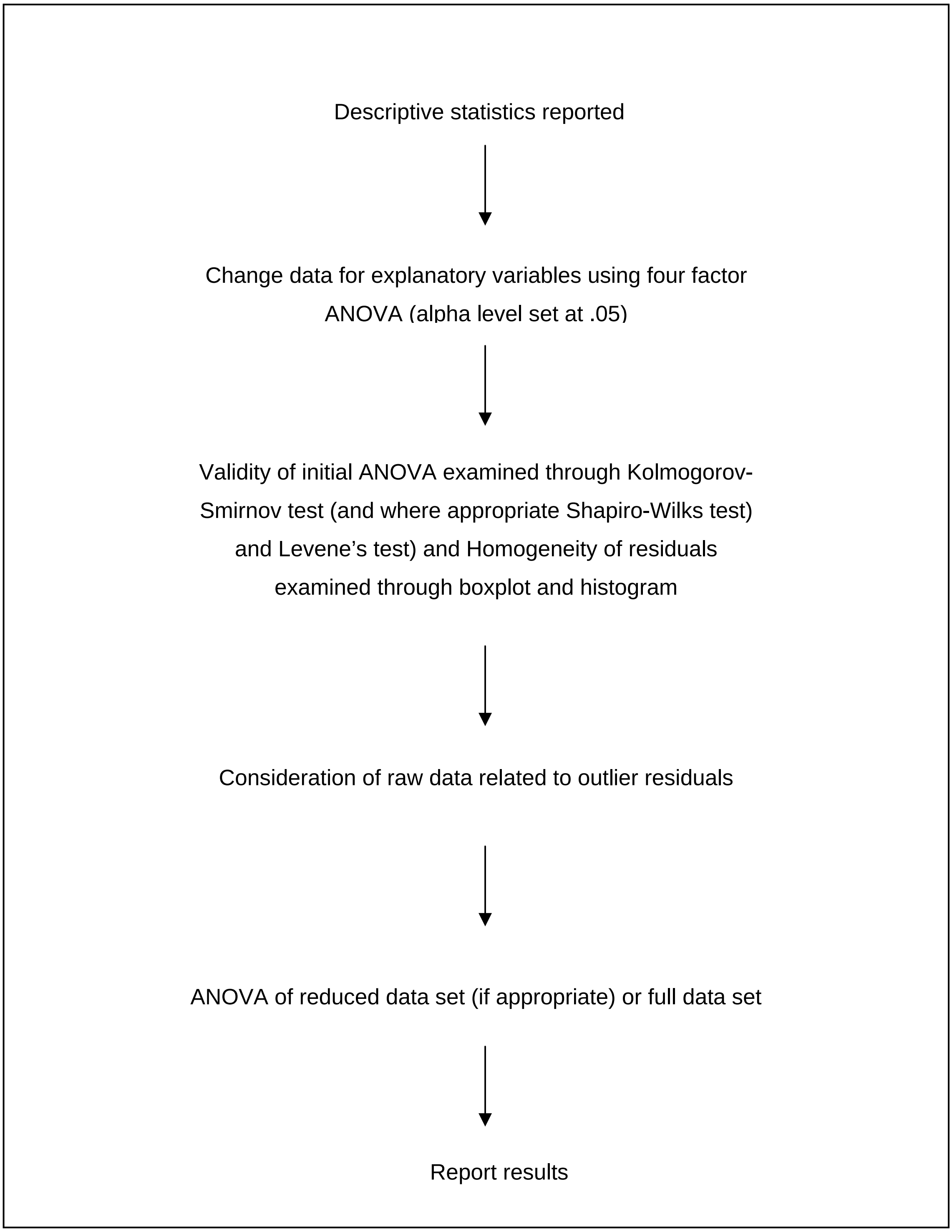

Figure 22

Flow Chart for Data Analysis

GLOBAL HEALTH

The global health measures used in this study relate to the two levels of the International Classification of Impairments Disabilities and Handicaps (ICIDH) most relevant to rehabilitation intervention (handicap and disability).

Handicap Level

The descriptive statistics (Table 18) showed a positive trend between admission and discharge (possible range 0–130), although the range of scores on admission was wide. This is less apparent when the median score and interquartile ranges for admission RNL scores are reported 70.19 (59.90, 80.29). RNL change scores show a similar range 10.96 (67, 20.29).

Table 18
Descriptive Statistics for Handicap Level Change via Reintegration to Normal Living Index (RNL)

	N	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
RNL on Admission	42	13.08	99.62	69.2857	17.2111
RNL on Discharge	42	43.08	100.00	81.0440	13.0867
RNL Change	42	-16.92	44.23	11.7582	14.0171
Valid N (Listwise)	42				

After an initial ANOVA the distribution of residuals was examined and three outliers were identified. On examining the raw data it was found that the outliers were associated with two subjects with atypically negative changes and one with a very high positive change score. Consideration of the circumstances of these subjects and their RNL data revealed that one subject had a complex dual diagnosis, with a recent orthopaedic injury complicating the effects of a long-term progressive neurological condition. Another subject lived in a nursing home, where the potential to undertake handicap level activities was likely to be limited. The third subject, with an unusually high positive change score, had scored her RNL only by extreme scores. This perhaps indicated difficulty with accurately self-measuring handicap, as it was unlikely that handicap domains were either total on admission or non-existent on discharge. The data associated with all three outliers were removed, as the cases were considered unusual for the reasons indicated (p. 85 Limitation).

The results from the ANOVA on the reduced data set (n = 39) indicated that participation in client-centred, team-based rehabilitation was associated with change in handicap (F = 27.85, p = <.0005), with a large effect size (η^2 = .621) for the cohort. There was not a differential association between change and any of the explanatory variables (diagnosis, age, cognition, and program) either individually or in combination.

The Levene's test result for homogeneity of variance was acceptable (.209). When the residuals from the reduced data set were examined, the significance of the Kolmogorov-Smirnov test was .001, but the Shapiro-Wilks test score was .202; the boxplot and histogram were considered normal. The non-normality of the Kolmogorov-Smirnov test result was likely to be due to that test's sensitivity to the discrete nature of the distribution, especially the high frequency of scores in the middle with no change. Tabachnick and Fidell (2001) recommended that in such circumstances that normality tests be interpreted conservatively: "with relatively equal sample sizes in groups, no outliers, and two tailed tests, robustness is expected with 20 degrees of freedom for error" (p. 281). Therefore, given the sample size, Shapiro-Wilks score, degrees of freedom and the appearance of the plots, the ANOVA was considered an acceptable test for the data, with an alpha level set at .001 rather that .05 to accommodate the normality issues.

Five statistical hypotheses were related to handicap level change, decisions related to these hypotheses are now described, and detailed results of all analyses are included in Appendix 7.

H_o 1

There will be no change subjects' level of handicap after team-based rehabilitation as measured on the RNL pre and post intervention.

Decision: The hypothesis was rejected because there was significant change in subjects' level of handicap after team-based client-centred rehabilitation as measured on the RNL pre and post intervention (F = 27.85, p = <.0005, η^2 = .621).

Results supported the next four hypotheses, therefore the decision was to accept hypotheses two to five.

H_o 2

There will be a no difference in handicap level change between subjects with neurological diagnoses to those with orthopaedic diagnoses, as measured on the RNL pre and post intervention.

H_o 3

There will be no difference in handicap level change between subjects without significant cognitive impairment compared to those with cognitive impairment, as measured on the RNL pre and post intervention.

H_o 4

There will be no difference in handicap level change for those receiving rehabilitation at home to those receiving facility-based rehabilitation as measured on the RNL pre and post intervention.

H_o 5

There will be no difference in handicap level change between subjects of different ages as measured on the RNL pre and post intervention.

Disability Level

The descriptive statistics (Table 19) show a positive trend between admission and discharge scores (possible range 18 -126), although there was a wide range of scores at admission. The interquartile ranges indicate a more clustered central range on admission: 105 (90, 109) and for FIM change 7 (4, 16).

Table 19

Descriptive Statistics for Change in Disability via Functional Independence Measure (FIM)

	N	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
RNL on Admission	54	36	126	97.70	18.58
RNL on Discharge	54	77.00	126.00	108.7222	11.2827
RNL Change	54	-1.00	43.00	11.0185	10.4113
Valid N (Listwise)	54				

After running an initial ANOVA, the distribution of residuals was examined. Ten outliers were identified and a more normal distribution of FIM change residuals was achieved with the removal of these outliers (Kolmogorov-Smirnov Test .007, Shapiro-Wilks Test .225). Histogram and box plot graphs confirmed normal distribution; However, FIM data had required greater filtering as a cluster of scores indicating minimal change accounted for 43% of the sample and exerted influence. This cluster of scores is shown (Figure 23) in the Detrended Normal Q-Q plot (chosen over the Normal Q-Q plot for clarity). Additionally, several subjects' change scores were extreme.

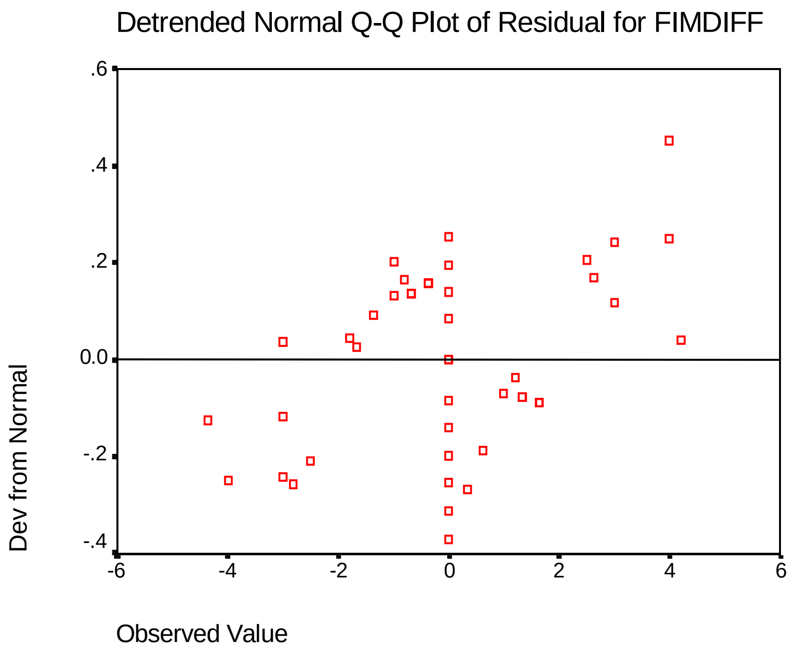

Figure 23

Detrended Normal Q-Q Plot Showing Central Cluster of FIM Change Residual Scores Likely to Influence Normality Tests

In examining the raw data, several reasons were found for the presence of outliers. First, several patients were admitted with very high levels of disability and after unusually long stays in rehabilitation achieved high levels of change on the FIM. Alternatively, several subjects had somewhat uncommon diagnoses within this rehabilitation setting (back pain, post surgical complications, and cerebral hypoxia), and showed relatively little change over the program. Such comparative variation can, however, occur within a rehabilitation group. It is also acknowledged that there can be little disability level change possible for subjects admitted to rehabilitation with a high FIM score. This was the case for 70% of subjects (38 had an admission FIM score of 96 or more out of 126, 32 of these subjects were from HRP [91% of that cohort]). Consequently, some of these subjects showed zero change. The effect of these factors contributed to the distribution of FIM change scores for the total cohort not meeting the assumptions of normality. It would appear to be within convention to analyse the FIM data with parametric tests in the understanding that the FIM has been reported to have interval properties (Linacre, Heinemann, Wright, Granger, & Hamilton, 1994; Ring et al., 1997) although scores may not be absolutely normally distributed. Researchers have used parametric tests with raw summated FIM scores and FIM gain scores (Gray & Burnham, 2000; Ring et al., 1997; Semlyen et al., 1998). Analysis using a parametric test proceeded, but strategies were used in light of the distribution issues and the removal of a portion of the sample.

First, results of ANOVA analysis before and after filtering were compared to examine the impact of the outliers. It did appear that the outliers were affecting results as six further factors reached significance with their exclusion. The existence of outliers appeared to be related to the effect of the central cluster, as the exclusion of subgroups of outliers did not establish a normal distribution though exclusion of all 10 did so. The reduction in sample size was accepted and outliers excluded. Results on Levene’s Test after the exclusion of outliers was .015. The distribution of residuals again showed the effects of a large central cluster with the Kolmogorov-Smirnov test score result .007, although the Shapiro-Wilks test result was .225. The second strategy involved an extension of the Ranks based procedure used by Kitchens (1998) for implementing the Kruskal-Wallis one way analysis of variance. This extension is commented on by Edgington (1995, p. 85). He discusses the use of the transformation of raw data into ranks “to permit the use of a non-parametric test because of the doubtful validity of the parametric test”, and states that “when the only available data are rankings…the t test and ANOVA programs used for ordinary data can be used on ranks to determine significance”. Factors with significant scores on both the ANOVA (with filtered outliers) and an ANOVA of the Ranks for the larger sample were considered. If the results for a factor were at odds then the non-significant score was accepted.

There was reasonable normality shown on the Ranks change distribution after the filtering of two cases (Kolmogorov-Smirnov score of .081, confirmed by histogram and boxplots). This strategy allowed the results of the larger sample to be taken into account while also recognising the need for a normal distribution in the FIM change ANOVA. The results reported are from the FIM change ANOVA if significance was confirmed by the results of the ANOVA analysis of FIM ranks. The significant results for each of these ANOVAs are summarised (Table 20). As noted the significant results considered for acceptance are those from the FIM reduced data set (*n* = 44) when confirmed by the Ranks FIM ANOVA (*n* = 52). However, given the confounding of the analysis for disability change and cognition, the significant result cannot be considered valid (p. 56).

