FROM A SYNCHRONOUS SYSTEMS MODEL TO AN ECOLOGICAL APPROACH TO REHABILITATION OF THE STROKE PATIENT

by

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"There is a tide in the affairs of
men,
Which taken at the flood, leads on
to fortune;

Omitted, all the voyage of their
life
Is bound in shallows and in
miseries."

Julius Caesar -
William Shakespeare

For Jacques, Natalie and Katherine

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SUMMARY

The literature on stroke reveals an increasing interest in the role played by social and emotional factors in rehabilitation after stroke. A comprehensive literature survey shows profiles of spontaneous recovery, the significance of a team approach to rehabilitation, patterns of prognostic significance for long-term recovery and adaptation and formulations of rehabilitation models for the Western world. The importance of depression as a major factor in demotivation to participate in rehabilitation and achieve long-term quality of life post-stroke emerges.

From the literature survey a research design was formulated for the ecological study of a sample of 51 stroke patients at Ga-Rankuwa Hospital near Pretoria. The questionnaire was structured according to the Synchronous Systems Model, and data gathered from the biological, personal and environmental spheres of patients. Data was collected by a multidisciplinary team at three assessment times, three days, two weeks and three months post-stroke. These corresponded to the acute physical phase of stroke, the end of the hospitalisation period, and an assessment of patients once they had been discharged back into the community. Descriptive statistics were obtained on all variables and principle axis factor analysis was performed to verify the factorial structure of the tests. In order to establish whether group scores changed between assessments, t-tests for dependent measures were applied. Pearson Product Moment correlations were computed for the purpose of establishing relationships between variables.

The results revealed dramatically differing biographical characteristics of the sample of stroke patients both premorbidly and at three months after the stroke. Significant recovery profiles emerged in both the physical and

neuropsychological spheres at both the 14 day and 3 month assessments. Depression and the social sphere of role functioning at home and at work emerged as profiles of deterioration. At 14 days, depression was significantly related to physical and cerebral functioning. This changed at three months, with depression also being significantly related to aspects of social functioning.

On the basis of these results, depression after stroke was conceptualised as a severance of relational connected-ness in the social ecological functioning of stroke patients. An ecological approach to rehabilitation is proposed that would seek to reframe the identity of stroke patients and establish relational connectedness post-stroke.

CHAPTER 1

INTRODUCTION

Stroke is a Life-disrupting Event

As a neurological incident catastrophic for cerebral functioning, stroke can result in brain-damaged survivors, impaired in cognitive and motor functioning, deprived of physical autonomy, robbed of satisfying work and interpersonal experiences, and often forced to withdraw from their premorbid social sphere of functioning. The eventshape of stroke, as part of the life line of the individual, is both disruptive and destructive.

> I do not know who coined the word "stroke" but it is such a one-fell-swoop experience that I think stroke is a singularly appropriate term for the sudden cutting-off of competence. (Clifford-Rose & Capildeo, 1981, p.2)

Stroke is the third leading cause of death and disability in the Western world. It is also a major cause of mortality and morbidity in African communities. It has been estimated to account for 4% of all hospital admissions and up to 45% of neurological admissions in Nigeria (Osuntokun, 1980). In Ga-Rankuwa Hospital in the Transvaal, stroke constitutes over 50% of neurological admissions (Joubert, 1987).

Stroke is a challenging illness (Wade, Langton-Hewer, Skilbeck & David, 1985). The initial challenge of diagnosis and medical management evolves into long-term challenges of helping the person to live with residual disability and frequently depression. The disruption that stroke causes in the life line of patients can be conceptualised into three phases (Figure 1.1).

Phase I	Phase II	Phase III
Premorbid functioning	The incident of stroke	Social, emotional and physical functioning after stroke
Life Line		
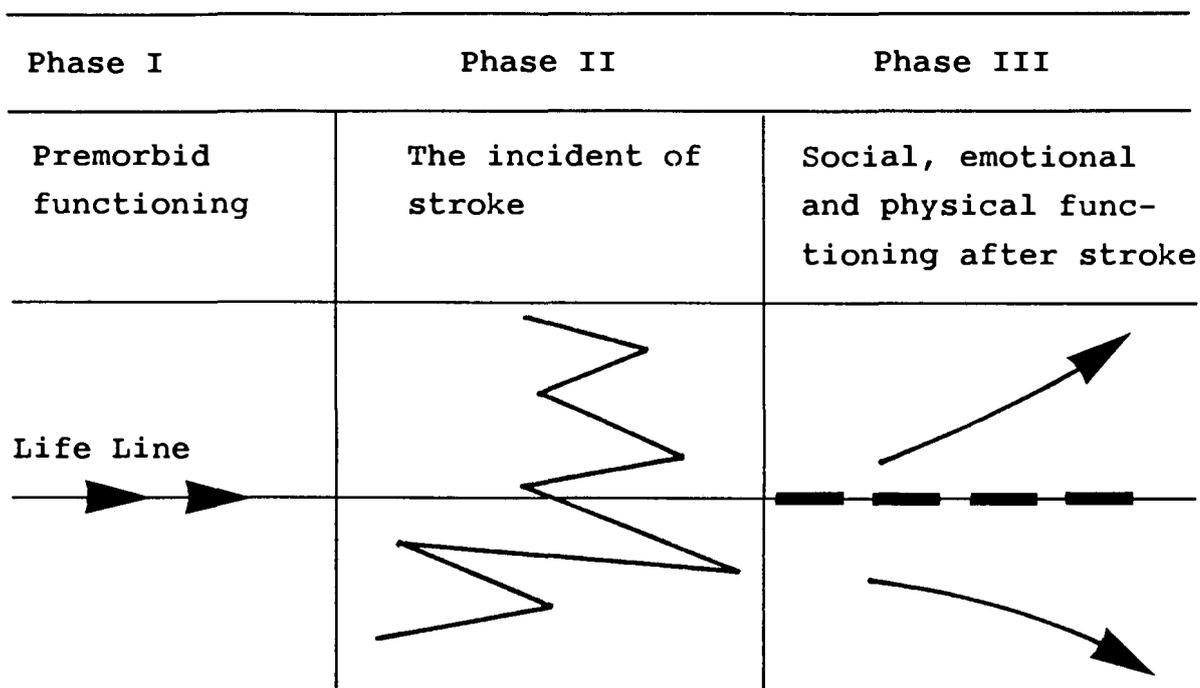
Figure 1.1. The three phases of stroke in the life line of the stroke patient.

Research on stroke in the Western world has centred on aspects of the three phases depicted in Figure 1.1. Precipitating factors in phase I, resulting in the event of stroke, such as diet, hypertension, smoking and life style, have been thoroughly investigated (Joubert, 1987).

In phase II, research has focused on the sophisticated techniques utilised in hospitals to aid in diagnosis, acute life-saving medical treatment of the condition, and the prevention of further strokes (Binder, 1984; Golper, 1984; Holbrook, 1982). Emphasis has been laid on a team of specialised professionals (medical practitioners, occupational therapists, physiotherapists, speech therapists, social workers, nurses and psychologists). Research has also highlighted the importance of planning rehabilitation programmes, focusing on the areas of dysfunctioning emerging

from assessment at the end of the acute phase. These therapies may involve any members of the team mentioned previously and may extend over a period of three to six months, or even a year on an out-patient basis (Basmajian, 1989).

Should the hospital rehabilitation programme fail in returning the patient to a level of functioning relatively independent of the community, then provision may be made for:

- intensive in-patient treatment in a specialised stroke rehabilitation centre (Feder, Ring, Rosenthul & Eldar, 1991);

- intensive out-patient services provided to him in his own home, to assist the family in caring for him (Lesser & Watt, 1978); or

- custodial care (Granger, Hamilton, Gresham & Kramer, 1989).

Medical and surgical treatment is ineffective in the long-term management of the majority of cases of stroke. While the medical profession has the major role to play in primary prevention of stroke (phase I) as well as in the prevention of repeat strokes, in diagnosis and in the acute medical management of phase II, it has little to offer in terms of rehabilitation (phase III).

Research in phase III has focused on the scientific validation of therapeutic techniques as an aid to spontaneous recovery (Lincoln, Pickersgill, Hankey & Hilton, 1982; Wade et al., 1985). This has been both difficult and disappointing. In addition, depression occurring in more than 30% of stroke patients (Collin, Tinson & Lincoln, 1987) reduces their motivation to participate in rehabilitation

programmes and affects their outcomes. However, costly and labour-intensive therapeutic programmes to alleviate the long-term personal suffering of patients after stroke can be justified on humanitarian grounds alone. The motivation for funds to finance these labour intensive services can, however, be problematic.

> The traditional grounds of the appeal of rehabilitation to the public may not be enough. Money is tight. Other people in need are asking for it. The novelty of rehabilitation and its centre piece, the team approach, may be wearing thin. (Diller, 1990, p.275)

This is especially the case in deprived third-world communities, such as the residential areas near Ga-Rankuwa Hospital outside Pretoria. These communities are characterised by lack of financial resources and limited manpower. Here the stark tragedy of the long-term problems experienced by stroke patients is not softened by a vast array of rehabilitation services such as those offered by affluent Western societies.