Table 20

Significant Results from FIM ANOVA Analyses: Dependent Variables, Measures, Cohorts

	DISABILITY FIM *N* = 54	DISABILITY RANKS FIM *N* = 54	DISABILITY FIM *N* = 44	DISABILITY RANKS FIM *N* = 52
Normality Tests				
Levene’s	.029	.149	.015	.004
Kolmogorov-Smirnov	.000	.085	.007	.081
Shapiro-Wilks			.225	
Significant Associations with Explanatory Variables				
Program	*	*	*	*
Diagnosis				
Cognition		(*)	(*)	(*)
Age			*	
Diagnosis/Cognition			*	
Diagnosis/Program			*	
Cognition/Program			*	
Cognition/Age			*	
Program/Age			*	

The results indicated that significant disability level change for the whole cohort was associated with participation in team-based client-centred rehabilitation ($F = 279.373$, $p = <.0005$, $\eta^2 = .9$).

Disability change varied differently in association with the two program subgroups ($F = 35.632$, $p = <.0005$, $\eta^2 = .608$). Figure 24 shows the variation.

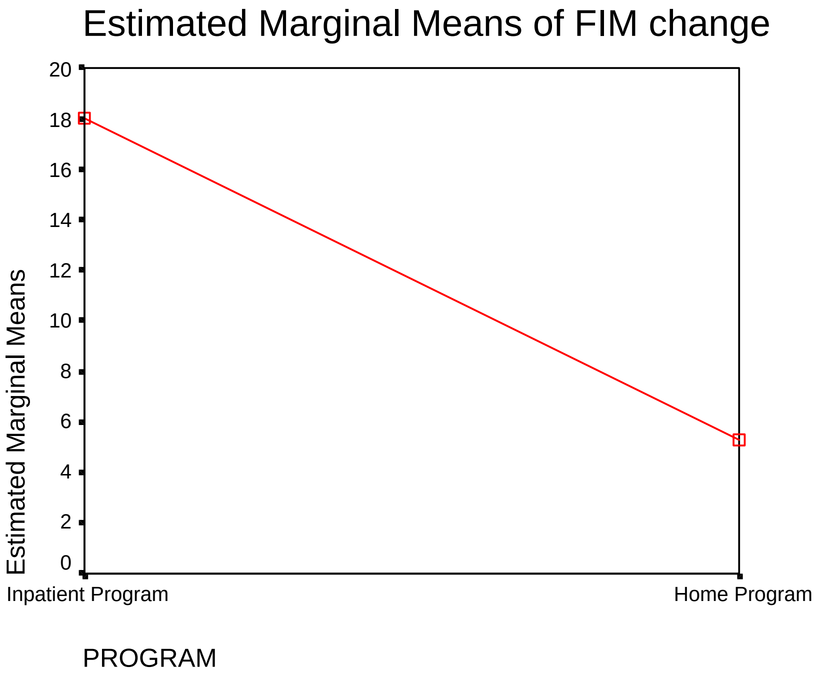

Figure 24

Comparative Disability Change Between Subjects in Alternative Program Formats

Five of the statistical hypotheses were related to disability level change. Hypotheses are reordered for clarity. Detailed results of analyses are included in Appendix 7.

H₀ 6

There will be no change in subjects' level of disability after client-centred team-based rehabilitation as measured on the FIM pre and post intervention.

Decision: This hypothesis was rejected.

H_o 9

There will be no significance difference in disability level change for those receiving rehabilitation at home to those receiving facility-based rehabilitation as measured on the FIM pre and post intervention.

Decision: This hypothesis was rejected.

H_o 7

There will be a no significant difference in disability level change between subjects with neurological diagnoses to those with orthopaedic diagnoses, as measured on the FIM pre and post intervention.

Decision: This hypothesis was accepted.

H_o 8

There will be no significant difference in disability level change between subjects without significant cognitive impairment compared to those with cognitive impairment, as measured on the FIM pre and post intervention.

Decision: This hypothesis was accepted, despite there being an association reported ($F = 6.224$, $p = .020$), because the result was confounded by the cognitive score being included in the disability change score.

H_o 10

There will be no significant difference in disability level change between subjects of different ages as measured on the FIM pre and post intervention.

Decision: This hypothesis was accepted.

SUBJECTIVE HEALTH

Performance on Individually Identified Health Goals (COPM)

Activities associated with individually defined health were identified through the structured goal identification process. Subjects self-rated their performance on the COPM in relation to those activities and their satisfaction with that performance. Change in performance scores was calculated between admission and discharge and mean change scores calculated (as subjects varied in the number of rehabilitation goals that that they identified). Mean change scores could vary from -9 to 9. Descriptive statistics indicated a positive change trend (Table 21).

Table 21

Change in Subjects' Performance in Relation to Rehabilitation Goals as Measured on the COPM

	N	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
Performance on Admission	53	1.00	8.80	3.5747	1.7506
Performance on Discharge	53	1.80	9.83	6.7775	1.8570
Change in Performance	53	-1.40	7.50	3.2028	1.9078
Valid N (Listwise)	53				

The distribution of performance score change residuals were screened after the initial ANOVA analysis. Although the Kolmogorov-Smirnov score was .045, the associated boxplot showed only one outlier and the normal curve associated with the histogram for distribution of residuals appeared reasonably normal. The raw data for the subject associated with the outlier was considered and her unusually high score was perhaps related to her choice of two very simple performance goals. Data indicated that the subject's performance-related problems had resolved by the time she was discharged from the program, and this allowed a very high average change score. It could be expected that subjects would occasionally make such choices regarding performance goals. The whole sample was subsequently accepted on the basis of the closeness of the Kolmogorov-Smirnov score to acceptability and the appearance of the histogram and boxplot. Levene's Test score was .004, and the ANOVA was used applying the same rationale as Tabachnick and Fidell (2001).

The results of the ANOVA analysis indicated that there was a significant association between change in performance related to individually identified health goals (F = 43.808, p = <.0005, η^2 = .594) and participation in client-centred rehabilitation. There was not a differential association with any of the major factors either individually or in combination.

Five statistical hypotheses were related to performance level change, and only the first was rejected (H_o 11). Detailed results of analyses are included in Appendix 7.

H_o 11

There will be no change subjects’ level of goal-related performance after team-based rehabilitation as measured on the COPM pre and post intervention.

Decision: The hypothesis was rejected.

Hypotheses 12 to 15 were accepted.

H_o 12

There will be a no difference in goal-related performance change between subjects with neurological diagnoses to those with orthopaedic diagnoses, as measured on the COPM pre and post intervention.

H_o 13

There will be no difference in goal-related performance change between subjects without significant cognitive impairment compared to those with cognitive impairment, as measured on the COPM pre and post intervention.

H_o 14

There will be no difference in goal-related performance change for those receiving rehabilitation at home to those receiving facility-based rehabilitation as measured on the COPM pre and post intervention.

H_o 15

There will be no difference in goal-related performance change between subjects of different ages as measured on the COPM pre and post intervention

Satisfaction With Performance on Activities Related to Subjects’ Health Goals

The possible change score range was -9 to 9. A positive change trend was reported on the descriptive statistics (Table 22). While the change range appears large, 50% of the sample changed within a narrow range: median 2.6 (1, 4.9).

Table 22

Change in Satisfaction with Performance in Relation to Rehabilitation Goals as Reported through the COPM

	N	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
Satisfaction on Admission	53	1.00	8.80	3.9559	2.3358
Satisfaction on Discharge	53	1.80	10.00	6.9286	2.1405
Satisfaction Change	53	-1.80	8.00	2.9177	2.4512
Valid N (Listwise)	53				

When an ANOVA was run on change scores and residuals data examined, one outlier was identified. Raw data indicated that the subject concerned had identified three goals and appeared to be scoring very high satisfaction with her performance after rehabilitation, although her performance scores had not changed to a similar extent. As such inconsistencies may be expected in a minority of cases, and as the effect of such inconsistency on the whole group is not indicative of the behaviour of the whole group, the subject's data was removed. With the running of a further ANOVA and testing of normality assumptions a further two outliers were identified and raw data considered. In one instance a very low change score was attributed partly to the effect of an acute orthopaedic problem on the subject's pre-existing severe neurological condition. In the other case, the subject scored towards extremes for satisfaction, this tendency was noted on domains of another measure. These subjects were excluded for the reasons cited.

Results from the ANOVA on the reduced data set indicated that change in satisfaction with performance was significantly associated with participation in client-centred team-based rehabilitation (F = 54.383, p = <.0005, η^2 = .660). Satisfaction with performance was differently associated with different program formats, diagnosis, and the interaction between program and diagnosis.

Levene’s test result (.148) indicated equal variance between the groups. The central cluster of scores apparent in plots affected the Kolmogorov-Smirnov test result (.016) but the Shapiro-Wilks test score was .127. The boxplot and histogram indicated a normal distribution.

Satisfaction change was differently associated with program format (F = 4.536, p = .042, η^2 = .139) as indicated in Figure 25.

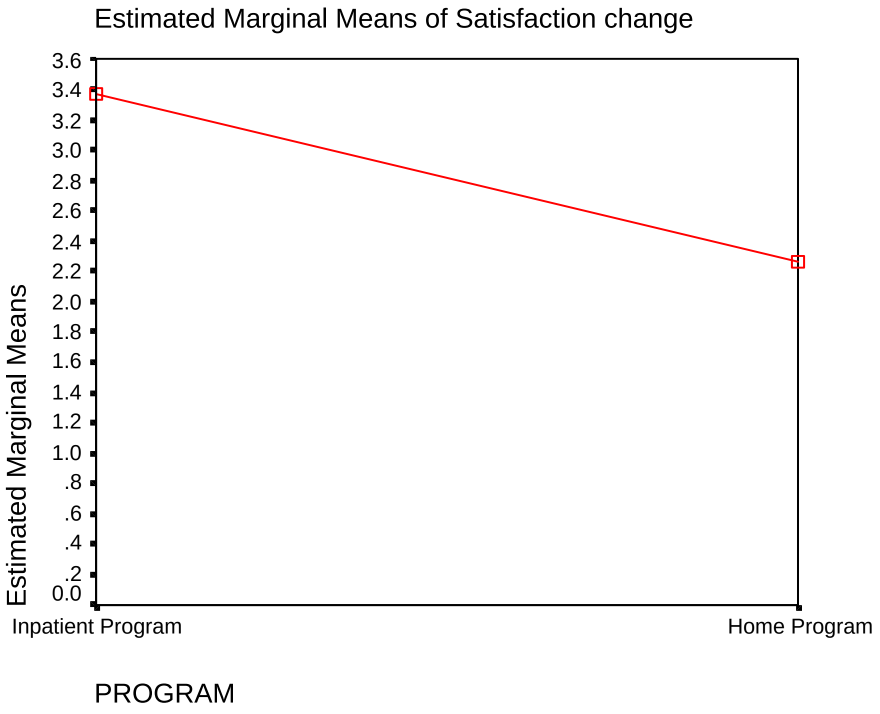

Figure 25

Comparative Change in Satisfaction With Performance for Subjects in Alternative Program Formats

Satisfaction change was associated variably with diagnosis ($F = 4.909$, $p = .035$, $\eta^2 = .149$) as indicated in Figure 26.

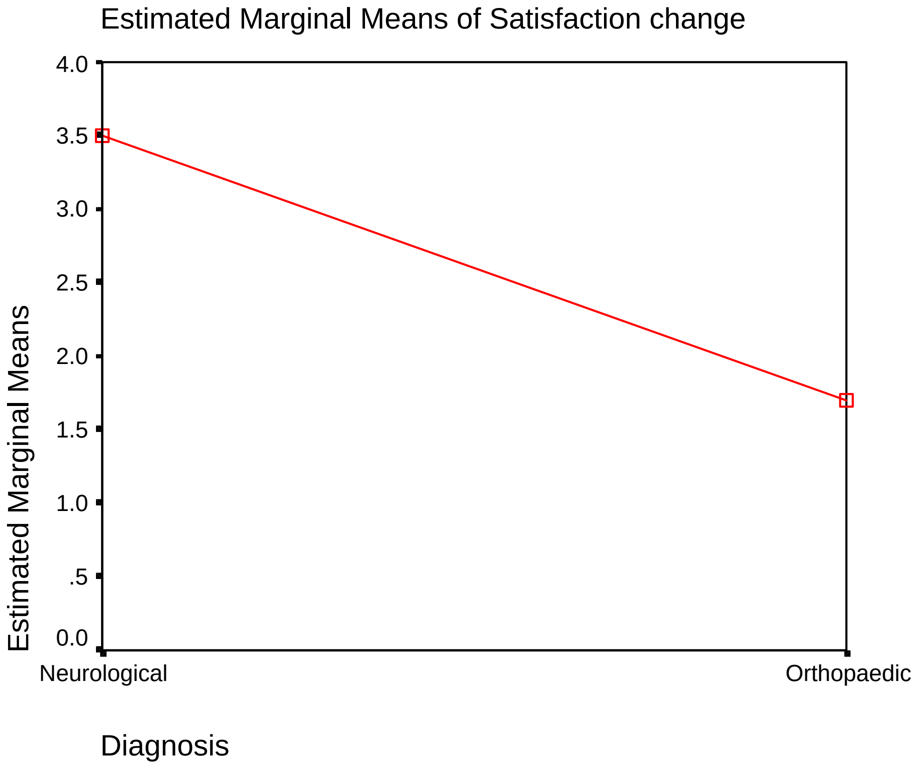

Figure 26

Comparative Change in Satisfaction With Performance for Subjects in Alternative Diagnostic Cohorts

The interaction between diagnosis and program factors was also differently associated with satisfaction change ($F = 8.854$, $p = .006$, $\eta^2 = .240$). Figure 27 shows those neurological IRP subjects and orthopaedic HRP subjects are relatively more satisfied than neurological HRP subjects and orthopaedic IRP subjects.

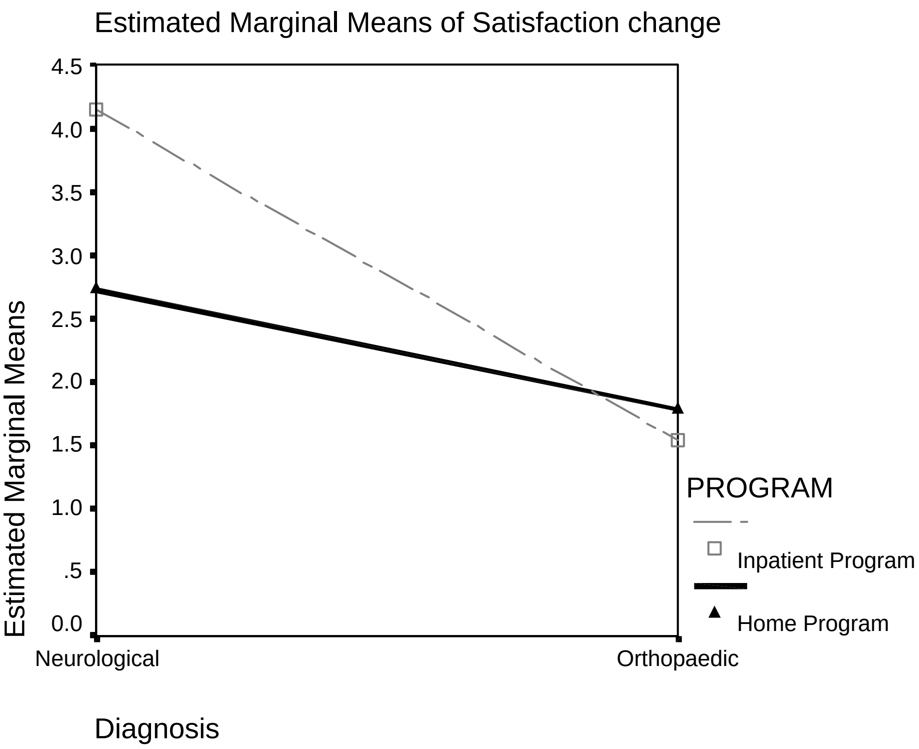

Figure 27

Comparative Change In Satisfaction With Performance Associated With the Interaction Between Diagnosis and Program Format

These results are related to the statistical hypotheses. These are reordered for clarity, and detailed results of all analyses are included in Appendix 7.

H₀16

There will be no change subjects' level of satisfaction with goal-related performance after team-based rehabilitation as measured on the COPM pre and post intervention.

Decision: This hypothesis was rejected.

H₀ 17

There will be a no difference in satisfaction with goal-related performance change between subjects with neurological diagnoses to those with orthopaedic diagnoses, as measured on the COPM pre and post intervention.

Decision: The hypothesis was rejected.

H_o *19*

There will be no difference in satisfaction with goal-related performance change for those receiving rehabilitation at home to those receiving facility-based rehabilitation as measured on the COPM pre and post intervention.

Decision: This hypothesis is rejected.

H_o *18*

There will be no difference in satisfaction with goal-related performance change between subjects without significant cognitive impairment compared to those with cognitive impairment, as measured on the COPM pre and post intervention.

Decision: The hypothesis was accepted.

H_o *20*

There will be no difference in satisfaction with goal-related performance change between subjects of different ages as measured on the COPM pre and post intervention.

Decision: This hypothesis was accepted.

There was also a significant association between the interaction of program format and diagnosis, and satisfaction change. No other interactions were significantly associated.

Summary

Positive significant changes on health measures related to dependent variables (handicap, disability, performance and satisfaction with performance) were significantly associated with participation in client-centred, team-based rehabilitation.

Differential associations between explanatory variables and health changes after participation in client-centred, team-based rehabilitation occurred and are summarised in Table 23.

Table 23

Differential Associations Between Dependent Variables, Measures and Cohorts

	Handicap Change RNL *N* = 39	Disability Change FIM *N* = 44	Performance Change COPM *N* = 53	Satisfaction with Performance Change COPM *N* = 50
Normality Tests				
Levene's	.209	.015	.004	.148
Kolmogorov-Smirnov	.001	.007	.045	.016
Shapiro-Wilks	.202	.225		.127
Significant Associations with Explanatory Variables				
Program		*		*
Diagnosis				*
Cognition		(*)#		
Program/Diagnosis				*

Although there was a significant association reported between cognitive impairment and disability change (*F* = 6.224, *p* = .020), this result was confounded by the cognitive impairment score being included as a part of the disability score, therefore this result cannot be accepted.

ANALYSIS OF ASSOCIATIONS BETWEEN MAIN VARIABLES

Global and Subjective Health

Although the importance of global outcome evaluation at handicap and disability levels, is stressed in rehabilitation theory (van Bennekom et al., 1995), few of the studies reviewed used both measures. Dalley (1999) stressed the worth of subjective outcome evaluation but relatively few studies reported it. As this study reported change in handicap, disability and subjective health measures, it was possible to measure the associations between the changes in these measures. A high association between one or more of these change scores may indicate that a measure is redundant. The size and direction of association between change in each of these main variables was examined by the Pearson product-moment correlation. Results were reported at .05* and .01** levels (Table 24).

Table 24

Strength of Association Between Change in Dependent Variables

	RNL CHANGE	FIM CHANGE	PERFORMANCE CHANGE	SATISFACTION CHANGE
<u>RNL Change</u>				
Pearson Correlation	1.000	.167	.371*	.200
Sig. (2-tailed)	.	.291	.017	.211
<u>FIM Change</u>				
Pearson Correlation	.167	1.000	.029	.263
Sig. (2-tailed)	.291	-	.834	.057
<u>Performance Change</u>				
Pearson Correlation	.371**	.029	1.000	.681**
Sig. (2-tailed)	.017	.834	-	.000
<u>Satisfaction Change</u>				
Pearson Correlation	.200	.263	.681**	1.000
Sig. (2-tailed)	.211	.057	.000	

*Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

Significant association was found between change in performance and change in handicap (*r* = .371*, *p* = .017), and between performance in self identified goals and satisfaction with that performance (*r* = .681**, *p* = .<0005). A scatterplot showing the positive association is shown in Figure 28. This indicated a moderate association between the two measures of subjective health. However, there was no significant association demonstrated between change in the two global health measures, handicap and disability.

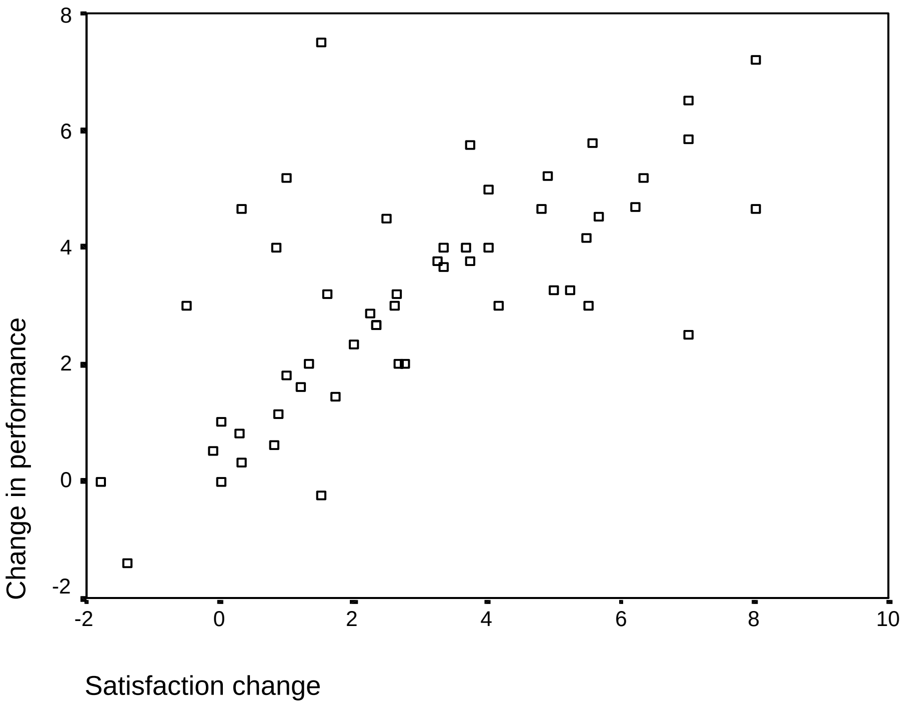

Figure 28
Association Between Change in Performance and Change in Satisfaction With Performance

The relevant statistical hypotheses related to association was rejected.

H₀ 21

There will be no association between change in handicap, disability, goal achievement, and satisfaction with goal achievement for subjects.

This hypothesis was rejected because there was moderate significant association between change in performance and satisfaction with performance (*r* = .681**, *p* = .000), and a small significant association between change in performance and change in handicap (*r* = .371*, *p* = .017).

Therapy Intensity

Therapy intensity was examined in relation to association with change in the health measures, initially though consideration of scatterplots. There appeared to be an association between disability change and therapy intensity (Figure 29).

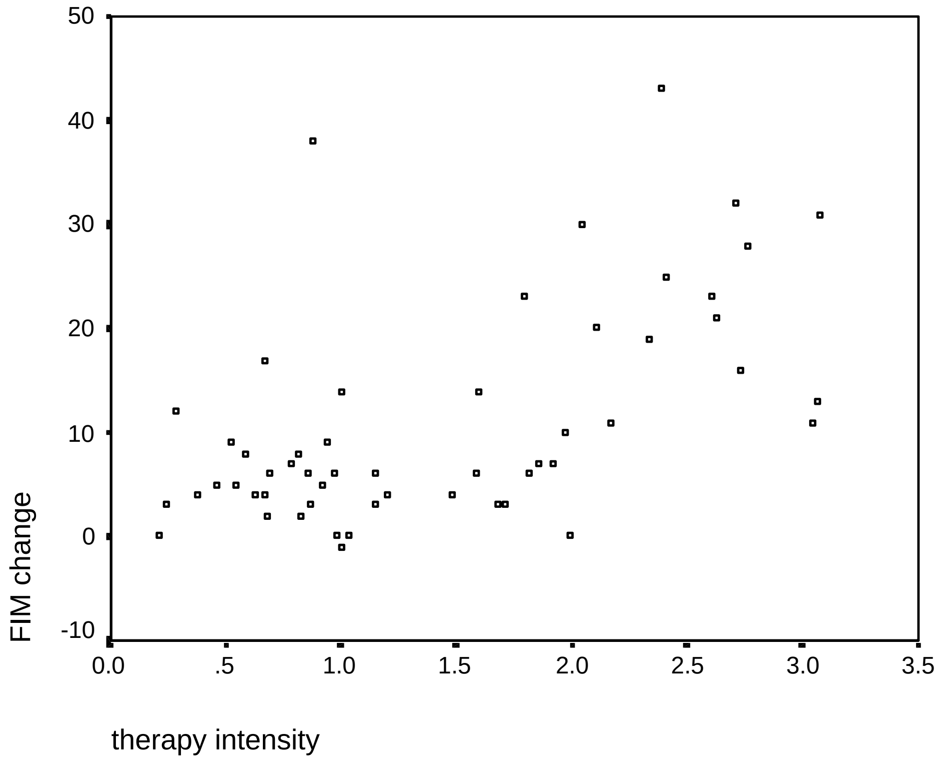

Figure 29

Association Between Change in Disability and Therapy Intensity

Correlation analysis confirmed this association (*r* = .574**, *p* = .000), and also indicated a mild negative relationship between change in performance and therapy intensity (*r* = -.272*, *p* = .049). The results (Table 25) indicated that a higher therapy intensity was associated with disability change, but conversely that the lower the intensity the greater the association with performance change.

H₀ 22

Therapy intensity will have no association with the level of change in subjects' level of handicap, goal achievement, satisfaction with goal achievement and level of disability when measured pre and post rehabilitation.

Decision: This hypothesis must be rejected as therapy intensity is positively associated with change in disability (*r* = .574**, *p* = .<0005) and negatively associated with change in goal-related performance (*r* = -.272*, *p* = .049).

Table 25

Strength of Association Between Changes in Dependent Variables and Therapy Intensity

	Handicap Change	Disability Change	Performance Change	Satisfaction Change	Therapy Intensity
Handicap Change					
Pearson Correlation	1.000	.167	.371*	.200	.076
Sig. (2-tailed)	-	.291	.017	.211	.632
Disability Change					
Pearson Correlation	.167	1.000	.029	.263	.574**
Sig. (2-tailed)	.2	-	.834	.057	.000
Performance Change					
Pearson Correlation	.371*	.029	1.000	.681**	-.272*
Sig. (2-tailed)	.017	.834	-	.000	.049
Satisfaction Change					
Pearson Correlation	.200	.263	.681**	1.000	.013
Sig. (2-tailed)	.211	.057	.000	-	.924
Therapy Intensity					
Pearson Correlation	.076	.574**	-.272*	.013	1.000
Sig. (2-tailed)	.632	.000	.049	.924	-

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

Length of Stay (LOS)

Differences in LOS have been acknowledged in between subgroups in the cohort (pp. 118). The association between LOS and change in the explanatory variables was explored in scatterplots and through Pearson product-moment correlation analysis (Table 26).

Table 26

Strength of Association Between Change in Dependent Variables and Length of Stay

	Handicap Change	Disability Change	Performance Change	Satisfaction Change	Length of Stay
Handicap Change					
Pearson Correlation	1.000	.167	.371	.200	.305*
Sig. (2-tailed)		.291	.017	.211	.050
Disability Change					
Pearson Correlation	.167	1.000	.029	.263	.651**
Sig. (2-tailed)	.291	.	.834	.057	.000
Performance Change					
Pearson Correlation	.371	.029	1.000	.681	-.046
Sig. (2-tailed)	.017	.834	.	.000	.742
Satisfaction Change					
Pearson Correlation	.200	.263	.681	1.000	.000
Sig. (2-tailed)	.211	.057	.000	.	.998
Length of Stay					
Pearson Correlation	.305*	.651**	-.046	.000	1.000
Sig. (2-tailed)	.050	.000	.742	.998	.

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

The results of the analysis indicated that there was an association between LOS and both aspects of global health: handicap (r = .305*, p = .050), and disability (r = .651**, p = <.0005). However, there was no significant association between LOS and change in either of the subjective measures of health (performance or satisfaction with performance).