Stroke patients do, however, constitute a major problem in the area. Hospital records at Ga-Rankuwa Hospital show that an average of 300 new stroke patients are admitted annually. An in-patient team consisting of an occupational therapist, a speech therapist and a physiotherapist (all "shared" with other departments) together with medical and nursing staff is available to provide rehabilitation services for in-patients. A stroke data bank started at the hospital in 1986 indicates the social problems of patients. There have been many cases of tragic neglect, where improvement achieved in hospital by the rehabilitation team, was followed by deterioration and death due to neglect in the community.

Golper (1984) talked of the often "unseen", "generalised" and "dismissed" variables of the emotional, social and

environmental aspects of the recovery process. These dynamics prevail once the work of the therapist in the hospital is over, and the patient discharged back into the community. Basmajian (1989) described the "internal" and "external" factors that can influence improvement after stroke. "Internal" factors are related to the lesion-type, site, size, density, surrounding brain reaction (oedema), and their effects (especially) on motor function and speech disability. "External" factors can affect the recovery of internal factors and are instrumental in the quality of life the patient will experience on his discharge from the hospital into the community. They are broader and sociological; they are ecological. The exact nature of the ecological factors affecting recovery post-stroke is a relatively neglected field of study (House, 1987). The interaction of cerebral lesion, expression of mood, and stressful social events, with their consequent effect on coping skills, remains unexplained. The significance of this area is acknowledged in most research studies, but is usually not delineated or conceptualised.

This study will examine the ecological dynamics of a sample of stroke patients from Ga-Rankuwa Hospital immediately after the life-disrupting event of stroke (phase II), and on their return to the community (phase III).

Aims of the Study

- An evaluation of the theories surrounding the condition of stroke and its effect on physical, social, and emotional functioning; implications for rehabilitation and the value of Western rehabilitation technology in recovery.

- An evaluation of the role played by depression in recovery after stroke and its effect on motivation and social integration.

- An analysis of a consecutive sample of stroke patients from Ga-Rankuwa Hospital to establish recovery profiles over a period of three months and to establish any significant relationships between ecological variables.

- The development of an ecological approach to rehabilitation of the stroke patient.

STROKE: TRADITIONAL LINGUISTIC DISTINCTIONS

Stroke patients present an increasing challenge to the health care system owing to their large numbers, their marked degree of disability and their high consumption of hospital beds and community health care resources.   Health care resources are usually dependent upon many social and economic factors.   There is, however, little doubt that stroke patients consume a large proportion of whatever resources the community is able to provide.

Studies from Western countries indicate certain trends in stroke management. Granger et al. (1989) reported on the type and amount of care given to stroke patients in Massachusetts in the United States of America. Of 418 patients admitted to hospital, 75 died, 282 went home, 59 moved to nursing homes, and 2 remained in acute hospitals after a spell in the rehabilitation unit. Fifty-seven of the 418 patients were referred on to the rehabilitation unit, and each spent an average of 24 days there. Most of the 57 (75%) eventually went home.

Sheikh, Meade, Brennan, Goldenberg and Smith (1981) examined the length of stay of 671 patients discharged from Northwick Park Hospital in North London. The average length of stay was 37 days for men and 50 for women. The length of stay was related to the patient's age, the presence of incontinence, loss of consciousness at outset, the initial neurological deficit and the residual disability.

Differences between countries are probably dictated by their different economic circumstances, health care standards and social circumstances such as the availability of family or community support.

A World Health Organization report (Aho, Harmsen, Hatono, Marquardsen, Smirnov & Strasser, 1980) reflects the differential supply and utilisation of long-term institutional care one year after stroke. Only 16% of all the European survivors reported on were in institutional care at one year post-stroke, and in Japan the figure was only a little lower at 14%. No Indian or Sri Lankan patients were in care and only 4% of Mongolian and 5% of Nigerian survivors were in long-term institutions. In the United Kingdom, Terent (1985) found that 68% were at home, 16% to 24% in hospital, and 7% to 17% in old people's homes, at any time post-stroke.

Christie (1982) found that 26% of survivors reported on in Australia were not living at home after six months; those under 75 years of age were much more likely to return home (87% were at home at six months) than those over 75 (64% were at home at six months).

High levels of free home care are provided in the United Kingdom and Sweden, and this appears to be reflected in shorter hospital stays (18% and 30% respectively).

Any evaluation and planning of services for stroke patients in South Africa must take into account the different needs of different areas, the contrast between developed and undeveloped communities, and the lack of existing community resources in areas such as Ga-Rankuwa. Planning must also rest on basic concepts common to stroke services the world over.

Explanation of Basic Concepts

What is "Stroke"?

The World Health Organization (WHO) (Aho et al., 1980) defines stroke as "rapidly developed clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause

other than of vascular origin" (p.113);   that is, it is   the
outward manifestation of a localised sudden interruption of
the blood supply to some part of the brain.

The National Survey of Stroke in the United States of
America (Walker, Robins & Weinfield, 1981, p.13)   formulated
the following definition:

> Stroke is a clinical syndrome consisting of a constel-
> lation of neurological findings, sudden and rapid in
> onset, which persists for more than 24 hours and whose
> vascular origins are limited to:
>
> (a)   Thrombotic or embolic occlusion of a cerebral
>   artery resulting in interaction or
> (b)   Spontaneous rupture of a vessel resulting in
>   intracerebral or subarachnoid haemorrhage.

This definition excludes occlusion or rupture due to
traumatic neoplastic or infectious diseases which produce
vascular pathology.

Risk factors for stroke can be divided into two major
groups: those that are well documented and proven and
others less well documented.   Well documented risk factors
consist of those that are untreatable or of uncertain value,
such as age, gender, familial factors, race, diabetes
mellitus, prior stroke and asymptomatic carotid bruits and
treatable factors,   such as hypertension, cardiac disease,
transient ischaemic attacks, elevated haematocrit,   and
sickle cell disease. Less well documented risk factors can
be subdivided into two groups: those where treatment is not
possible or of uncertain value are geographic location,
season and climate, and socio-economic factors.   Treatable
factors of unestablished value are elevated blood choleste-
rol and lipids, cigarette smoking, alcohol consumption, oral
contraceptive use, physical inactivity, and obesity (Dyken,
1983).

The frequencies of significant risk factors for stroke patients from the Ga-Rankuwa area are shown in the following table (Joubert, 1987):

Table 2.1
Risk Factors for Stroke in Patients from the Ga-Rankuwa Area

Condition	% Frequency (N = 267)
Cardiac failure	0
Pregnancy	1,49
Oral contraceptive use	2,62
Migraine	0,74
Heavy alcohol intake (24 hours prior to stroke)	1,87
Family history of stroke	11,6
Previous stroke	9,73
Moderately overweight	22,2
Obese	11,0
Hypertension	41,7
Ischaemic heart disease	6,9

Once patients were discharged from the Ga-Rankuwa hospital, relatives and friends reported that there was some improvement in 73,2%, 15,2% were judged to have remained static, and 11,7% were felt to have deteriorated (Joubert, 1987).

Stroke is essentially and certainly initially a clinical diagnosis made on the basis of the history and examination. The two most important clinical features are a sudden onset of a disturbance of neurological function. If possible, a distinction between cerebral haemorrhage, thrombosis, and an embolism (i.e. type of stroke) should be made, since this might have implications for further treatment or prevention of a second stroke. This distinction is very

difficult to make. It is important to identify whether it is a haemorrhage, as this is of importance if anticoagulant medication is to be used.

An accurate diagnosis allows treatment to be implemented. Treatment covers five important areas:

I. <u>Specific drug therapy</u>. A majority of stroke syndromes are caused by thrombo-embolic occlusion of cerebral arteries. Timely dissolution of blood clots by intravenous or intra-arterial infusion has therefore been found to be a logical treatment strategy for acute thrombotic or embolic stroke. This treatment rests on the early referral of stroke patients to a hospital where an intensive-care neurological service is provided (Gelmers, Krämer, Hacke & Hennerici, 1989).

II. <u>Specific surgical intervention</u>. Surgical intervention may be necessary in some cases of cerebellar haemorrhage. However, this form of stroke is rare, comprising less than 10% of all haemorrhages (Waga & Yamamoto, 1983).

III. <u>General symptomatic care</u>. This mainly involves nursing care and is aimed at maintaining life and avoiding complications.

IV. <u>Prevention or specific treatment of any complications that may arise</u>. In the acute stage, problems arise that require appropriate care. These may be physical (excretion, intake of fluid and food, immobility), cognitive (coma, confusion and behavioural disturbances), communicative (language disturbance, dysarthria, deafness or blindness) and emotional (fears).

There are many complications that can arise from stroke. They can be divided into four groups:

1. <u>General due to immobility</u>: bronchopneumonia, bedsores, constipation, deep venous thrombosis, pulmonary embolus.

2. <u>Local due to paralysis</u>: shoulder pain or limitation, contractures, falls and fractures.

3. <u>Cerebral due to brain damage</u>: epilepsy, thalamic pain, associated movements.

3. <u>Long-term due to arteriosclerosis</u>: further stroke, myocardial infarction.

IV. <u>Rehabilitation</u>. This is the most important part of treatment. It concentrates on maximising the patient's natural, spontaneous recovery and helps his adaptation to residual disability.

The Concept of Disability

The popular concept of a disabled person is of someone who has lost a limb or who is physically deformed in some obvious way. This concept is largely based on the appreciation of structural damage. Severity is considered to be dependent on the extent of the damage. However, disability may be thought of in terms of behaviour and performance,, and may be considered as limitation of the performance of an individual when compared with a "fit" person. This concept considers disability as a disorder of function rather than a structural abnormality or loss.

The Committee on the Medical Rating of Physical Impairment (USA) (in Lees & Shaw, 1974) distinguished between these two approaches. The concept of total functional loss is considered to be disability, whereas the anatomical or structural abnormality is described as impairment.

Garrad (1974) adopted this distinction, but defined the terms more strictly. "Impairment" was defined as an anatomical, pathological or psychological disorder, which may be described in diagnostic symptomatic terms. It may cause or be associated with disability so that while every disabled person has an impairment, not all people with impairments are necessarily disabled. Impairments can be divided into four categories: those affecting locomotion or any motor activity; sensory impairment; those related to internal medicine, for example, cardiac and respiratory disorders; and those of primarily psychological origin together with unclassifiable organic disorder.

Garrad (1974) defined "disability" as limitation of performance in one or more activities which are generally accepted as essential basic components of daily living, such that inability to perform them necessitates dependence on another person. The severity of disability is thus proportional to the degree of dependence. The areas of essential activity are:

1. Mobility: walking, negotiating stairs, transfer in and out of bed or chair, and travel.

2. Self-care: feeding, dressing, and toilet care.

3. Domestic duties: shopping preparation, cooking of food, household cleaning, and washing of clothes.

4. Occupation: the ability to hold unmodified employment in open industry according to age, sex and skill.

This model of disability is dynamic. An infant born healthy and continuing to survive, could progress to become impaired and subsequently disabled. The usual sequence of events is for the period of "fitness" to end in middle age or later with the manifestation of one or more of the

chronic degenerative diseases, most commonly of locomotor or internal origin. As the disease progresses, the individual loses his independence of living and thereafter becomes increasingly disabled.

Time periods for the different stages differ from individual to individual. Following diseases such as rheumatoid arthritis or multiple sclerosis, the period of disability can extend for many years, whereas after a severe stroke the period may be short. A child involved in an accident may lose a limb and be impaired for life, but may become disabled when ageing supervenes. The critical point in the progression is when independence of living is lost and disability ensues. This can be affected by the severity of the disease and changes in the psychological state of the patient.

Fluctuation or remission in the severity of a disease or treatment can allow independence to be regained. Surgical procedures or the use of gadgets can also assist in restoring or maintaining the ability of the individual to function independently or to function to the best of his limited abilities.

The two concepts of disability and impairment are of practical value, since they can be defined and attempts can be made to measure them. The two concepts also appear to have different psychological characteristics. Measurement also identifies groups at risk: people suffering an impairment are at risk of becoming disabled, while people disabled by physical impairments are at risk of developing psychological disturbance.

A stroke is, first of all, a disturbance of the cerebral blood supply, leading secondarily to loss of brain tissue, that in turn interferes with neurological function. Within the lost brain there will be many parts of many neurophysiological systems involved in

many different functions. Thus a stroke will interfere with many functions, some more than others, but rarely will it only affect a single ability. (Wade et al., 1985)

In the light of the above, the authors suggest therefor that eight aspects of stroke need to be considered in order to ascertain "disability" as related to stroke. These are:

    medical

    cognition

    communication

    motor and sensory function

    daily activities

    housing

    social function

    emotional state

The Concept of Rehabilitation

As stated earlier, rehabilitation concentrates on maximising the patient's natural, spontaneous recovery and assists his adaptation to residual disability.

Laurence and Stein (1978) make a distinction concerning the meaning of recovery. They state that the achievement of goals (such as dressing or eating) is the ultimate aim of any behaviour, and that after neural injury these goals can be reached using new tactics. The use of new tactics constitutes an <u>adaptive recovery</u> whereas recovery of the normal means to gain the desired end constitutes an <u>intrinsic recovery</u>.

When this concept is related to stroke, adaptive recovery relates to the process of learning to use the unaffected side in new ways. Another term for this is "behavioral substitution" (Goldberger, 1980). There is great scope for this, especially in the area of "activities

of daily living" (ADL), where almost all the functions can recover purely through adaptive processes. A patient may walk on a spastic leg, and dress, wash and feed himself one-handed. This does not mean, however, that any actual recovery has occurred within the affected part of the brain. Social recovery is also clearly adaptive (Wade et al., 1985).

Various theories have been put forward to account for intrinsic recovery (Goldberger, 1980; Laurence & Stein, 1978; Yu, 1980). The following table summarises these and considers the process at different levels.

Table 2.2

Intrinsic Recovery: Some Possible Processes

Pathophysiological

   Resolution of oedema
   Diaschisis and restitution of function

Systems

   Redundancy and multiple control
   Functional substitution
   Global reorganisation

Anatomical

   Axonal regeneration and sprouting
   Synaptic changes and denervation supersensitivity

Recovery is most rapid in the first few weeks and slows down after that. Rehabilitation therapy can improve this process.

Motivation is an important aspect of rehabilitation (McDaniel, 1976). A client's motivation in rehabilitation programmes can therefore be conceptualised as a function of his own estimates of his chances of success, times the value he places on attainment of the objective, balanced by his assessment of the costs involved. This relates to the following model (Lewis, 1965):

Where:
$$\text{Motivation} = \frac{P(Os) \times U}{C}$$

where C - Cost =   estimate of the expense of attempting an activity in terms of time, money, physical or mental effort

   P - Probability of a successful outcome = individual's own personal estimate of his chances of achieving a favourable result for his efforts

   U - Utility =   meaning or value the client places upon the performance of the task and attainment of the objective

Motivation can be seen as a complex of forces, some interfering with and some disposing towards effort and learning. Negative motivational factors arise in states of increasing stress, while positive motivational forces develop with decreasing stress. Clinically increasing stress develops as the patient is unable or anticipates being unable to achieve what he is trying to do. Decreasing stress ensues as the patient becomes able or anticipates being able to achieve his goal (Zane & Lowenthal, 1960).

"Motivational" problems can be brought about by the nature of the hospital setting. The hospital provides complete care and assumes total responsibility for all aspects of the patient's life, reducing self-directed autonomous behaviour. This is warranted in the acute early stages of an illness (such as stroke), but may interfere with the patient's perception of suitable goals and his

probability of attaining them over longer periods of time (Schlesinger, 1963).

Staff-patient relationships as well as the general interpersonal structure of the agency therefore have important implications for the rehabilitation process. Staff members need to learn to perceive their own behaviour as a deliberate instrument for modifying patient behaviour.

The Concept of a Synchronous Systems Model for Health

Combining science, medicine and psychology, this paradigm applies general systems theory to a neopsychosocial and ecological structure depicting spheres of influence upon human functioning (Janoski & Schwartz, 1985).

Historical Background

General systems theory. This examines the structure and functioning of a group of interacting components, in which the whole group working together, has greater impact than the sum of the independent parts. Their synergistic whole has a functional structure composed of interactive connections of communication that cannot be altered without disturbing the functioning of the overall system. Yet the components themselves can be replaced with similar parts with little disruption to the whole system. What the component does for the overall arrangement is more important than what the component is. This functional principle is based upon the organismic principle that the whole determines the function of the individual parts.

Biomedical model of health. With a molecular biology base, the traditional biomedical model reduced the disease experience sole to physiological (biochemical or neurophysiological) phenomena with linear causation. This has become the model for the Western world. The biomedical

model has been termed reductionistic, linear, dualistic and exclusionary utilising a factor analytic approach. Where the need to combat infectious disease is paramount, this model remains effective. However, an approach to chronic disease must include behaviour and lifestyle as important factors. The biomedical model is not able to include these.

The biopsychosocial model of health. This model subsumed the biomedical model as it joined forces with psychology. In addition to physical phenomena - stress and environment - person transactions were considered as causes of disease and slow recovery. Instead of reducing psychosocial factors to physical phenomena, a pluralistic recognition of their functional importance and contribution added complexity. Supporters of this model are moving away from dualism into monism, understanding that body and mind are simply different manifestations of a fundamental unity, the person. Thus psychology, science and medicine finally converge in the synchronous model of health which transcends dualism.

The synchronous model of health. Synchrony means timed together or simultaneously. Synchrony combines ecological, biological, psychological and social factors into a synergistic framework. Systems theory offers function and process for the synchronous model, but cannot supply form. Ecology, specifically human ecology, provides the structure.

General ecology utilises systems theory to understand the relationship between living organisms and their home ranges or environment. Human ecology specifically focuses on the human ecosystem which is the basic unit of analysis. The human ecosystem delineates the external environment both psychosocial and physical, whereas the biomedical model adds the internal environment. The synchronous system functions within this ecological and biomedical structure.