H_o 22

There will be no association between handicap and disability level changes and change in goal-related performance and satisfaction and length of stay in rehabilitation.

Decision: This hypothesis must be rejected because disability change is moderately associated with length of stay (r = .651**, p = <.0005) and has a mild association with handicap change (r = .305*, p = .050).

RESEARCH HYPOTHESES

Two overarching research hypotheses were posed. These hypotheses are considered separately on the basis of the statistical results reported.

Research Hypothesis 1

There will be significant positive change in rehabilitation patients' global health status after participation in client-centred, team-based rehabilitation as demonstrated by reduction in handicap and disability.

Decision: This hypothesis was accepted because significant positive change was reported on the two relevant health measures for subjects participating in client-centred, team-based rehabilitation: RNL/handicap (p = <.0005, α = .05), FIM/disability (p = <.0005, α = .05). However, change in one measure did not predict change in the other (r = .167, p = .291, α = 05).

Research Hypothesis 2

There will be significant positive change in rehabilitation patients' subjective health status after participation in client-centred, team-based rehabilitation as demonstrated by progress towards individually identified rehabilitation goals and satisfaction with progress towards those goals.

Decision: The hypothesis was accepted because significant positive change on both the individually defined health measures was reported: performance on self-identified goals as measured on the COPM performance factor (p = <.0005, α = .05) and satisfaction with progress on self-identified goals as measured on the COPM satisfaction factor (p = <.0005, α = .05). Furthermore, the two change scores were moderately strongly associated (r = .681**, p = <.0005).

Other Associations

Although not directly related to the statistical hypotheses, the association between admission scores and global outcome was explored, as the association between disability admission score and disability change has been discussed in the literature. The scatterplots indicated that there might be an association between the admission disability score and disability change for subjects in this study (Figure 30) and some weaker association between the admission handicap score and handicap change (Figure 31). Associations also appeared likely between admission performance scores and performance change scores (Figure 32) and admission satisfaction scores and satisfaction change scores (Figure 33).

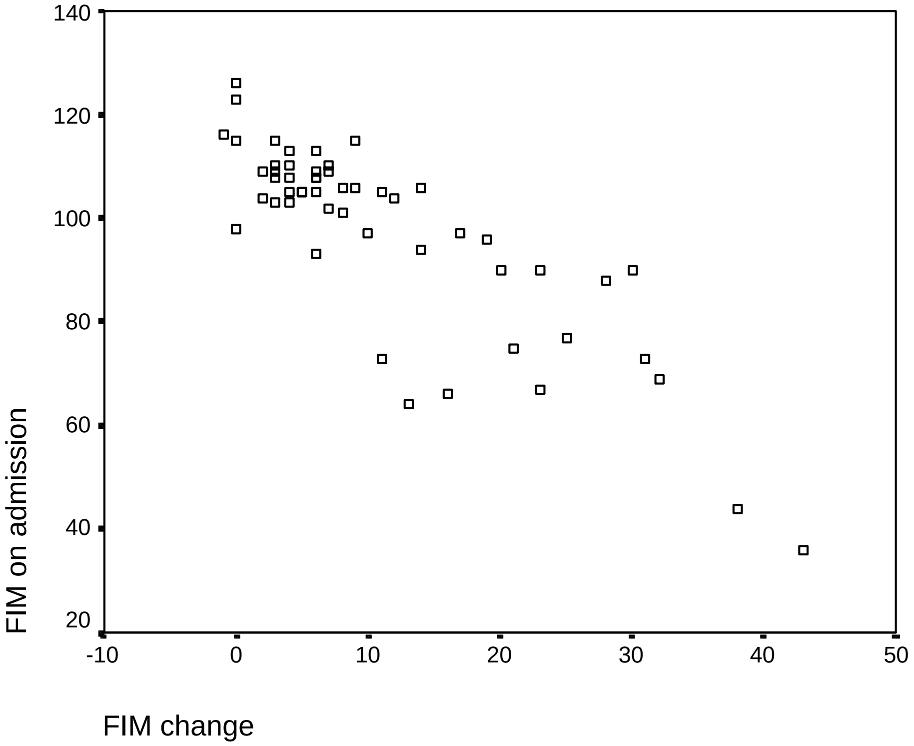

Figure 30

Association Between FIM Admission Score and FIM Change

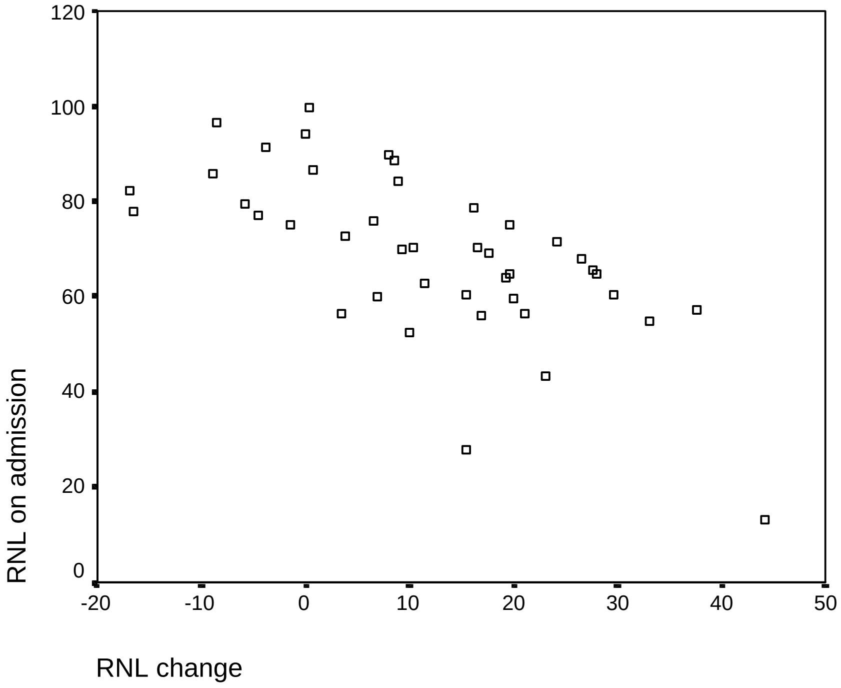

Figure 31

Association Between RNL Admission Score and RNL Change

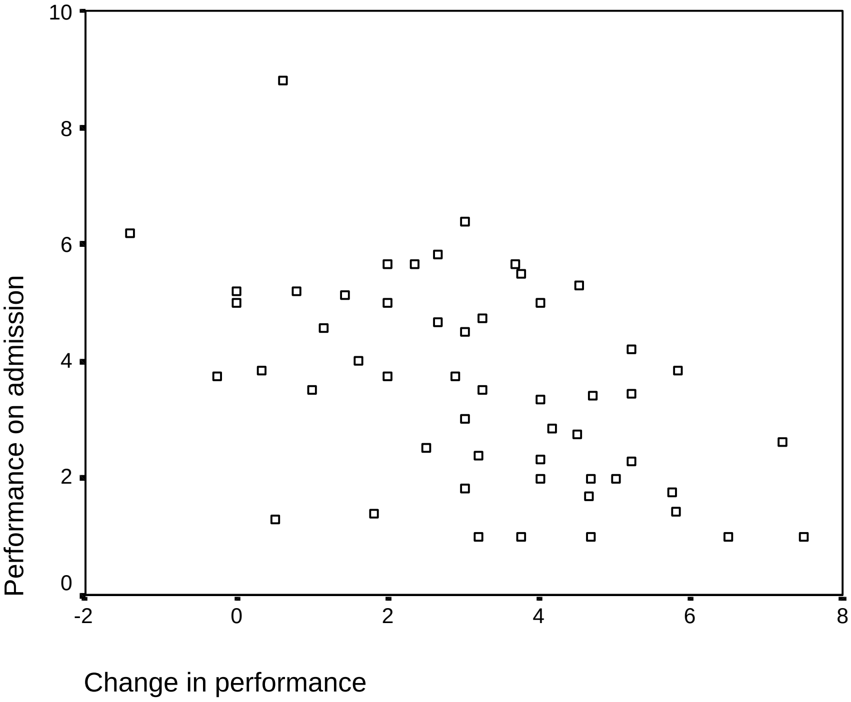

Figure 32

Association Between COPM (Performance) Admission Scores and Change Scores

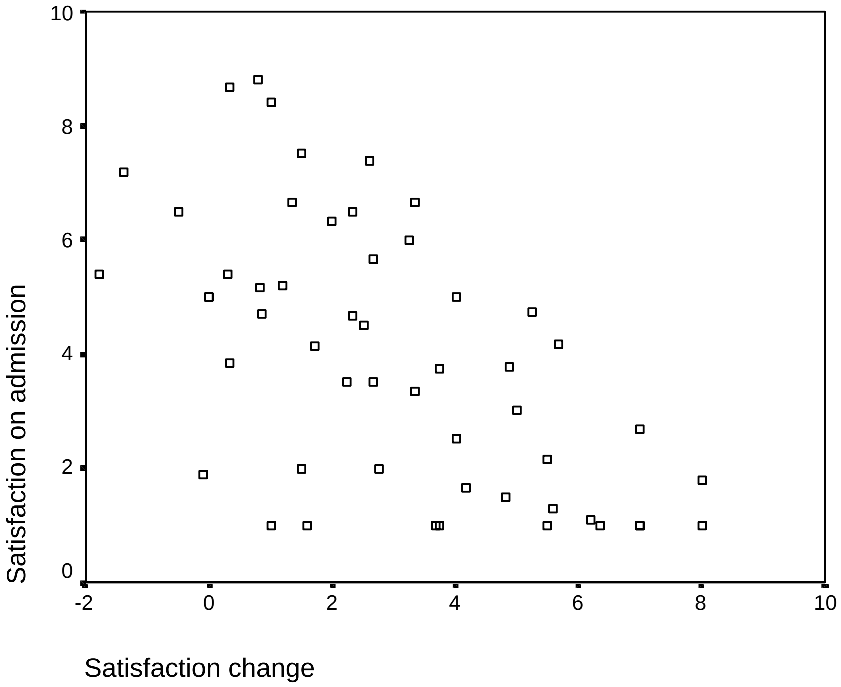

Figure 33

Association Between COPM (Satisfaction With Performance) Admission Scores and Change Scores

When analysed using the Pearson product-moment correlation, there was significant association between global health admission scores and change scores (FIM [disability] *r* = -.843**, *p* = <.0005; RNL [handicap] *r* = -.666**, *p* = <.0005). Similarly, there was a significant association between the admission scores and change scores for the measures of subjective health (COPM [performance] *r* = -.507**, *p* = <.0005; COPM [satisfaction with performance] *r* = -.599**, *p* = <.0005). Analyses are included in Appendix 7.

SUMMARY OF RESULTS

This study described associations between significant positive change on global and subjective health measures for subjects who participated in client-centred, team-based rehabilitation. Regardless of diagnosis, cognitive status, age or the format in which rehabilitation was offered, subjects showed significant change in their global health status and subjective health status. Without a control group causation cannot be assumed. Some factors showed particular trends, for example, satisfaction with subjective health outcome was associated with diagnosis and program format.

There was a significant association between change reported from the two measures of subjective health, but there was minimal association reported between the two measures related to change in global health status. An association was reported between one aspect of global health (handicap) and one of subjective health (performance). While there was a moderate and significant positive association reported between disability change and therapy intensity, a low but significant negative association between performance change and therapy intensity was found. Finally, changes in both measures of global health were associated with length of stay, although changes in the two subjective health measures were not. Discussion of these results occurs in the chapter that follows.

CHAPTER 6

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Context of the Study

Rehabilitation has been acknowledged to be a complex, staged process provided to patients who have experienced illnesses or injuries (Hoenig et al., 1999). The interventions provided by members of a rehabilitation team could include those aiming to remediate impairments, compensate for disabilities or handicaps, or to facilitate adjustment to the long-term effects of an illness (Barnes. 1999). Framed more positively, team-based rehabilitation may enhance a person’s participation in home and community life. For some patients rehabilitation can include assistance to develop or re-establish a sense of identity in keeping with his or her current aspirations and abilities (Ben-Yishay & Prigatano, 1990; Hayden et al., 2000).

Client-centred practice has been identified as a promising approach to rehabilitation (Johnston & Wilkerson, 1992). This approach is based on a philosophy which holds that the relationship between health workers and patients should be “defined by trust, caring and competence” (Law, Baptiste, & Mills, 1995, p. 251), and characterised by the active participation of patients in defining the goals of intervention. Faladeau and Durand (2002) stated that the client-centred philosophy is grounded in concepts of respect, power and partnership, and with patient participation in the negotiation of assessment and intervention approaches.

Collaboration between rehabilitation staff and patients in rehabilitation goal planning is likely to generate goals that reflect the patient’s health needs and aspirations, and that maximise motivation and health outcome (Kramer, 1997; McGrath & Davis, 1992). This collaboration can reflect respect for patient autonomy (Haas, 1995; Sim, 1998), although patients may need a structured goal-planning process if there is cognitive impairment (Hobson, 1996), and shared decision-making should be balanced against safety needs (Wade, 1999c). The rehabilitation process can gradually facilitate patients' abilities to regain control over decision-making (Caplan, 1988), and increase the skills needed to undertake the activities of importance in their everyday lives (Bairstow et al., 1997). Those preferred activities are seen to be reflective of the patient's subjective health definition. Rehabilitation can therefore assist patients in their transition between illness and health.

Many factors are said to influence rehabilitation and its outcome: diagnosis (Kane, 1997), age (Frost & Barone, 1996; Rice-Oxley & Turner-Stokes, 1999), cognitive status (Heruti et al., 2002), the features of the rehabilitation program available (Koch, Widén – Holmqvist, Kostulas et al., 2000), and the availability of practical and social supports on discharge (Kramer, 1997), as well as influences beyond the scope of rehabilitation (Grönblom-Lundström, 1992; Keith, 1995). The availability and quality of evidence in relation to the impact of these factors and other issues relevant to rehabilitation outcome varies (Fuhrer, 1995; Keith, 1995).