PHYSICAL

ENVIRONMENTAL

Environmental Spheres

Personal Spheres

Biological Spheres
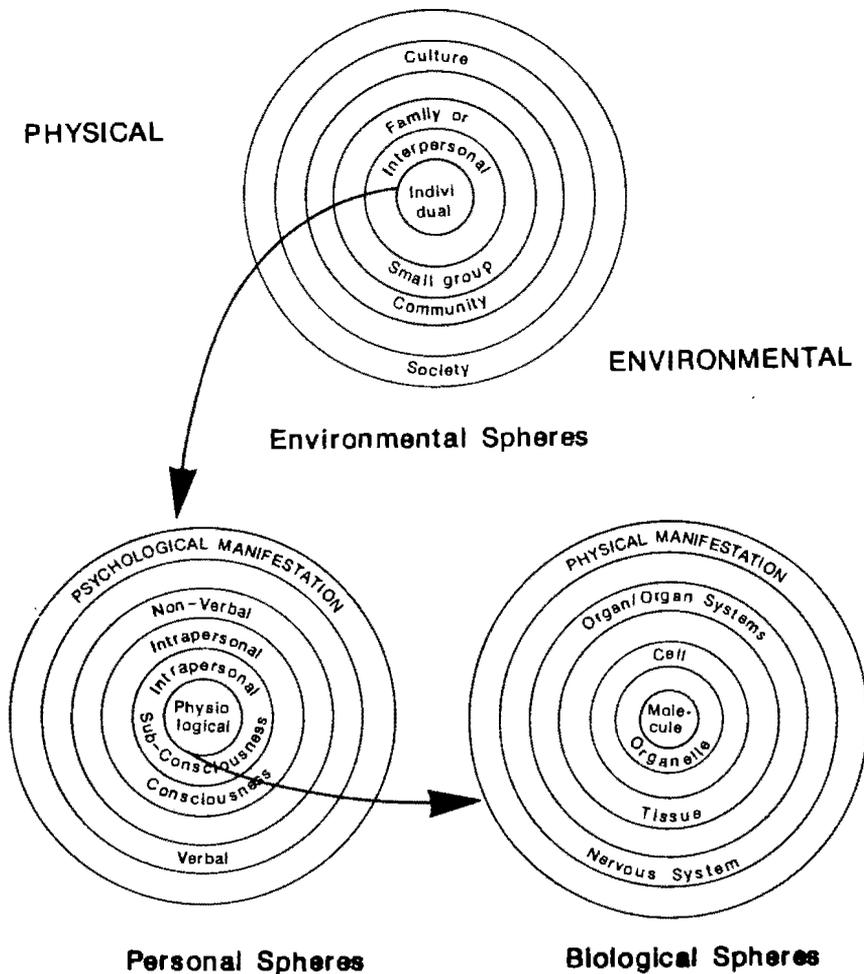
Figure 2.1. The synchronous systems model of health (Janoski & Schwartz, 1985).

As can be seen from the above diagram, the individual occupies the central niche in the synchronous model. All events and experiences are ultimately interpreted in terms of their impact on the individual human being. The external environment forms a structural part of the model, and is defined as the surrounding or context of the individual's experience, behaviour and functioning. Psychosocial and physical components may be delineated in the environment for the sake of analysis.

The psychosocial environment may include such aspects as the interpersonal, the family or small group, the community, the cultural, and the societal levels. One may consider both human-created and natural environments under the physical environment.

The synchronous model is more complex than is suggested by the two-dimensional representation of the diagram. At a given level each system is composed of parts that are themselves subsystems and each system is simultaneously part of at least one large system called a suprasystem. All spheres interact with one another and each sphere can be viewed as an open system in and of itself. Because the model functions synergistically - that is, the whole has an impact greater than the simple sum of its component spheres - not only does each field need analysis, but the manner in which they fit together must be reconsidered.

The Regulating Function of the Human Bio-ecosystem

The system functions in terms of the disregulation of change and the regulation of stability. Central to human bioecology and the synchronous model are the ways in which human beings maintain themselves in continually changing yet restricted internal and external surroundings. The synchronous system always changes in order to maintain stability.

Disease, health and wellness in the synchronous systems model are defined via the states of synchrony and dysynchrony along with the processes of regulation and disregulation.

State of health is perceived as being disregulation and regulation working together in dysynchronous and synchronous fashion in the human ecosystem in order to preserve the functional integrity of the system as environmental and internal conditions change.

A new idea, the concept of wellness, was needed to represent the system of person and situation transactions in the manifestation of health (wellness). The idea of optimisation, describes the cyclical feedback process whereby people seek optimal environments for themselves. Optimal environments are those which maximise fulfilment, meet

needs, or accomplish goals the person has. In optimisation human beings actively orient themselves to operate on and evaluate the quality and conduciveness of the environment as a context for future goals and activity. Using the physics model, one can say that health is the potential to be well, just as energy is the potential to be matter. One needs therefore to measure the functional state of wellness of a person at a given time, and then infer the capacity/potential for the person to remain well or to function optimally in a transynchronous state. By "stressing" a person with biological pathogens or psychosocial pathogens and then measuring his psychobiological responses to the stresses and recovery from the stresses, it becomes possible to _infer_ the degree of self-regulation (health potential) versus disregulation (illness potential) present in the person at that moment. By using a synchromy paradigm, it is possible to uncover the potential to heal (i.e., health) and distinguish it from the measured state of being well (i.e., wellness).

It is, however, naive to perceive health and wellness as the sole possible outcomes of alternating synchronous and dysynchronous states. Another less healthy state can occur and is called malsynchrony. Malsynchrony refers to a state of stabilised dysynchrony or disease. It is usually at this point that an individual seeks help from health professionals. Outside intervention aims to disrupt the malsynchrony. Diagnosis depends upon discovering the distressing patterns present in the malsynchronous system, manifesting in the weakest link whether physical or psychological.

The concepts discussed in this chapter form the traditional linguistic models that can be formulated to form patterns characterising the rehabilitation of stroke patients.

CHAPTER 3

PATTERNS THAT CHARACTERISE REHABILITATION

Recovery Profiles after Stroke

Since stroke is a leading cause of disability, consider-
able resources should be expended on the rehabilitation of
its victims. It is therefore important to know any general
sequence of events that occur in recovery, as well as
prognostic indicators, mainly   occurring from   clinical
features, or patient characteristics. These could include
length of hospital stay and functional and neurological
status (Jongbloed, 1986).

Wade, Wood and Langton-Hewer (1985) found that 80% of
recovery was complete by 6 weeks, with little recovery
occurring after the 12 weeks following the stroke. Recovery
was rapid during the first few weeks.   The authors found
that urinary incontinence, when present seven to ten days
post-stroke, had high prognostic significance, both for
survival and functional recovery.

Kotila, Waltimo, Niemo, Laaksonen and Lempinen (1984)
felt that there was a clear improvement in neurological and
neuropsychological deficits from the acute state to three
months. Although this continued to 12 months, it was only
to much lesser degree. Activities in daily living increased
from 32% acutely to 62% and 68% by 3 and 12 months respect-
ively. Of those gainfully employed prior to the stroke, 55%
had returned to work after 12 months. The authors felt that
the three major indicators for prognosis were neurological
and neuropsychological deficits and emotional reactions.

Patient Characteristics

Sex. In a randomised trial of team care following stroke, Wood-Dauphinee Shapiro, Bass, Fletcher, Georges, Hensby and Mendelsohn and (1984) found that there was an unexpected difference in survival, depending upon the sex of the patients. In motor performance as well as in functional abilities, male survivors performed better when they received team care rather than a more traditional individual type of treatment. There was no difference found between different treatment groups in women.

In general, sex has not been found to be a potential predictor variable for functional recovery (Jongbloed, 1986).

Age. Older patients tend to have less favourable outcomes than younger ones. Lehman, Dehateur and Fowler (1975) found age to be negatively correlated with discharge function, but to have no association with improvement in function. This could be explained by the fact that some of the younger people in the study were less impaired and consequently had less room for improvement.

The increased incidence of chronic disease (such as coronary heart disease, congestive heart failure, diabetes and hypertension) in older people is a possible explanation for the negative correlation between age and function on discharge.

Previous stroke. Most studies find that a previous stroke is an adverse prognostic indicator of functional outcome (Bourestom, 1967).

Interval between onset of stroke and hospital admission. The longer the interval between the onset of the stroke and hospital admission, the less favourable the functional outcome. Certain functional activities, such as ambulation

and transfers, appear to be adversely affected by the delay, while others, such as dressing, feeding and personal hygiene, are not affected (Novack, 1984).

However, it must be remembered that most studies measure improvement over time. As stroke recovery occurs most rapidly in the early months, it is to be expected that those who are studied earlier will show more change in functional status. Wade (1988) evaluated this, finding no correlation between delay in admission and functional status six months post-stroke, but a negative correlation (r = 0,24) between delay in admission and improvement occurring between the initial and six-month testing. The apparent relationship between early admission and improvement may therefore reflect the pattern of stroke recovery rather than indicate that early treatment is beneficial.

As a result, a conclusive statement about the importance of early admission cannot be made. Functional assessments need to be made at set intervals <u>post-stroke</u> with admission time as an important variable.

<u>Neurological Status</u>

<u>Site of lesion</u>. The global confusion and disorientation following a stroke may mask the focal features resulting from the lesion. Slow recovery is usually related to more extensive damage, generalised hypoxia, cerebral oedema, and respiratory infections. Clouding of consciousness and confusion usually clears quickly after small focal lesions. Kotila et al. (1984) showed that unconsciousness at the time of the acute stroke is associated with an increased level of hospitalisation at 3 months but not at 12 months post-stroke.

Accurate localisation of a focal vascular lesion is made difficult in patients who suffer from behavioural

problems, cognitive difficulties, and impairment of con-
sciousness (Upton & Finlayson, 1987). Investigations are
helpful and could include an EEG (electroencephelogram), CT
scan (computerised tomography) or PET (position emission
tomography). While a CT scan will not necessarily confirm
the diagnosis of stroke, it can eliminate alternative
diagnoses (such as tumors, subdural heaemorrhages or ab-
scesses) or detect intracerebral heaemorrhage, when either
surgery or anticoagulant therapy are contemplated.

The size of the brain lesion does not appear to deter-
mine the severity of behavioural and psychological changes.
The location of the lesion is of paramount importance.

Table 3.1

Clinical Effects of Focal Lesions

Focal Lesion	Behavioural and Cognitive Problems
Frontal	Personality was affected more than cognition; lack of initiative and interest; rarely restless and hyperactive; euphoric mood; irritability and petulance; inappropriate joking and punning; lack of social awareness, tact and inhibition; impairment of judgement, insight and concentration
Parietal	Agnosia, apraxia, problems with topology, disorientation, dysphasia, depression, lack of attention or co-operation, inconsistencies, and hallucinations
Temporal	Psychosis, hallucinations, receptive dysphasia, amnesia, euphoria, and paranoid thinking
Occipital	Amnesia, dementia, and visual agnosia
Diencephalon	Amnesia, confabulation, dementia, somnolence, and mutism.

Certain important areas of functioning emerge from the neurological examination that have significance for recovery (Upton & Finlayson, 1987). These can be summarised as follows:

Mental Status Examination

This includes:

Level of consciousness. An alert patient is awake and is able to interact with those around him; a lethargic or drowsy patient loses his train of thought, is not able to pay attention, and drifts off to sleep; a confused patient is unable to think clearly because of inattentiveness or forgetfulness rather than drowsiness.

It is important to recognise the locked-in syndrome when level of consciousness is being evaluated. Although the patient is fully awake and alert, on superficial examination he may appear to be in coma, because he is unable to make any responses other than eye movements. The upper pontine lesion responsible for the locked-in state involves all descending corticospinal and corticobulbar motor fibres, paralysing all movement of the face, bulbar muscles, and limbs.

Attention. If a patient is unable to focus his attention on a specific stimulus for a certain period of time, he will not be able to carry out more complex mental activities. An alert patient responds to stimuli, but need not necessarily be attentive.

Memory. Two aspects of memory are important. The first is the ability to learn and retrieve new material (i.e., short-term memory) and the second is the ability to recall past information or events of a personal, social or historical nature.

Cognition. The higher levels of mental functioning include the fund of information available, calculation and problem-solving ability, insight and judgement, and abstract thinking ability. (Cognitive dysfunctioning after stroke is discussed in more detail in section 3.2.)

Perception, apraxia and construction ability. Certain psychosensory functions are of vital importance to the patient's future functioning. These include:

Agnosia	- failure to recognise familiar objects even though primary sensory function is intact
Stereognosis	- lack of tactile recognition of familiar objects
Somatotophagnosia	- inability to recognise parts of the body
Apraxia	- inability to perform learned movements when muscle strength co-ordination and tone are normal, and sensation is intact
Construction inability	- inability to reproduce simple two- or three-dimensional designs: these drawings will also reveal visual neglect and abnormalities in body schema
Dressing apraxia	- inability to dress oneself in familiar clothing, such as a shirt

Affect and behaviour. After a stroke the patient may be withdrawn and apathetic, especially if there are frontal lobe lesions, diffuse bilateral disease, and large right-hemisphere lesions.

Temporary confusional states can be associated with toxic reactions to infection or drugs, changes in homeostasis, congestive cardiac failure or hypoxia. Reactive depression is common after stroke and care must be taken to distinguish the apathy of organic disease, and the withdrawn, social isolation and sadness associated with such a disabling condition. Robinson, Starr, Lipsey, Rao and Price (1984) found that at both three and six months post-stroke, patients with left-hemisphere infarcts showed a strong relationship between severity of depression and distance of the lesion on CT scan. This viewpoint has been disputed, and will be discussed in more detail in chapter 4. Patients with bilateral disease may show emotional lability.

Language. It is accepted that some recovery of language functions occurs spontaneously, following the onset of aphasia. Aphasia of traumatic origin has been shown to have a better prognosis than that of vascular origin (Butfield & Zangwill, 1946).

Recovery of comprehension appears to occur first, with expressive abilities recovering later. The pattern of recovery depends on the severity of initial language impairment with the ceiling for recovery from severe aphasia being too low to permit the recovery of expressive abilities. Lincoln et al. (1982) found that motivation appears clinically to be an important determinant of recovery. Patients reported by staff to be highly motivated practised language tasks on their own, asked to be given work to do alone, and showed concern over their own progress.

In a later study, the authors found that sex differences were not observed in either the number of changes or the final level of language recovery reached. Most recovery appeared to occur in the first three months and the level of language abilities at six months seemed to depend almost exclusively on the severity of the aphasia early after the stroke (Lendrem & Lincoln, 1985).

Language problems experienced by stroke patients could consist of one or more of the following:

<u>Aphasia</u>	- an inability to speak which could be expressive or receptive
<u>Spontaneous speech</u>	- frequent interruption of speech by word-finding pauses
<u>Comprehension</u>	- this need not necessarily be related to verbal output
<u>Anomia</u>	- impaired naming ability which is more pronounced for less frequently used and more complex words
<u>Repetition</u>	- the ability to repeat words, phrases or sentences may be spared or affected independent of other language disorders
<u>Reading or writing</u>	- writing ability (agraphia) will be impaired when aphasia is present

Motor Function

In the initial phase after the stroke, when the patient is confined to bed, the extremities on the affected side are flaccid. This does not commonly remain the case, and spasticity will soon be noticed on the affected side. Contractures and joint limitations may result from incorrect positioning in bed, and could affect the patient's level of independence at a later stage (Geibel & Kubalanza-Sipp, 1987).

Normal arm function is usually lost on the affected side, and will limit the performance of the many skilled

tasks performed daily that are dependent on arm function. Langton-Hewer (1990a) found that 50% of the patients studied had moderate to severe arm paralysis, with 13% having no paralysis. In those surviving three months, 58% had moderate or mild weakness, 16% had severe paralysis, and 26% had no weakness. About 40% had significant loss of function. Shoulder problems were rare. The initial motor loss was an important prognostic factor, with only 16% of survivors with initially severe motor loss regaining useful arm function. Between three and six months 13% of patients showed measurable improvement. Olsen (1990) found that stroke severity affected the time required to obtain maximal recovery of arm and leg paresis. Patients who were unable to perform basic activities needed for daily living, recovered more slowly. He found that maximum arm and leg functioning was achieved seven weeks after the stroke.

Activities of Daily Living

The disability following stroke is usually of a sufficient degree to interfere seriously with the patient's ability to carry out essential daily personal activities of self-care, such as getting out of bed, bathing, grooming, dressing, eating, drinking, elimination and locomotion. These self-care activities are commonly referred to as activities of daily living (ADL). Failure to achieve functional independence in any self-care activity means being dependent on someone else for assistance or supervision, and can result in a loss of self-esteem and sense of worth. As a result, maximising independence in ADL is a key element in the rehabilitation of the stroke patient (Basmajain, 1980).

Immediately after a stroke, most patients are totally dependent and are unable to carry out any ADL. However, new techniques can be taught, which may, for example, rely on one-handed techniques to bath and dress. Up to 50% of

patients surviving from stroke will become fully independent in all ADL. Inability to carry out ADL in patients with stroke is due mainly to neurological sequelae. These may be paralysis, sensory loss, perceptual impairment, decreased balance, hemianopsia, confusion, cognitive impairments, and easy fatiguability. Psychosocial variables can also strongly influence functional capacity (Feigensen, McDowell, Meese, McCarthy & Greenberg, 1977).

Bjorneby and Reinvang (1985) found a positive relationship between apraxia and long-term dependency in ADL. Functional skills improved during the treatment period in hospital but were not maintained at the same level at home. ADL could be evaluated more optimistically in a hospital setting than in the more demanding (and lonely) situation at home. The patient and his family must learn to cope with an altered appearance and intellect. The authors pointed out the importance of domiciliary visits by the rehabilitation team in order to facilitate carry-over of learned skills from the hospital to the home environment.