Evaluation of rehabilitation outcome requires measurement of health outcome at global and subjective levels (Glömstrom-Lundstöm, 1992; Tam, 1998; van Bennekom et al., 1995), and needs to include the level meaningful to the person undertaking the program (Rosenthal, 1996). Global outcome can be described through reports of change on measures of handicap and disability, while subjective health can be described by self-reported change on measures relevant to an individual's own definition of health. The efficiency of rehabilitation expressed in terms of the length of stay and therapy input costs for a given outcome also require consideration (Banja, 1997).

This study described changes on health measures at global and subjective levels after participation in client-centred, team-based rehabilitation. Global health was measured at handicap level through the Reintegration to Normal Living Index (RNL) (Wood-Dauphinee and Williams, 1987), and at disability level through the Functional Independence Measure (FIM) (Hamilton et al., 1987). Subjective health was measured via the performance, and satisfaction with performance, domains of the Canadian Occupational Performance Measure (COPM) (Law et al., 1991/1994). Associations between changes on health measures, and some explanatory variables (age, cognitive status, diagnosis and program format) were reported. Associations between changes on health measures and intervening variables related to rehabilitation efficiency (therapy intensity and length of stay) were reported, as were associations between admission status and health changes. Issues related to the client-centred, team-based rehabilitation approaches were then explored.

In this chapter, changes recorded on measures of handicap, disability, and subjective health for patients who had participated in client-centred, team-based rehabilitation are briefly reviewed; significant associations between health changes and major and intervening variables are described, and then discussed in relation to rehabilitation theory and literature. Associations between admission status and change on each of the measures are described, prior to the client-centred aspects of the study being discussed. Issues related to the measures used and to the design of the study are briefly discussed. Conclusions are drawn, prior to recommendations for future rehabilitation practice and research being presented.

Outcomes

GLOBAL HEALTH STATUS

This study described significant positive change for patients participating in client-centred, team-based rehabilitation, in both aspects of global health: handicap, as measured on the Reintegration to Normal Living Index (RNL), and disability, as measured on the Functional Independence Measure (FIM). Participation in client-centred, team-based rehabilitation was associated with positive changes on global and subjective health measures for subjects, regardless of their diagnosis, age, cognitive status or the program in which they received their rehabilitation. As the study was not controlled or randomised, results cannot be directly attributed to the client-centred approach.

Handicap

Results

Handicap reduced significantly for the whole cohort after participation in client-centred, team-based rehabilitation, but none of the major factors (diagnosis, cognitive status, age, or program format) had a differential association with handicap level change. Handicap change was significantly associated with length of stay, and handicap admission scores, and there was a weak but significant association between handicap change and performance change.

Discussion

Reduction of handicap, one of the key aims of rehabilitation (McGrath & Davis, 1992), was reported in this study. It has been acknowledged that the study design does not permit attribution, therefore the reduction in handicap can only be described as occurring for the cohort that was provided with client-centred, team-based rehabilitation, not because of it. Other factors, such as spontaneous recovery, may have contributed to the handicap change.

From a theoretical point of view, program format may have been expected to be influential, as treatment provided in the familiar environment is said to enhance outcomes (Hayden et al., 2000), and providing therapy in the usual living environment to maximise generalisation (Willer & Corrigan, 1994). However, no significant difference was found in handicap level change for those provided with therapy in a familiar environment, compared to those provided with therapy in the clinical facility. The functional differences between the cohorts on admission to the programs and the differences in length of stay for patients in those rehabilitation programs may have influenced this result. The between program cohort differences on admission were possibly due to either program admission or study selection protocols. The IRP subgroup had a higher mean level of handicap than the HRP group on admission, but there was scope for improvement for both subgroups.

It may have been that the length of stay for those in HRP was too short to allow any measurable difference in the degree of handicap level change compared to that demonstrated by those in the inpatient rehabilitation program (Mean LOS for IRP = 44.4 days; Mean LOS for HRP = 22.6 days). As suggested by Keith (1995), those with complex health issues may need additional time beyond that available in an initial subacute rehabilitation program to achieve handicap level change. Comparative handicap outcome may need to be evaluated at later review after all of the component programs within an episode of rehabilitation.

Handicap change was associated with length of stay. This could be expected since higher level of handicap (lower score on the RNL) might indicate a need for therapy over a longer time to address handicap domains or to address a greater number of handicap level activities, leading to the high negative association recorded.

As earlier studies (Heinemann et al., 1994) had reported an association between disability admission scores and disability change, the association between handicap admission scores and handicap change could be anticipated, especially as disability and handicap are both said to be aspects of global health (Halbertsma, 1995). The strength of association between handicap admission scores and handicap change was not as strong as that reported at disability level. This may be because disability levels can be a limiting factor for discharge from an inpatient rehabilitation program. The reduction in handicap, however, is not necessarily required for discharge, and may be addressed in subsequent outpatient rehabilitation programs, and over a longer time.

Recommendations

It is recommended that evaluation of handicap change after rehabilitation along with evaluation of disability change be undertaken, as together handicap and disability are said to describe global health. Existing validated and reliability-tested handicap measures could be used, and new measures related to the ICF are likely to become available for use.

Further study of handicap outcome related to program format is recommended. If patients who were considered safe to access either facility-based or home-based rehabilitation were randomly allocated to a program, the handicap change could be compared at the end of the program, after the whole episode of care and at review. Alternatively, a regression-discontinuity (RD) design (Trochim, 1984) recommended by Johnston, Ottenbacher, and Reichardt (1995) as an appropriately rigorous quasi-experimental design for program comparisons may be appropriate. This design would allow comparison of outcomes for patients admitted to a different rehabilitation programs at an agreed handicap or disability level.

Disability

Results

There was significant positive change on the disability measure for the whole cohort after participation in client-centred, team-based rehabilitation. Significantly greater disability change was associated with inclusion in the inpatient rehabilitation program (IRP) compared to inclusion in the home-based rehabilitation program (HRP). Disability change was associated with therapy intensity and length of stay, and disability admission scores were associated with disability change.

Discussion

The association between disability change and program format was very likely to have been affected by the admission and selection practices for the two programs, especially as these practices lead to different patient profiles being reported for the two cohorts. The ceiling effect of the FIM may also have been influential.

Had the differences in patient profiles within the two programs been known at the outset of the study then the statistical hypotheses may have been different. However, this clarification was one of the outcomes of the study. The differences between the two groups on admission do make it difficult to interpret the association reported between program type and disability change.

The association reported between participation in IRP or HRP and disability change would also have been affected by the limitations of the FIM in the context of the HRP cohort. The admission FIM scores indicated that more severely disabled subjects admitted to the IRP were selected for the study, while those included from HRP were relatively less disabled on admission (mean admission FIM score for IRP = 81.2 compared to 106.7 for HRP). This meant that those in the IRP who were selected had more scope to record improvement on the FIM than those included from HRP (ceiling FIM score = 126). Oczkowski and Barreca (1993) had stated that those patients with an admission FIM score of more than 96 were likely to demonstrate little FIM gain after rehabilitation, and most admission FIM scores for HRP patients were above 96.

The ceiling effect in the FIM has been acknowledged in the literature: Stineman et al. (1996) stated that populations other than inpatients might be functioning too highly for the FIM to register improvement. However, the FIM was used in the HRP as it was designed as a bed-substitution program and it was anticipated at the outset that patients with similar functional status to those admitted to IRP would be admitted. The subject descriptions (p.112) suggested that this was not the case at the time of this study, as the HRP cohort had higher disability scores than expected.

As noted in the results section (p. 129, p. 139), multivariate analysis indicated that the disability change for those with cognitive impairment differed significantly from those without impairment. Although the cognitive FIM score does have some credibility as a screening score (Hajek et al., 1997; Heruti et al., 2002), and was the only quantitative cognitive measure used for all subjects in the two programs, it was not appropriate for use within the analysis related to cognitive status and disability change (p. 56). This was because the cognitive FIM score that was used to characterise cognitive status was included in the total FIM score when change was calculated. That particular analysis was confounded for the reasons stated, and the results were not considered to be valid. The use of the cognitive FIM score did not confound the analyses relevant to handicap or subjective health measures.

In future studies where cognition was being used as an independent variable and disability as a dependent variable and measured on the FIM, an alternative cognitive screen could be used. Several groups of researchers have recommended the Mini Mental State Examination (MMSE) for cognitive screening (Hajek et al., 1997; Heruti et al., 2002; Zwecker et al., 2002). Alternatively, in-depth cognitive assessment, as recommended by Hajek et al. (1997) could provide the cognitive status information.

The association between therapy intensity and disability change, and length of stay and disability change are not unexpected given that those with potential to benefit and need for reduction in disability are likely to receive therapy until they are able to be discharged. The strong association between admission disability status and disability change has also been reported previously (Heinemann et al., 1994; Johnston & Hall, 1994). These similar results give an indication that disability outcomes after client-centred, team-based rehabilitation are consistent with those reported in earlier studies, and that efficiency data shows some similar trends.

Recommendations

Further studies exploring the disability outcome for patients provided with either inpatient or home-based rehabilitation are recommended. This would be possible using the FIM; patients considered safe for either program could be randomly assigned between the programs and disability level outcome measured at discharge.

Studies comparing the outcome for rehabilitation patients admitted to varied rehabilitation programs and with different levels of cognition on admission are recommended.

It is recommended that the FIM be used in future studies that explore client-centred practice as data exists from studies for comparison with other rehabilitation approaches.

Association Between Change in Global Health Measures

Results

There was no significant association found between changes reported on the two measures of global health (handicap and disability). This indicated that both measures need to be used to capture global health outcome.

Discussion

There are several possible reasons for the lack of association, for example, the differences in the measurement of handicap and disability, which reflect the scope and context of the domains being measured. For disability, expert observers typically score subjects’ basic self-care and mobility capability in a clinical environment, while for handicap, subjects self-report their capacity to undertake complex activities in familiar environments.

Within the primarily older rehabilitation cohort in this study, it is likely that a proportion of subjects experienced some level of premorbid handicap. After rehabilitation for a new problem, disability relevant to that problem may have decreased, but the subject’s overall level of handicap may have increased. This was observed in some subjects in the study, and was likely to have affected the associations between the changes reported.

As handicap is individually defined, it can vary widely, according to the range of subjects' preferred activities, level of disability, and environmental demands or opportunities. These variations were apparent in the number and range of handicap goals set by subjects within this study. On the other hand, disability as represented on the FIM, comprises a more limited number of domains. While there are sometimes opportunities to reduce disability, simple options that could reduce handicap may not be available. Accordingly, both handicap and disability may be reduced but not at comparable rates.

Handicap measures usually rely on self-report, which may lead to variations; for example, the patient's self-reported competence in complex activities may be influenced by immediate circumstances, such as depression or fatigue. On the other hand, simple disability level tasks can be rated over time, and with sufficient collaboration between rehabilitation staff occurring to render one-off circumstances less likely to define the result. The more immediate influences on self-report at handicap level may affect the handicap scores and subsequently the association between changes on the two measures.

Self-report may be influenced by patients' cognitive impairments, for example, a patient with limited insight may overestimate abilities related to complex handicap level activities. Furthermore, as insight improves patients may report abilities more precisely and this data may suggest an increase in handicap over time, rather than the gradual decrease that may be occurring. Cognitive-communicative impairments may also affect the accuracy of self-report, for example, a patient may have a limited ability to comprehend the questions on a self-report measure. The cognitive and communication issues may consequently affect the scores on the handicap measure and could affect the level of association found between changes in the two aspects of global health.

It must also be acknowledged that sudden change in abilities as a result of illness or injury can have a severe impact on the individual concerned (Banja, 1997), and that this may lessen the capacity to immediately judge their own capacity to manage in new circumstances. It may be possible that the association between disability and handicap change should be evaluated later, after the entire rehabilitation episode rather than at the end of one component program, so that patients have time to adjust to their changed abilities.

The basic skills related to disability are likely to improve after initial rehabilitation, as the potential for some resolution in disability is generally required for admission. This need not be the case for handicap, where additional rehabilitation stages or extra time post-discharge may be required (Keith, 1995). Additionally, it has been emphasised by Brummel-Smith (1993) and Cohen and Marino (2000) that there is a difference between capability, which may be observed in the clinical setting, and the actual performance of tasks in the home and community, or as stated by Keith (1995) capacity in relation to usual behaviour. Patients may be observed doing tasks in the clinical environment, but this may not be what they choose to do or feel confident to do outside the clinical environment, and consequently may not self-report a capacity to do those tasks. Furthermore, some patients may be able to judge their abilities in tasks they have tried but not those that are yet untried (Chan & Lee, 1997), perhaps leading to difficulties in the self-rating of complex community-based activities for those in facility-based programs. These issues may reduce the likelihood of a significant association between reported disability change and handicap change.

At a broader level, attempts to reduce costs by considering only disability level outcome after one component program in a rehabilitation episode would be unfortunate, although acknowledged as a temptation by Keith et al. (1995). These authors emphasised the need for consideration of broad outcomes for patients to ensure cost saving was not counterproductive to global outcome after rehabilitation. Results of this study indicate that broad-based outcome evaluation after a rehabilitation episode may provide important information regarding the global health benefits of rehabilitation.

Recommendations

It is recommended that both the disability and handicap domains are evaluated after rehabilitation, as the lack of association between rates of change on these two measures indicates that neither is redundant. The recommendation that both levels be evaluated is supported in the literature (Fuhrer, 1995, Rice-Oxley & Turner-Stokes, 1999).

Further research is recommended to compare any variation in rates of change in disability and handicap after client-centred rehabilitation and after more traditional rehabilitation programs.

It is recommended, in line with Kramer (1997), that global health be evaluated after a whole rehabilitation episode.

Subjective Health Status

This study described significant positive change after client-centred, team-based rehabilitation on both subjective health measures: competence as scored on the COPM Performance measure, and satisfaction with performance as scored on the COPM Satisfaction measure. As the study was not controlled or randomised, attribution cannot be assumed.