Fugl-Meyer and Jaasko (1980) explored the relationship between hemiplegia and ADL in stroke patients. They found that the final stage of motor recovery in hemiplegia is a significant prediction for self-care in ADL. No significant differences in ADL were found in patients with aphasia or perceptual difficulties. They also stressed the importance of rehabilitation in close contact with the home and social milieu. "Rehabilitation of people after stroke must first be seen as a problem involving people and people in their homes rather than at hospital" (Weddell & Beresford, 1974, p.71).

Summary of Prognostic Indicators in Recovery Profiles

In summary, disability resulting from stroke can include one or more of the following physical impairments: hemiparesis, hemianopsia, dysphasia, dysphagia, and bladder

and bowel incontinence. In addition, neuropsychological deficits could include the following: impairment of intellectual reasoning and memory, specific neuropsychological disturbances (in speech, gnostic and practical functions), and emotional reactions.

Physical prognostic indicators. Most studies agree that all neurological deficits clearly improve by three months and continue to improve for one year (Smith, Goldenberg & Ashburn, 1981).

Feigensen and McCarthy (1977) found the presence of a dysphasia or hemisensory loss in addition to a hemiparesis was unrelated to discharge disposition and ultimate functional status, although the hospital stay was prolonged. A significant organic mental syndrome (OMS) was present in 27% of the patients. Only 68% of OMS patients were discharged home, only 73% were ambulatory on discharge, and only 33% were independent in ADL.

Wade et al. (1985) found that urinary incontinence present at 7 to 10 days post-stroke was the most important prognostic factor for both survival and functional recovery. They commented that incontinence is rarely the result of specific brain damage after stroke, and that it is possibly secondary to poor cognitive function. Therapy should therefore be directed at cognitive stimulation, rather than focusing mainly on physical therapy (which is usually the case). In support of this, they also found that motor function was of little significance in prognosis.

The following table illustrates the neurological variables associated with poor or good outcome in a consecutively admitted sample of 148 patients.

Table 3.2

Variables Correlated with Outcome (p = <0,05) (Allen,   1984,
p.477)

Variable	Outcome	
	Good	Poor
	87 (64%)	50 (36%)
Loss of consciousness at onset	10 (36%)	18 (64%)
Progression of deficit after admission	6 (35%)	11 (65%)
Drowsy or comatose on admission	17 (37%)	29 (63%)
Drowsy or comatose after 24 hours	11 (27%)	30 (73%)
Conjugate gaze palsy	14 (38%)	23 (62%)
Complete limb paralysis	24 (39%)	37 (61%)
Intracerebral heaemorrhage	9 (36%)	16 (64%)
Age (yrs) (mean ± SEM)	2.4 (±1.0)	67.9 (±1.0)
Admission systolic BP (mm)	162 (±3.8)	147 (±4.8)
Peripheral WCC x 10%1	8.8 (±0.3)	10.9 (±0.5)

Neuropsychological prognostic indicators. The study
carried out by Feigensen et al. (1977) established that of
248 patients admitted over a period of 16 months, 39% had
significant perceptual dysfunctioning (denial,   neglect,
apraxia, disorders of body-image/scheme, visual-spatial, L-R
disorientation). Patients with perceptual dysfunction, but
not with cognitive dysfunction, could make significant gains
in ADL and ambulation with adequate training. The authors
felt that the treatment programme was largely responsible
for improved outcome in the perceptually impaired patients.
Even though most patients with perceptual dysfunction could
walk at the time of discharge and even though many could

learn to control their bowel and bladder functions, most still continued to need some assistance or supervision with ADL activities. The authors felt that perceptually impaired patients required more time to achieve adequate improvement.

Kotila et al. (1984) also found that visuoperceptual deficits had the greatest prognostic significance at 3 and 12 months. Impairment of memory and intelligence was the most important prognostic indicator of being able to return to work. The profile of the improvement occurring in neuropsychological disturbances resembled that of the neurological disabilities. These results supported earlier studies by Lehman et al. (1975) and Robinson, Starr, Kubos and Price (1983a or b?) in that all concluded that neuropsychological disturbances play an important role in recovery from stroke, despite having received less attention than physical prognostic factors.

Perceptual and Cognitive Dysfunctioning after Stroke

Perceptual Dysfunctioning

The perceptual problems following adult cerebral vascular accident (CVA) victims can be divided into various categories:

- body-image and body-scheme difficulties
- spatial relations problems
- apraxias
- agnosias
- Aphasia relates to specific perceptual deficits, mainly body scheme, apraxias and agnosias, and often masks perceptual problems and complicating evaluation and treatment.
- Sensory problems can also complicate perceptual deficits.
  (Siev & Freishtat, 1976)

In the average adult, body-scheme and perceptual skills are highly developed. However, after a stroke perceptual deficits may result from brain damage at the cortical integrative level for sensory input. Certain deficits occur only as a result of right- or left-sided brain lesions. Deficits that result from right-sided cerebral lesions cause unilateral perceptual problems of the left body side and space (i.e., unilateral neglect) while lesions in the left cerebral hemisphere cause bilateral problems (i.e., a disturbance in right/left discrimination). Patients with right-hemisphere lesions seem generally to have more problems with perceptions than patients with left hemisphere lesions, and as a result have more problems in becoming independent in ADL.

The tracking of stroke-related perceptual, cognitive and affective deficits during the first year after onset may help guide the rehabilitation community in targeting therapeutic interventions for those deficits which show little or no spontaneous resolution. It has long been widely assumed that right brain damage (RBD) and left brain damage (LBD) produce different patterns of perceptual, cognitive and affective deficits. Research has emphasised a visuospatial/verbal dichotomy, presumably related to a more fundamental difference in holistic/analytic processing. This may be theoretically useful, but it could lead to a bias in assessment of patients with lateralised lesions.

A RBD patient might be assumed defective, and therefore only assessed in terms of visuospatial processing, whereas assessment of the LBD patient might focus only on the verbal area. Other important neurological signs in relation to profiles of perceptual and cognitive disturbances, could also be ignored if this view were taken (Sinyor, Jacques, Kaloupek, Becker & Goldenberg, 1986).

In a study carried out by Gordon and Diller (1983),
right brain-damaged patients were more impaired than RBD and
nonaphasic LBD patients with intact visual fields in the
first year after stroke, in the areas of hemispatial neglect,
reaction time, depression, and affect comprehension. Gross
resolution of deficits in hemispatial neglect as well as
affect comprehension did occur over time, but more subtle
manifestations of hemispatial neglect slowed reaction time
and depression did not resolve for most patients. The
authors stated:

> The education of family members to the nature and
> likely course of these cognitive deficits, may help in
> preventing harmful misattributions, and in preparing
> family members to adjust to the change in their lives
> brought about by a stroke in the family. (Diller,
> 1990, p.273)

Delis, Robertson and Balliet (1983) showed that the
superiority of the right hemisphere in the performance of
visual spatial tasks depends to a large extent on the nature
of the task. They suggested that perceptual difficulties
following lesions to the left hemisphere occur in more
complex spatial tasks, such as route finding and copying
drawings and block designs. There were also qualitative
differences between right- and left-hemisphere damaged
patients in the performance of tasks. Patients with damage
to the right hemisphere produced scattered and fragmented
drawings which showed a loss of spatial relations. They
tended to include many additional lines in attempting to
connect the drawings. In contrast, patients with left-
hemisphere lesions had coherent but simplified drawings with
the preservation of spatial relations. Production was often
slow and laborious and there was a gross lack of detail.

In a study attempting to estimate the frequency of
perceptual difficulties in stroke patients, Andrews,

Brocklehurst, Richards and Laycock (1980) found that approx-
imately half their subjects had difficulties with simple
drawing tasks, but that there were no significant differences
between right- and left-hemisphere. However, they did find
differences in the type of picture abnormality for each
hemisphere, with left-hemisphere damage presenting more
often with perseveration and unrelated activities, and the
right-hemisphere damaged patients having more structural
abnormalities.

Bernspang, Lindberg and Fugl-Meyer (1982) also found
that perceptual problems were more common after right-
hemisphere stroke. In their study, with stroke patients
assessed at three weeks after stroke, they found that about
75% of patients with RBD had perceptual deficits compared
with 37% of patients with LBD. They also stated that
perceptual problems were more common than aphasia in LBD
patients.

Generally, perceptual difficulties appear to be a
common consequence of stroke, and can affect either the left
or right hemisphere. There is some suggestion that RBD
patients are more likely to suffer perceptual deficits,
although research results do not indicate such marked
differences (Edmans & Lincoln, 1987). However, perceptual
dysfunctioning together with unilateral neglect has negative
prognostic indications for activities in daily living
(Friedland & Weinstein, 1977).

Edmans (1987) assessed the frequency of perceptual
problems in stroke patients using a standardised assessment,
the Rivermead Perceptual Assessment Battery. One hundred
and fifty stroke patients (75 right-hemiplegic and 75 left-
hemiplegic) were assessed one month after stroke. Percept-
ual difficulties were identified in 71% of right-hemiplegic
stroke patients, and 81% of left-hemiplegic patients. They
were identified in 97% of dysphasic right-hemiplegic pa-
tients, compared with 47% of nondysphasic right-hemiplegic

patients and 84% of female hemiplegic patients, compared to 67% of male hemiplegic patients. Unilateral neglect was identified in both right- and left-hemiplegic patients.

Unilateral Visual Neglect

Visual neglect can be defined as a failure to notice visual features to one side of the immediate environment. In everyday life it leads to problems such as bumping into doorways on the neglected side, missing out words to that side when reading, or eating food only from one side of the plate (Friedland & Weinstein, 1977). Clinical impressions are that it has the greatest influence on outcome in rehabilitation. Left spatial neglect frequently follows right cerebral lesions. The rate and extent of improvement have been found to depend on the integrity of the remaining areas in both cerebral hemispheres (Levine, Warach, Benowitz & Calvanio, 1986).

Neglect of the right side of visual space is much less commonly reported. In a study of young stroke patients, Oxbury, Campbell and Oxbury (1974) found that 41% of the 17 right-hemisphere patients had unilateral visual spatial neglect, while none of the 15 left-hemisphere patients showed neglect.

There is uncertainty over the extent and time course of recovery from neglect. Severe visual neglect is most frequently seen in the very early stages of recovery from brain injury, but there is evidence that it can persist beyond the acute stage (Heilman & Valenstein, 1978).

Wade and Langton-Hewer (1987) studied 449 patients three weeks and six months after stroke using the Greek Cross (a simple copying task) and Ravens Progressive Coloured Matrices. The tests detected visual neglect in 8% to 11% of patients three weeks after stroke, which was more frequent after right-sided than after left-sided brain damage.

Significant neglect was rarely observed six months after stroke, but further recovery did occur between six months and one year. Neglect appeared to exert a slowing influence on rehabilitation, as measured by ADL scores.

Memory

After a stroke, patients frequently complain that their memory is not as good as it used to be. Their relatives often agree, and one survey stated that over half of surviving stroke patients complained of poor memory (Sorenson, Booysen, Jen & Schnohr, 1982).

Prescott, Akhtar and Garraway (1982) found when evaluating patients four weeks after stroke that 9% had slight and 15% had moderate or severe disturbance of memory and that this disturbance was related to poor early functional recovery but not to long-term recovery. The tests used related more to orientation and recall and not to the ability to remember new material.

An epidemiological study of 138 patients intended to establish how common the inability to make new memories is in people who have had stroke found that acute stroke did disturb new memories, at both three and six months after stroke. At three months immediate logical recall of a story was poor in 29% of patients and 14% could not draw a picture immediately after seeing it. Poor memory function was not associated with poor functional ability on everyday tasks. Poor visual recall was associated with lower abilities at ADL, independent of any effect of age. Statistically significant recovery was detected in immediate logical memory and visual recall between three and six months. The association between poor memory and ADL does not necessarily imply a causal connection. It is at least as likely that both reflect some common factor, probably a more general cognitive deficit affecting, for example, visuospatial perceptual ability (Wade, Parker & Langton-Hewer, 1986).

Assessment of Perceptual and Cognitive Dysfunctioning

The consequences of stroke can vary in intensity, complexity and type, and this makes the valid, reliable and detailed assessment of each individual patient a vital part of the rehabilitation process.

Assessment can be defined as the identification and measurement of function lost or preserved after stroke (Wade et al., 1985). The purposes of assessment can be summarised into two main areas:

(a) Routine clinical management to identify all problems, help give a prognosis and monitor progress.

(b) Research both to describe the patients entering the research and to detect early changes.

The following table outlines the significance of assessment for clinical reasons:

Table 3.3
Assessment for Clinical Reasons

Aiding clinical management	Particular desirable characteristics
Full identification of problems	
Giving an accurate prognosis	Easy to use
Monitoring effectiveness of treatment	Easy to record and retrieve information
Helping make decisions	Relevance
Educating staff	Easily understood by all involved with patient

Evans and Bishop (1982) suggested that any assessment should be relevant, repeatable, recordable and retrievable. A stroke can interfere with many functions, some more than others, and rarely affects only a single ability. Assessments cannot therefore be carried out in isolation, but have to be interpreted in the light of the whole patient. Patients function on many levels. Biologically, they sleep, move, breathe, digest; practically, they feed, dress, move, bath, walk; and socially, they work and take part in family and social life.

From this, it is apparent that assessment, like all aspects of a rehabilitative approach to the stroke patient, must be a team approach. Communication and interaction between team members are vital to ensure that the assessments constitute a needed whole and that the patient is not bombarded by a series of lengthy and unnecessary tests. The following eight categories are suggested by Collin, Wade, Davies and Horne (1988) as the areas that should be measured in every patient: medical, cognition, communication, motor and sensory function, daily activities, housing, social function, and emotional state.

Perceptual assessment. This is usually carried out by the occupational therapist. Although rehabilitation training concentrates on restoration of motion and compensation for lost functional skills, perceptual deficits could be the cause for continued confusion and lack of rehabilitation progress. It is therefore vital that they be assessed correctly. Siev and Freishtat (1976) believe that each patient should be assessed in a minimum of four areas: body scheme, spatial relations, apraxia, and agnosia.

Very few studies have been done to correlate results of tests on perception with actual functional abilities and disabilities. As a result, some occupational therapists rely solely on functional tests, such as whether a patient

able to dress himself or feed himself. The problem with functional tests is that one cannot ascertain <u>why</u> the patient is having problems. Hypothesised reasons should be tested with discrete, formal perceptual tests. In this way, a combination of functional and perceptual tasks is most useful.

<u>Somatognosia</u>, a disturbance in body scheme, is the lack of awareness of body structure and the failure to recognise one's parts and their relationship to each other. As such, the patient has difficulties in his reference to the outside world. He may have trouble with his contralateral limbs, may confuse the sides of the body and may not differentiate his body parts properly from those of the examiner. Macro- and microsomatognosia are disorders in body scheme that distance one's perception of one's own body. The patient may see his whole body, or part of it, as abnormally small (micro) or abnormally large (macro).

The evaluation of <u>somatagnosia</u> could be done with the therapist asking the patient to point to body parts on command, point to body parts by imitating the examiner, and answer questions on body visualisation and space concepts. "Draw-a-Man" and human figure and face puzzles could also be used.

<u>Unilateral neglect</u> could be tested by asking the patient to copy simple drawings or by asking him to cross out lines on a page (for example, Albert's Test). Wade et al. (1985) stated that visual neglect is not an all-or-none phenomenon, but must be considered as a point somewhere along a continuum which runs from a slight biasing of visual attention away from one side up to a constant fixation of gaze away from that side. The Greek Cross Copying Test proved to be sensitive only to severe neglect, but the Progressive Matrices detected neglect in a much higher proportion of patients. A problem with the Progressive

Matrices is that they are abstract and not closely related to any common everyday activities. However, patients with neglect had made a poorer recovery on measures of ADL at six months.

The Spatial Relations Syndrome presents as varied problems in perceiving spatial relationships and distances between objects or between self and two or more objects. It includes the following disabilities: figure ground, form constancy, position in space, spatial relations, constructional apraxia, dressing apraxia, topographical disorientation, and depth and distance perceptual deficits. Tests that used to assess this problem could include Ayres' Figure Ground Test, Frostig Figure Ground or a functional test where the patient would be asked to pick out an object in view.

Apraxia is the inability to perform certain skilled purposeful movements in the absence of loss of motor power, sensation or co-ordination. It may take several forms, such as constructional, motor, ideomotor, ideational, verbal and dressing. Two or more types usually occur together. Assessment of this disability could include the copying of designs, the Bender-Gestalt Test, a functional test, asking the patient to dress, the Goodglass Test of Apraxia, or Ayres' Imitation of Postures.

Agnosia is a perceptual deficit that deals with the patient's lack of recognition of familiar objects perceived by the senses, and occurs frequently. It may be a disturbance in one or all of the following sensory modes: visual, tactile, propioceptive and auditory, or may involve additional problems in body scheme, such as somatognosia or anosognosia. Assessment of this could involve object recognition, Ayres' Manual Form Perception and Aphylognosis.

Expressive receptive and conduction aphasia can interfere in the performance of the patients on these perceptual

tasks, as aphasic patients are often confused and lack the ability to communicate. Diminished sensation can also affect the patient's performace, as it may be the cause of impaired motor planning, limb agnosia, and the inability to localise touch, pressure and pain. For someone who no longer receives adequate limb sensation, motor planning for body parts becomes extremely difficult. This needs to be taken into account when doing perceptual assessments.

Neuropsychological assessment. Neuropsychology is concerned with the appraisal of brain-behaviour relations in both qualitative and quantitative terms. The goal of neuropsychological assessment has become the delineation of a cognitive-perceptual-motor profile, which has immediate relevance to rehabilitation (Caplan 1982). Brain-injured patients typically display deficits in some aspects of mental functioning, such as memory, reasoning, judgement, perception, constructional skills, language, or capacity for sustained attention. Brain injury may not only cause these losses of function but may also cause behaviours that were not there before, such as unilateral neglect and confabulation (Goodglass & Kaplan, 1979).