Each patient's health goals had become the criteria for outcome evaluation as suggested by Blackmer, (2000). Some subjects identified up to 10 health-related goals that covered many life domains. For a few subjects, health was more narrowly defined and reflected competence in basic self-care skills. These differences suggest variation in the scope of individuals' personal definitions of health.

Performance

Results

There was significant positive change in self-rated performance on tasks related to subjective health after client-centred, team-based rehabilitation. None of the explanatory variables (diagnosis, cognition, age or program format) were differently associated with performance change. There was a weak significant association between performance change and handicap change, and performance change and therapy intensity. A significant negative association was reported between performance scores on admission and performance change.

Discussion

It may have been considered likely that those with more severe disability and consequently more severe problems as recorded on global health measures, (perhaps associated with neurological diagnoses, or cognitive impairments), would have demonstrated significantly less change in subjective health. However, none of the independent variables analysed in this study predicted change in performance scores. A similar finding was reported by McColl et al. (2000) who found that "neither age, gender nor severity of disability were predictive of COPM scores" (p. 28).

On the other hand, there was a weak but significant association reported between performance change and handicap change. This would not be entirely unexpected given that both measures use self-report, and that it is likely that use of the broad handicap measure would lead to inclusion of some of the domains likely to be listed on the COPM.

The significant negative association reported between the admission performance scores and changes in performance indicated that those who were admitted with low scores on a subjective health measure make the most change (while those with high scores on admission can make less change). If such a result occurs when a standardised measure is used, clinicians or researchers may refer to a ceiling effect, as did Hall et al. (2001) in relation to the FIM. However, in a self-defined measure such as the COPM, the patient sets the standard to be achieved. Reaching the ceiling means achieving the subjective health standard set by the patient in the case of the COPM, rather than the normative standard on the measure in the case of the FIM. High Performance scores on the COPM as used in the context of the study could be one indicator of regained subjective health. High scores could also be indicative of closure of the rehabilitation episode from the patient's viewpoint.

Once subjective health goals are acknowledged as the goals of rehabilitation by rehabilitation staff, there is a consequent ethical responsibility to address those goals. It may be that observational studies are required to evaluate subjective health change, or qualitative studies as suggested by Keith (1998). There are strong practical and ethical reasons that make more positivist research designs problematic (p. 51, 78). Alternatively, more interpretivist methodologies are said to offer promise for research in the context of client-centred practice (Hammell, 2001).

Satisfaction with Performance

Results

Significant positive change in satisfaction with performance was associated with participation in client-centred, team-based rehabilitation. Two explanatory factors were associated with change in satisfaction scores: program format and diagnosis. Neither of the efficiency-related variables (therapy intensity or LOS) was associated with satisfaction with performance, but there was a strong negative association between admission satisfaction scores and satisfaction change.

Discussion

Subjects in IRP reported significantly increased change in satisfaction scores compared to those in HRP. It has already been acknowledged that subjects in the IRP, typically with lower functional scores on admission compared to those in HRP, had demonstrated relatively greater disability level improvement than those in HRP (p. 141). Subjects included in the study from IRP typically needed to make progress across many domains, and this wide-ranging progress may have accounted for the higher levels of satisfaction score change for these subjects, compared to those in HRP who most often listed fewer subjective health goals.

Those with neurological diagnoses reported significantly greater change in satisfaction scores than those with orthopaedic diagnoses. Satisfaction with progress after neurological illness may be related to the potentially catastrophic nature of the diagnosis. Stroke, for example, can result in major disability affecting all aspects of life and there may be high satisfaction and relief at signs of progress. Alternatively, it could be suggested that patients may expect full recovery after a fracture and report relatively reduced satisfaction with performance if recovery is not complete. Given the age range of the cohort, and the subsequent likelihood of comorbidities, restoration to previous functional status is not necessarily expected.

The lack of association between satisfaction change and the efficiency-related variables was noted. Satisfaction with performance may be a difficult construct to link with efficiency. Other studies exploring satisfaction have done so by linking satisfaction with elements of the rehabilitation program, or with measurable outcomes, rather than measuring the association between satisfaction with self-rated performance and intervening variables. Keith (1998) stated that satisfaction is a complex concept and that its measurement and implications are complex. Nonetheless, patient satisfaction is an important outcome measure and requires further exploration.

Recommendations

It is recommended that further studies of subjective health change after rehabilitation be undertaken. It is acknowledged that this is a difficult area for research, given the subjective nature of both the concepts of personal health definition, and of the measures used.

Studies of the relative change in satisfaction with performance for patients of varied ages, with varied diagnoses, and within varied rehabilitation formats are recommended.

It is recommended that further study of client-centred rehabilitation goal achievement as a measure of patients' move towards subjectively defined health be undertaken.

Associations Between Subjective Health Measures

Results

In contrast to the lack of significant association between changes in the global health measures, the association between change scores on the subjective health measures was moderately strong (r = .681**, p = <. 0005). This correlation supports those reported by Bodiam (1999) (r = .69, p < .01), and McColl et al. (2000) (r = .68, p < .01).

Discussion

The similar level of association reported from several studies is suggestive of these two aspects of subjective health (performance in preferred activities and satisfaction with that performance) being related. It may follow that improvement in performance is related to improvement with satisfaction with that performance. However, in some instances, it could also be anticipated that patients may be satisfied with a given rate of progress, while others may aim for quicker change in performance, and consequently be less satisfied at a given point.

Association Between Results Related to Global Health and Subjective Health

Results

There was no significant association found between change in global health at disability level (FIM change) and change in subjective health (COPM Performance or Satisfaction change scores). There was a weak significant association reported between change in global health at handicap level (RNL change) and change in subjective health (COPM performance change) ($r = .371$, $p = .017$, $\alpha = .05$).

Discussion

The lack of association between disability change and subjective health change indicates that rehabilitation teams that choose to evaluate outcome with only a disability level measure are not capturing information about the subjective health experience. In this study, for example, only six subjects (11.3%) identified health goals from the disability domain alone. Rehabilitation philosophies that purport to produce better outcomes based only on disability change may be ignoring the full rehabilitation outcome, including particularly the relevance and meaning of those outcomes to patients. Edwards, Playford, Hobart and Thompson (2002) also highlighted this point, and found a low correlation between a subjective health change score and FIM change for neurological rehabilitation patients.

Recommendations

Further research of associations between change scores in subjective health outcome measures and global health change scores are recommended, particularly focusing on correlation between changes in these measures when administered under different conditions. Associations may be different if the measures are administered within programs that adhere to different philosophies or use different processes.

It is recommended that rehabilitation outcome should be measured at disability, handicap and subjective levels.

CHANGE SCORES AND EXPLANATORY VARIABLES

Theoretical papers (Hoenig et al., 1999) and rehabilitation practice guidelines (Australasian Faculty of Rehabilitation Medicine [Victorian Branch], 1997) indicated that rehabilitation is a complex process provided in varied formats to many diagnostic groups and across age ranges. Factors, such as patients’ cognitive status could also affect rehabilitation outcome (Johnston & Hall, 1994). The association between major factors (age, cognition, diagnosis, and program format) and global and subjective health changes explored in this study are now considered, along with associations between efficiency-related aspects, associations between admission status and health changes, and finally client-centred features.

Diagnosis

Results

Although diagnosis is said by some to be a factor affecting rehabilitation resource use and outcome (Kane, 1997), the results in the current study indicated that diagnosis was not differently associated with change in either of the measures of global health or with the performance aspect of subjective health. Diagnosis was weakly associated with change in the other aspect of subjective health status (satisfaction with performance) (p = .035, using alpha at .05).

Discussion

Most research reviewed was related to specific diagnostic groups and change on global health measures, typically at disability level only. Seldom were details regarding the severity of disability on admission to rehabilitation were recorded.

Recommendations

It is recommended that rehabilitation outcome at global and subjective levels be explored for the various diagnostic groups participating in client-centred, team-based rehabilitation, and that severity status is recorded for subjects on admission.

Cognition

Results

Cognitive status as measured by the FIM cognitive score was not differently associated with change in handicap or subjective health in this study. However, the cohorts for cognitive status were uneven (Normal cognition: n = 12 [22%], Impaired cognition: n = 2 [78%]). As the cognitive FIM score was used for cognitive screening and the total FIM score was used to measure disability change the analysis between cognition and disability was not considered valid.

Those with impaired cognition demonstrated a longer length of stay than those without (Impaired cognition: Mean LOS = 46.17 days [SD 9.36 days], Normal cognition: Mean LOS = 25.71 days [SD = 2.07 days]). This cohort was also provided with higher daily average therapy intensity (Mean therapy intensity = 1.92 hours [SD = .79], compared to the subgroup with normal cognition (Mean therapy intensity = 1.29 hours [SD = .80]).

Discussion

Given the indications that cognitive status might be critical for the rehabilitation outcome for some diagnostic groups (MacNeill & Lichtenberg, 1997), the routine use of a brief valid and reliability-tested cognitive screen is important. For research purposes where the FIM is used, and comparison with disability scores between cohorts is required, an alternative cognitive screen to the Cognitive FIM may be used. As noted (p. 55), the Mini Mental State Examination (MMSE) has been recommended.

An association between cognitive impairment and functional outcome has been reported (MacNeill & Lichtenberg, 1997), and cognitive status on admission reported to be predictive of both motor and cognitive outcome for some diagnostic groups (Heinemann et al., 1995). No quantitative studies were identified that investigated associations between cognitive impairment and rehabilitation outcomes across disability, handicap and subjective health levels. The potential impact of cognitive status on subjective health has been explored in longer-term qualitative studies (Nochi, 1998), but little research appears to have been undertaken using either methodology in regard to its impact on subjective health after initial rehabilitation. Given that there was no significant association between cognitive impairment and changes on subjective health measures after initial rehabilitation in this study, and given the reported associations between impaired cognition and longer-term rehabilitation outcomes, further exploration is needed.

The differing lengths of stay and therapy intensity provided for the two cognitive status-related cohorts suggests that cognition may be a critical factor in estimating program costs, and very likely post rehabilitation support costs. Cognitive screening, and where indicated, in-depth cognitive assessment, may be of assistance in planning rehabilitation programs for individuals, and at a broader level, in developing funding models.

Recommendations

Further research on the impact of cognitive impairment, identified through use of a cognitive screening tool such as the MMSE or cognitive FIM score, on global and subjective health status after rehabilitation for varied diagnostic groups, and for groups with varied functional status on admission, is recommended.

Research on resource requirements for patients with different cognitive status on admission to a variety of rehabilitation formats is also recommended.

Age

Results

Age was not found to be differently associated with change in either global or subjective health change in this study. In other words, the age of subjects could not be used to predict global or subjective health outcome after rehabilitation. There were however, differences between the age-related cohorts in the average time spent in rehabilitation (LOS) and in the intensity of therapy provided. For example, the youngest age-related cohort (< 50 years) was provided with higher therapy intensity and a longer length of stay than any other age-related cohort (see Table 13, p. 114).

Discussion

Reeder et al. (1996) found age not to be significant in anticipating rehabilitation outcome, and Harwood et al. (1997) found no association between age and handicap level after rehabilitation following stroke. However, these studies did not provide information regarding therapy intensity or program length. Cifu et al. (1996) reported that therapy intensity and program length could vary with age. Cifu et al. suggested that older patients might receive lower therapy intensity due to a decreased physical endurance related to normal aging, as well as pre-existing or current medical complications. The authors indicated that the capacity to participate at a given therapy intensity level as well as the likely LOS, should be considered as underpinning factors relevant to individual and broader program planning.

The variation in therapy intensity may reflect some bias against older patients in some circumstances while in rehabilitation programs as suggested by Rybarczyk et al. (2001). Then again as suggested by Kramer (1997) there may be stronger advocacy from the parents or families of younger rehabilitation patients and this may lead to them receiving relatively more service.

Given the factors cited as perhaps impacting on length of stay and those that may affect therapy intensity, comparisons in efficiency levels are very complex indeed. Nonetheless, exploration of better ways to collect relevant data may assist in increasing the accuracy of efficiency data, and subsequently in planning services in the longer term.

Recommendations

Further study is recommended, in relation to the age of rehabilitation patients, their length of stay, and changes in their health status, and the availability of social supports. Research into the attitudes of rehabilitation staff regarding the provision of intensive and relatively prolonged rehabilitation to patients within different age cohorts is also recommended.

Program Format

Results

In the current study, participation in a specific rehabilitation program was differently associated with disability level change reported in the other rehabilitation program. Participation in facility-based rehabilitation was associated with greater changes in status at disability level than participation in home-based rehabilitation. However, as noted (p. 112), the functional profile of patients selected from the two programs was likely to have affected the result. Patients in IRP were provided with a higher average daily therapy intensity than those in HRP (IRP M = 2.14 hours [SD .80], HRP M = 1.04 hours [SD .60]) and also had longer LOS (IRP M = 44.39 days [6.05], HRP M = 22.60 days [SD 1.94]).

This study has provided valuable information to the rehabilitation service about the difference in admission status for patient groups being admitted to the programs. Admission data from the newly instigated home rehabilitation program indicated that patients were admitted to that program with higher functional status than those from the inpatient program. This admission status difference, however, makes the reported differences in functional change for patients admitted to the two programs very difficult to interpret.

Discussion

Trombly (1995) had stated that rehabilitation provided in the patient’s usual environment is likely to be more effective, as the meaningfulness of the patients’ environments may facilitate motivation. Gilbertson et al. (2000) had indicated that there would be better outcomes for those whose rehabilitation was provided in the usual environment as interventions are more likely to be relevant and appropriate to the person’s needs. Furthermore, practicing functional tasks in the usual environment, rather than practicing the physical or motor patterns required for an activity in a clinical environment, has been said to result in superior outcomes (Kwakkel et al., 1999). However, Lafferty (1996) found only weak evidence for the superiority of community-based alternatives to facility-based rehabilitation, when a variety of such programs were reviewed.

This study suggested that a higher level of disability change was demonstrated within the IRP. However, there was variation in admission status for patients in the two programs, and differences in selection practices in regard to the client-centred process (pp. 77–78). Furthermore, there was a limitation in the capacity of the FIM to register change for patients selected for the study from HRP due to a ceiling effect. Findings are therefore tentative, and further exploration is recommended.

Recommendations

Given the difficulties noted, the design of further studies requires consideration. A comparison of disability level outcome would be possible through a randomised trial if patients considered safe for home-based or facility-based rehabilitation were to be randomly allocated to either program. Alternatively, a matched-pairs study could be undertaken. Each patient admitted to one program format could be matched according to admission disability level (for example, using a five point range for each of the motor and cognitive FIM scores), diagnosis, age and cognitive status, to a patient in the other program format. Alternatively, the regression-discontinuity (RD) design (Trochim, 1984) may be considered an appropriate design for program comparisons.

The identification of a disability measure appropriate for both programs would be important especially if admission practices continue to favour a less disabled cohort in home-based rehabilitation. Further, the additional routine use of a reliable and valid handicap measure in both programs may provide the necessary global health change information for both groups.

INTERVENING FACTORS

This study described change on health measures related to global and subjective health, after patients had been provided with client-centred, team-based rehabilitation. Sub-cohorts were identified in relation to major variables (diagnosis, cognition, age, and program type), and any comparative health changes considered. Length of stay in rehabilitation programs (LOS) and the intensity of therapy provided to those sub-cohorts were regarded as intervening variables related to program efficiency.

Therapy Intensity

Results

Therapy intensity referred to a patient's total individual therapy time divided by the total days spent in the program (p. 87). As previously acknowledged (p. 112–115, p. 118), there was wide variation in the therapy intensity provided within and between the cohorts. In examining the raw data, it appeared that therapy intensity was related to combinations of factors, for example, subjects in IRP with a neurological diagnosis, cognitive impairment and in the older age cohort, appeared to be provided with high therapy intensity.

A significant association was reported between therapy intensity and disability change as recorded on the FIM (r = .574, p = .000, α =.01), along with a weak yet significant negative association between therapy intensity and performance change (r = -.272, p = .049, α = .05).

Discussion

Variation in therapy provision was reported by Kwakkel et al. (1997) who identified a wide range of therapy intensity provided by different rehabilitation teams. There may have been differences in approach between the two rehabilitation teams (IRP and HRP) in terms of therapy intensity expectations, and this was neither explored nor measured. Furthermore, there were likely to be more opportunities for therapy to be provided for those in IRP (Hubbard & Dow, 1999). On the other hand, family carers of HRP subjects may have provided extra therapy for subjects after observing therapists' treatment or after being trained to provide therapy. This would have changed the therapy intensity provided to subjects, but would not have been reflected in therapy intensity data. Given that Baskett et al. (1999) had reported that outcomes were similar for subjects who were provided with therapy by family carers trained by therapists to those with therapy provided by therapists, this is an issue requiring further investigation.

Alexander, Bugge and Hagen (2001) found that those with most disability received most therapy and demonstrated most disability change while in a rehabilitation program, and suggested that therapy was likely to be appropriately targeted to those with greatest need to achieve competence in simple self-care and mobility tasks. These results are in contrast with the study by Heinemann et al. (1995) where no association was found between therapy intensity and disability change. In the current study, the results suggest that while those who need intensive therapy to achieve disability change received it.

There was no attempt made in the current study to describe the therapeutic techniques used in therapy time, that is, the therapy content. This approach is supported by Laing (1997), who indicated that it is better not to take a reductionist approach that aims to identify the precise ingredients of interventions used by health disciplines that contribute to positive change. He suggested instead the need to establish the relationship between good outcomes and a general rehabilitative process. This has been the approach taken in the current study, where the associations between the provision of a client-centred, team-based program and change in global and subjective health measures have been described. It is acknowledged however, that other researchers such as Banja (1997) have recommended that elements leading to improvements be investigated, and that health disciplines have been encouraged to explore the efficiency of their therapeutic techniques by others (Dalley, 1999; Ma & Trombly, 2002).

In this study, no attempt was made to measure the reliability of the therapy data, and no assumptions of reliability can be made. The possibility of therapy being provided by family carers for HRP patients and not included as therapy data was acknowledged. Associations between therapy intensity and major factors shown in this study are therefore reported with considerable caution.

Recommendations

Further work to develop accurate reporting of therapy time and type is recommended, followed by studies exploring associations between therapy type, therapy intensity and global and subjective health outcomes.

Length of Stay

Results

Mean length of stay (LOS) varied between subjects in HRP (M = 22 days) and IRP (M = 36.6 days), as well as between diagnostic groups (orthopaedic M = 24.7 days, neurological M = 36.6 days), and between cohorts related to cognitive status (normal cognitive status M = 25.71 days, reduced cognitive status M = 46.17 days). There was a significant association between LOS and FIM change reported in this study ($r = .651$, $p = .000$, $\alpha = .01$).

Discussion

Length of stay is a difficult variable to explore in comparative studies, as issues that may affect LOS such as program differences, and availability of post discharge supports are seldom reported in studies. Length of stay data may be embedded in cost-effectiveness data in some studies; for example, Rossi et al. (1997) and Westerkam et al. (1997) reported FIM change per day.

Hall and Johnston (1994) described transfers of patients to other programs within a continuum of care as generally resulting in the movement of patients from a high cost program to a less expensive one. This was the approach described in the report pertaining to a relatively new continuum of care model in Victoria (Department of Human Services, 1999) where safety, choice and efficiency were considered important. It means, however, that efficiency, described in terms of length of stay may not solely be related to patients achieving similar functional status as measured by discharge from a single program, but that LOS needs to be considered across the whole episode of care and related outcome.

Length of stay, however, is typically reported in association with the time for safe discharge from an inpatient program, rather than being related to the end of a rehabilitation process. This is regrettable, and outcome evaluation including efficiency data after an entire episode of care is also recommended in line with Kramer, (1997).

Recommendations

Exploration of methodologies to collect data on the efficiency of an episode of care in rehabilitation, as well as the development of a framework to describe efficiency of inpatient or other rehabilitation programs is recommended.

Association Between Admission Health Scores and Outcome

Significant association was reported between admission and change scores on each of the measures of global and subjective health. In each instance the association was moderately strong and negatively associated. That is, the lower the score on admission the greater the relative positive change on discharge. While this finding has been previously reported in relation to disability (Oczkowski & Barreca, 1993; Reeder et al., 1996; Ring et al., 1997; Stineman et al., 1998), similar studies related to subjective health had not been identified in the literature.

Recommendations

Further studies exploring the association between admission status across global and subjective health levels and change on those measures over time are recommended.

CLIENT-CENTRED ASPECTS

Introduction

The structured, client-centred process described in this study required implementation of several elements: identification of subjects’ health goals, interventions focussed on those goals and client-rated outcome evaluation. It was not possible to separate these elements in regard to their possibly differing association with changes on health measures, as they were designed to be part of an integrated therapeutic approach.

Data from this study indicated that a structured, client-centred process was either more likely to be implemented as part of a program’s routine protocol, as was the case for HRP (with 90% of the annual cohort of patients selected for the client-centred approach), or when a particular benefit to the patient and team was perceived, for example for patients with complex needs in IRP (8% of the annual cohort of patients selected). Client-centred practice for a group representative of the broad range of patients admitted to IRP was minimally explored in this study.

It cannot be claimed that the health gains reported in this study would not have been similar without the integrated client-centred process. However, it was through the client-centred approach that the patients' subjective health goals were identified, with consequent focus on those goals by the treatment team, and the clients' views of gains made were measured. Following Hammell (2001), the knowledge that outcome evaluation would include subjective measurement may have facilitated a focus on patients' subjective health goals. Furthermore, the process provided opportunities for therapists and patients to discuss the steps required to achieve subjective health goals, or the possible barriers to their achievement, so the process may have assisted in providing opportunities for education and support.

Recommendations

Further exploration of methods of structured goal identification is recommended.

Research regarding the degree of focus on patient identified goals within rehabilitation programs is recommended.

Qualitative exploration of the experience of patients involved in client-centred rehabilitation is recommended.

OTHER IMPLICATIONS TO BE CONSIDERED

The literature review highlighted other aspects of client-centred rehabilitation that were said to be of importance. The implications of these issues were not explored in this study, but it is recommended that they be considered in larger studies.

The resources needed to develop a client-centred approach require exploration as McGrath et al. (1995) indicated that significant staff time is required, and this was also the experience in the facility where the current research was undertaken. The relative commitment of health team members to a client-centred approach, and the effect of the philosophical stance adopted on processes and outcomes require attention. The long-term effectiveness of the client-centred approach, and any effect it may have on patients' adjustment also requires further exploration.

ISSUES RELATED TO OUTCOME MEASURES

The measures used in this study have been reviewed in other parts of this thesis (p. 88–94). The usefulness of the measures in the context of the client-centred process used in this study is now briefly discussed.

Reintegration to Normal Living Index (RNL)

The importance of handicap measurement had been emphasised in the literature: “If measuring nothing else, it is important to measure handicap as it is a meaningful measure” (Rosenthal, 1996, p. 88). The information gained through the RNL in this study was useful in identifying meaningful rehabilitation goals and in highlighting a need for collaborative rehabilitation planning, as well as in evaluating handicap level outcome. The RNL was therefore useful from both the research and clinical perspectives.

Although staff reported some difficulties with the administration of the RNL, it may be that handicap level measures can be complex to administer, given the range of domains covered, the subjective nature of handicap, and the often complex verbal content of handicap measures. In reporting the assistance required for completion of another handicap level measure, the London Handicap Scale, Harwood, Gompertz, and Ebrahim (1994) reported that 71% of respondents (*N* = 141) required help to complete that questionnaire. In the current study the RNL was successfully completed by 78 % of subjects, with therapist facilitation, and in some instances, the involvement of family advocates.

It was recognised by staff that patients’ own perceptions of problems as rated on the RNL gave some indication of their insight. The admission RNL also helped identify premorbid life role preferences and the likely areas for consideration in rehabilitation planning. Some therapists reported that the discharge scores on the RNL were helpful in suggesting changes in insight, as well as patients’ further rehabilitation needs and likely motivation in future rehabilitation programs.

The structure in the RNL appeared to assist in facilitating consideration of problems beyond those traditionally assumed to be the domain of specific health disciplines, and those that required collaboration between disciplines. For example, a goal related to return to ballroom dancing for one patient with severe physical impairments related to a stroke required: involvement of the physiotherapist (mobility issues), occupational therapist (access issues), psychologist (adjustment to loss of a valued activity) and social worker (exploration of a similarly satisfying community-based option). Importantly, the team of health professionals was needed to plan the sequence and intensity of interventions, which were related to remediation, compensation and adjustment.

While the RNL posed some challenges for patients with cognitive or communication impairments, involvement of patient advocates was said to assist these patients. Other handicap measures may have similar or different advantages and further exploration of handicap measures is recommended.

Functional Independence Measure (FIM)

The FIM has the major benefits of a broad research base, it is validated and reliability-tested. However, the ceiling effect demonstrated in HRP subjects supports the view of Jette (1997) who stated that the FIM is most appropriate for facility-based programs where patients with more potential for FIM change are usually located. As already stated, the high mean FIM score recorded for HRP patients may be more a reflection of admission practices, than the potential of that program to rehabilitate patients with higher levels of disability.

The clinical usefulness of the cognitive FIM scale was highlighted in this study, as it was the only quantitative cognitive score routinely recorded for all patients. It was acknowledged that use of the scale confounded one aspect of the multivariate analysis undertaken, and that an alternative cognitive screen would need to be used in future research if the total FIM score was used in measuring disability. However, the cognitive FIM is considered a credible instrument in clinical practice, as a cognitive screening tool in rehabilitation (Zwecker, 2002). As well as providing information on cognition, collaborative scoring, such as that recommended for the FIM, can facilitate team discussion on cognitive issues and interdisciplinary treatment strategies, particularly in a client-centred context.

Canadian Occupational Performance Measure (COPM)

Self-report on the COPM was possible for all but one participant in this study, and therapists did not describe difficulties in administering the performance domain of the measure. Some therapists described the satisfaction scoring as more challenging for some patients. Proxy respondents, as recommended by Pollock (1993) were involved when participants had severe cognitive or communication impairments. Selected family members undertook this role, after therapists negotiated participation, and this was found to be helpful, as was the assistance of speech pathologists for patients with cognitive impairments.

Chan and Lee (1997) had reported variation in the quality of information elicited through the COPM and recommended a more standardised approach to using the measure, while McColl et al. (2000) found patients able to generate more problem areas when the COPM was administered within a structured interview. The use of the RNL prior to the COPM provided a structured process that had the potential to focus on individual patient issues. The structure within the goal identification process used in this study may have assisted as subjects identified a broad range of health goals (p. 120). Further studies of the use of the COPM alone, and in conjunction with other measures may be of interest to clinicians.

On the other hand, Toomey et al., (1995) stated that the utility of the COPM depends on “the degree to which therapists had incorporated the client-centred approach in their practice” (p. 242). These findings are in keeping with Stewart et al. (2000) whose study indicated that benefits were evident when health professionals worked to understand the patient’s illness, and tried to find common ground in approaches to treatment. This implies a need for commitment to the communication required as well as to the following of a process. Anecdotal reports over the time of the study supported this concept.

ISSUES RELATED TO RESEARCH DESIGN

It is acknowledged that the descriptive design of this study prevented the attribution of the positive changes on health measures to the client-centred process used, and the difficulties involved in using a more rigorous scientific approach have been canvassed (p. 51, p. 78–79). The structured goal-planning process had been developed as a client-centred therapeutic strategy, and it enabled descriptive evaluation of health change. The rehabilitation team had developed the goal-planning process, and it was essential to the practical implementation of the philosophical and theoretical bases of the client-centred process. It carried with it a strong ethical responsibility to address the goals identified by the vulnerable patients in the rehabilitation programs.

From the clinical perspective, a descriptive study was the necessary option, as attempting to undertake a controlled study involving individual goal identification, without addressing those goals with vulnerable patients would have been ethically fraught. A prospective matched pairs design, as recommended by Hellman and Hellman (1991) to minimise such ethical issues, may be helpful in exploring this process in future studies. An interpretivist approach could also be considered; Hammell (2001) suggested that qualitative research might provide appropriate methodologies to explore the client-centred goal planning process.

As the study progressed, issues become apparent in regard to the varied selection protocols developed between programs, and to the different admission practices between programs. A matched pair design may be helpful in overcoming this problem in future research.

It would be possible in future studies to measure global and subjective health without using this specific goal planning process. Use of other subjective health measures, such as the Life H Scale (Fougeyrollas et al., 1999) could be explored. This may allow pre and post measurement of subjective health, and may allow a more robust research design. However, the acceptability of this approach would depend on the rehabilitation team's belief in the therapeutic value of goal planning in patient motivation.

The client-centred process explored and described in this study was informed from the relevant theoretical literature in terms of definitions and processes. However, the implementation of such rehabilitation processes is seldom described in detail within research literature (Fuhrer, 1995). Difficulties are therefore apparent for future comparative studies due to this lack of clarity in the language of client-centred practice in the literature (Wade, 1999d), with the emphasis on valuative and philosophical statements, rather than operational statements. Even basic information such as the process of negotiating consent for planned treatment, whether the treatment is in line with patient-identified or team-identified goals, is seldom documented, despite consent being an underlying principle in health care (Haas, 1995). Comparative studies would need to include clear criteria for client-centred programs, and expert-driven programs.

Conclusions

HEALTH CHANGE AFTER CLIENT-CENTRED, TEAM-BASED REHABILITATION

This study described significant positive changes on global and subjective health measures in association with client-centred, team-based rehabilitation. While causation cannot be claimed, strong association was reported between outcomes for patients and the client-centred process.

The lack of any association between change on the two global health measures (disability and handicap), along with the lack of a strong association between change on global and subjective health measures, indicates that outcome evaluation needs to be undertaken covering these three domains if a complete picture of client outcomes is to be reported.

Client-centred, team-based rehabilitation was associated with decrease in disability, and this is in keeping with outcomes reported for more traditional rehabilitation programs. The association between admission disability status and disability change after rehabilitation is also indicative of consistency in outcomes with previous studies. This may suggest that patients participating in client-centred, team-based rehabilitation were not disadvantaged by the provision of a client-centred approach in terms of the more traditionally measured and valued disability level outcome.

Rehabilitation patients in this study identified health goals across a range of domains, and most often goals were not limited to simple mobility and self-care tasks. This was in keeping with other studies that used a client-centred approach.

MAJOR AND INTERVENING FACTORS

Findings in relation to the expected contributing factors for rehabilitation outcomes raised issues for further exploration. For example, between-program comparisons, in terms of global and subjective health outcomes, as well as efficiency, may need to be explored at the completion of a total rehabilitation process. Age and cognitive status on admission may be important in rehabilitation planning and in the prediction of individual program costs. Length of stay in rehabilitation and therefore rehabilitation costs may be affected by elements unrelated to therapeutic programs (such as the availability of family carers, environmental access or the availability of community-based support). These need to be described in studies of rehabilitation outcomes if valid comparisons are to be made.

GLOBAL AND SUBJECTIVE OUTCOME MEASURES

The addition of a handicap measure, such as the RNL, to a valid and reliability-tested disability measure can give a more accurate description of the scope of global health change after rehabilitation. Measurement of handicap as undertaken in this study, also assisted in the framing of subjective health goals, and in indicating unmet needs at the completion of a rehabilitation program. Handicap measures may be difficult to administer to patients with severe cognitive or communication impairments, and the assistance of carer advocates or therapists expert in communication for this patient group is recommended.

CLIENT-CENTRED PRACTICE

A continuing focus on therapy planning related to subjective health goals and goal-related progress within the study may have facilitated a functional therapy focus. This client-centred approach needed to be tempered by duty of care considerations, with team goals being introduced when safety issues arose.

The client-centred process required time and resources, particularly in the development phase. Despite the support of rehabilitation theory for the approach and some preliminary evidence, its continued development is likely to be dependent on evidence of its effectiveness and cost efficiency.

It is anticipated that positivist research related to client-centred practice would be difficult to undertake due to ethical issues related to the establishment of a control group and randomisation, in the context of a vulnerable and expectant target group. However, a prospective matched pairs study and interpretivist methodologies offer promise.

LONG TERM ISSUES

If broadly based review of health outcome after rehabilitation is recommended as a general practice, health professionals who can assist patients with long-term adjustment issues might need to be available for patients in the longer term. This may add costs to those currently anticipated for an episode of rehabilitation.

Although adjustment was not measured directly in this study, preliminary evidence in the literature indicates that home-based rehabilitation may assist. A home-based rehabilitation program could be recommended for those with severe unresolved disability, and adjustment studied in comparison to those provided with facility-based care, at discharge and at review to explore this issue further.

Recommendations

AREAS FOR FURTHER RESEARCH

Further specific research on the following is recommended:

- the comparative health outcomes for patients provided with either inpatient or home-based rehabilitation;
- comparison of outcomes and resource requirements for rehabilitation patients with different levels of cognition on admission;
- comparison of outcomes and resource requirements for rehabilitation patients of different ages on admission;
- exploration of the impact of the availability of social and community supports for patients within varied age groups on length of stay and changes in health status;
- the attitudes of rehabilitation staff regarding the provision of rehabilitation to patients within different age cohorts;
- exploration of health outcomes for different diagnostic groups participating in client-centred, team-based rehabilitation;
- comparison between the subjective experience of patients involved in client-centred rehabilitation and expert-driven rehabilitation;
- further study of client-centred rehabilitation goal achievement as a measure of patients’ move towards subjectively defined health;

- alternative research methodologies be used to evaluate rehabilitation outcomes, for example, a prospective matched pairs design, an interpretivist approach, the regression-discontinuity (RD) design.

REHABILITATION PRACTICE AND OUTCOME MEASUREMENT

It is recommended that:

- health changes after rehabilitation be routinely evaluated at handicap, disability and subjective levels;
- there is a range of outcome research tools be made available to the field for routine use;
- health changes be evaluated at the completion of each component rehabilitation program, after a whole rehabilitation episode and at six months after final discharge;
- variation in rates of change in disability, handicap and subjective health after client-centred rehabilitation and after expert-driven rehabilitation programs also be explored;
- the association between admission status and change in status across global and subjective health levels be explored over time.
- evaluation of the benefit of a brief cognitive screen to assist in rehabilitation planning, or as an indicator for the possible need for an in-depth cognitive assessment be explored;
- that an accurate system of therapy-related data collection is developed and the data collected be reliability tested.
- further development of client-centred methodologies is explored, especially in relation to structured methods of health goal identification;
- handicap measures be used at the end of each phase of rehabilitation to help identify the need for further rehabilitation, and the patient’s likely motivation to participate;
- the benefit of using the COPM alone, and in conjunction with other measures be explored.

Summation

This study described the changes on health measures after participants were provided with a client-centred approach to rehabilitation. Staff, under the leadership of rehabilitation managers, aimed to provide rehabilitation that was developed “in response to the uniqueness of each person: his or her history, abilities, disabilities, environment, and expectations” (Bauer, 1989, pp. 21-22). Some aspects of the client-centred approach described in theoretical and research literature had been structured into a team-based rehabilitation process over a period of years prior to these outcomes being described.

The clinical significance of the study related to the development of the formalised client-centred process, as well as to the health changes described. The identification of some reliable and valid measures suitable to evaluate outcome in client-centred rehabilitation at global and subjective levels is another outcome of the study. The study attempted to use an outcome evaluation process which recognised a conceptual framework as recommended by Keith (1995); the framework reflects the ICIDH-2 (WHO). That framework acknowledges health being experienced subjectively as well as being able to be measured objectively.

Subjects demonstrated statistically significant positive change on global and subjective health measures in association with the provision of client-centred team-based rehabilitation, regardless of their diagnosis, cognitive status or age, or of the rehabilitation program format provided. This descriptive study is suggestive of a client-centred process being of benefit, which is in keeping with rehabilitation theory. The study design, however, precluded attribution of the health changes to the rehabilitation approach provided.

The study was limited by the lack of a control group and randomisation, as well as by the absence of a review evaluation. However, the preliminary study did offer support for the contention that a client-centred, team-based rehabilitation process as recommended in theoretical and medical ethics literature can be implemented and its outcome described. Outcome trends described and compared with expert-driven rehabilitation suggested that patients would not be disadvantaged from the client-centred process.

The significant positive change in global and subjective health status after rehabilitation suggested that client-centred, team-based rehabilitation might possibly offer a link between illness and health. Subjects in the study indicated through their rehabilitation goals what it meant to them to be healthy, and reported significant progress towards the achievement of those health goals after rehabilitation. The study supports the view taken by Hare (1986): it is the experience of the person that determines whether or not there is health or illness, sometimes despite the presence of unresolved disease. Further development of client-centred, team-based rehabilitation has been recommended, as have further studies exploring its outcomes.

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APPENDICES

APPENDIX 1

Definition of Terms

acute care Medical treatment usually provided in an acute hospital and typically treating pathology.

adjustment The gradual psychological process that can include understanding, acceptance, and change in self-appraisal after sustaining disability or handicap.

admission The time that the patient enters the rehabilitation program.

case conference Regular planning and review discussion involving the rehabilitation team.

client-centred practice Intervention provided to a patient who has been involved (as far as possible) in health problem identification, treatment planning and outcome evaluation.

cognition Processes associated with an individual's ability to think and including processes such as: planning, decision-making, judging and remembering.

communication Processes that allow understanding and expression of verbal, gestured, and written messages.

consent Patient’s active agreement to receive care or participate in the care process.

diagnosis Medical description of an illness.

disability Any restriction or lack (resulting from an impairment) of ability to perform an activity in the average manner or range.

discharge The time the patient exits the rehabilitation program.

discipline Health profession with a specified and recognised training, theory and practice base.

duty of care Professional responsibility to ensure patients’ safety and to provide appropriate care.

ethics Principles and responsibilities that guide professional practice.

expert-driven rehabilitation A rehabilitation program provided by a team of health professionals who design, implement and evaluate the program, with little reference to patients’ individual health goals.

functional outcome Appraisal of patient’s ability to undertake everyday tasks.

global health outcome The impact of rehabilitation interventions and other active factors on individual health.

handicap Disadvantage for an individual, resulting from an impairment or disability that limits or prevents the fulfilment of the person's normal role.

impairment Any loss or abnormality of psychological, physiological or anatomical structure of function.

individual health outcome Outcome of rehabilitation as perceived by the patient, and for this study, related to personally defined health.

meta-analysis Statistical analysis of the outcome of a group of studies investigating a specific research question.

rehabilitation program The format of the rehabilitation offered: facility-based rehabilitation for inpatients (IRP), or home-based rehabilitation (HRP) provided in the person's usual home environment.

rehabilitation team Group of health practitioners undertaking a coordinated approach to address a health problem.

sequelae Consequences or aftermath of a pathology state or illness.

sub-acute care Treatment program provided to address impairment, disability and handicap, that is, a rehabilitation program.

therapy Treatment strategies applied to address impairment, disability or handicap.

APPENDIX 2

Class 1 Studies Related to Client-Centred Goal Planning

APPENDIX 3

Ethics Clearances

APPENDIX 4

Documentation Given to Subjects

APPENDIX 5

Measures and Interventions Cited

Action Research Arm Test (Lyle, 1981)

Barthel's Index (BI) (Mahoney & Barthel, 1965)

Berg Balance Scale (Berg, Wood-Dauphinee, Williams, & Maki, 1992)

Bobath method (Bobath, 1978)

Brunnstrom method (Brunnstrom, 1970)

Canadian Occupational Performance Measure (COPM) (Law, Baptiste, Carswell, McColl, Polatajko, & Pollack, 1994)

Carergiver Strain Index (Robinson, 1983)

Disability Rating Scale (DRS) (Rappaport, Hall, Hopkins, Belleza, & Cope, 1982)

Frenchay Activities Index (Holbrook & Skilbeck, 1983)

Functional Independence Measure (FIM) (Hamilton, Granger, Sherwin, Zielenzy, & Tashman, 1987)

General Health Questionnaire (Goldberg & Williams, 1988)

General Health Questionnaire-28 (Goldberg & Hillier, 1979)

Goal Attainment Scaling (GAS) (Kiresuk & Sherman, 1968)

Goal Planning Tool (Mac Phail, 1996)

Hospital Anxiety and Depression Scale (Zigmond & Smith, 1983)

Independent Living Skills Evaluation (Johnson, Vinnicombe, & Merrill, 1980)

Life Habits Scale (LIFE-H 3.0) (Fougeyrollas, Noreau, Dion, Lepage, Sevigny, & St Michel, 1999)

London Handicap Scale (LHS) (Harwood, Rogers, Dickinson, & Ebrahim, 1994)

Mini-Mental State Examination (MMSE) Folstein, Folstein, & McHugh, 1975)

Modified Barthel Index (Shah, Vanclay, & Cooper, 1989)

Motor Assessment Scale (Carr, Shephard, Nordholm, & Lynne, 1985)

Motor Relearning process (Carr & Shepherd, 1982)

Neuro-developmental treatment (Davies, 1985, 1990)

Nottingham Extended Activities of Daily Living (EADL) Scale (Nouri & Lincoln, 1987)

Performance-Oriented Mobility Assessment (Tinetti, 1986)

Rancho Los Amigos Levels of Cognitive Functioning Scale (Malkmus, Booth, & Kodimer, 1979)

Reintegration to Normal Living Index (RNL) (Wood-Dauphinee & Williams, 1987)

Scandinavian Neurological Stroke Scale (Scandinavian Stroke Study Group, 1985)

APPENDIX 6

Data Collection Guidelines

APPENDIX 7

Results of ANOVA Analyses Normality Tests, Homogeneity Plots, and Correlation Analyses