A thorough neuropsychological evaluation could delineate each patient's mental resources and limitations in such a way as to contribute to the accuracy and realism of the early phase of programme design. For example, patients with reduced attention span should be programmed for more numerous but briefer therapy sessions. Those with memory disorders might receive coaching in the use of mnemonic aids, imaginable techniques, or written guidelines for performing ADL tasks. Patients with certain kinds of visual perceptual disorders may require retraining in this area first, before they attempt walking.

Test results obtained at the initial assessment should be used as a baseline against which to measure progress and

outcome. During the course of a patient's rehabilitation, periodic reassessment of previously documented deficit areas may suggest revisions of the therapeutic programme congruent with changes in intellectual functioning.

Analysis of the test scores requires not only the examination of test scores in relation to normative data and the patient's estimated premorbid intellectual level, but also consideration of other factors which could include the following:

- The nature of the items missed: Were they predominantly verbal or pictorial, timed or untimed, located on the right or left side of the test form, did they require a spoken response, pointing or construction?

- The patient's test-taking behaviour: Was he persistent, easily frustrated, lethargic, perseverative; were problem-solving strategies suited to the task; did he appear motivated to do well?

- Test conditions: Were the premises noisy, crowded, or otherwise distracting?

- Other subject factors: Did the patient bring needed eye glasses; did he tire easily; had he recently taken medicine with psychoactive properties; had a visual field defect or bearing loss been reported?

- Observation of the patient's behaviour in the unit and in therapy to assess the "real-life" impact of psychometric defects (Caplan, 1982).

The traditional function of the neuropsychologist (i.e., the diagnosis of brain damage, with the emphasis on localisation by means of psychometric tests) has largely been taken over by computerised tomography. Baird, Adams, Shatz, Brown, Diaz and Ausman (1984) found that conventional

neuropsychological data may not mirror the site of cerebrovascular stenosis in a patient with mild to moderate symptoms. In their study, three groups of cerebral revascularisation candidates failed to differ on an extended Halstead-Reitan battery. As was consistent with previous work, these patients generally were mildly impaired on neuropsychological tests, even though many were not symptomatic at the time of the assessment.

Neuropsychological tests seem to be sensitive to the presence and severity of cerebral ischemia, but in isolation may not be sufficient to determine the loci of vascular stenoses. The incongruence between angiographic and neuro-psychological findings underlines levels and types of measurements in defining subgroups of cerebral revascularisation candidates.

Wade et al. (1985) state that two general points should be made about cognitive assessments. The first is that a differentiation should be made between "specific" and "general" disturbance. This could range from the very specific impairment in the ability to recognise faces (termed prosopagnosia) to the very general deficit seen in most confused patients. Any specific assessment needs to be interpreted in the light of a patient's general state and the interpretation of the results of any general assessment should consider the specific tests included.

The second point is that communication abilities are very important. Before investigating other cognitive functions, it is necessary to examine and verify that gross aspects of language are intact. The patient's inability to understand the examiner's questions and tests will make the answers untrue. A patient's expressive language can also make it difficult for the examiner to evaluate his test responses. Premorbid factors, such as age, or any previous cerebrovascular disease are other points which Wade et al. (1985) stress would be important to consider.

Rehabilitation of the Stroke Patient

Rehabilitation can be defined as the combined and
co-ordinated use of medical, social, educational and voca-
tional measures for retraining a person to the highest
possible level of functional ability (World Health Organiza-
tion, 1969).

Stroke leaves many of its survivors with mental and
physical disabilities which are difficult to assess, making
comparison and generalisation difficult. Stallones, Dyken,
Fang, Heyman, Seltzer and Samler (1972) estimated that of
every 100 survivors of the acute phase of stroke, 10 will
return to work without disability, 40 will have "mild"
disability, 40 will be severely disabled, and 10 will
require institutionalisation. Gresham, Phillips and Labi
(1979) reviewed 148 survivors of stroke and compared their
function in several categories with age- and sex-matched
controls. Categories included vocational function, social
function, ability to perform household tasks, mobility,
self-care skills, and institutionalisation. In each area of
comparison, a higher percentage of patients with stroke
experienced severe disability. Efforts at prevention of
stroke, other than the treatment of hypertension, have made
little impact on disability from stroke. Attempts to
improve the prognosis during the period immediately after
stroke by the provision of intensive care facilities form an
ongoing area of pharmaceutical and neurological research.
At present it is largely left to rehabilitation early after
stroke to improve functional ability and to decrease long-
term social and economic costs.

Principles of Rehabilitation Applied to Stroke

The Joint Committee for Stroke Facilities (1969)
summarised the accepted and well-established principles of
rehabilitation for stroke as follows:

- prevent or minimise secondary complications
- compensate for sensory and perceptual loss
- substitute for lost motor function
- provide environmental stimulation
- encourage socialisation
- produce a high degree of motivation
- enable independent function and home living
- achieve vocational rehabilitation when feasible

Langton-Hewer (1990), in a review of the practice of rehabilitation, stresses the following principles as they apply to stroke patients:

1. A clear definition of clinical problem and likely outcome must be made and discussed with all concerned (including the patient and his family) as soon as possible.

2. A realistic programme for hospital admission and returning home and to work should be agreed upon as soon as possible.

3. Appropriate industrial or domestic resettlement must be phased in with physical treatment as soon as possible.

4. There must be no gaps in treatment - even for a few days.

5. Skilled assessment should be made of environmental needs, aids and appliances and the social support needed for people with long-term disabilities.

If such a programme is to be implemented, there must be close co-operation between a large number of people from various disciplines - including doctors, social workers, physical, occupational and speech therapists, psychologists, and nurses. They must work together in assessing, planning and implementing a management programme. This requires

sensitive organisational skills, as each profession will focus on a different aspect of the problem. The occupational therapist, for example, will focus on the functional approach. This would involve the repetitive practice of particular tasks, usually ADL tasks intended to make the patient more independent in meeting his basic needs (Siev & Freishtat, 1976). Its emphasis is on treating the symptom rather than the cause of the problem. This approach could then be connected to the work of the social worker, nurse and psychologist. The adult who has had a cerebral vascular accident has suffered a physical disability with a huge emotional and social impact. The sooner he can be independent in self-care, the greater will be his social and emotional well-being.

Wade et al. (1985) stress two aims of rehabilitation in the stroke patient:

1. Adaptive recovery. This has also been termed "behavioral substitution" by Goldberger (1980). There is large scope for this, particularly in ADL. Social recovery is also adaptive, as well as visual function and writing. In essence, this type of recovery refers to the process of learning to use the unaffected side in new ways. A patient may walk on a spastic leg, and dress, wash and feed one-handed. This does not necessarily mean that any actual recovery has occurred within the brain.

There are two aspects of this type of recovery. In compensation the patient is made aware of his problem, and then taught to compensate or make allowances for it. In adaptation one makes changes in or adapts the environment of the patient so as to compensate for his symptoms.

2. Intrinsic recovery refers to the recovery of lost neurological functions. One major process underlying this, is the resolution of the oedema surrounding the infarcted area which may take up to eight weeks to recover (Innoue,

Takemoto, Miyamoto, 1980). It is also clear that some relearning does occur after acute neural damage (Prevo, Visser & Vogelaar, 1982). However, this retraining may only affect the particular behaviour being trained and may not generalise or become functionally useful.

Home-based Rehabilitation in Comparison with Hospital-based team care

Although stroke is commonly thought of as being a hospital-based problem, practices can vary considerably. Approximately 40% to 60% of stroke patients in Britain are admitted to hospital. The main reason for this is nursing care, and few medical investigations were undertaken (Brocklehurst, Andrews, Richards & Laycock, 1978). Weddell and Benesford (1979) stated that the rehabilitation of people after stroke must be considered first as a problem involving people, and people at home, rather than in hospital. The target must always be to achieve the fullest possible life at home. The most effective measures might therefore be those that increase people's capabilities in their own homes. This could involve the installation of aids and adaptations as soon as possible after the stroke, together with much-improved co-ordination between medical services, local authorities, and voluntary agencies.

Wade, Langton-Hewer, Skilbeck, Bainton and Burns-Cox (1985) carried out a controlled home-care service available for the first six months after acute stroke. The trial group used more hospital bed days, had a slightly higher admission rate, and did not show better emotional adjustment to stroke than the control group. There was no difference between the two groups in stress on relatives. Functional recovery was equal in the two groups. A quarter of patients managed at home in each group were severely disabled. Providing a new service does not necessarily alter clinical decisions in the short term. The study showed that more patients could be managed at home, as 27% were initially

severely disabled. The authors felt that a major factor in the provision of such a home-care service was whether care-givers were motivated to use it. This could have affected the results obtained.

Hospital-based Rehabilitation Services

A major issue of speculation has always been whether or not departments of internal medicine and neurology, with their emphasis on diagnostic investigation and "cure" of disease, are equipped in terms of staff or facilities to handle the "care" problems inherent in the detailed planning required for the rehabilitation of stroke (Garraway, 1985).

What are the components of a stroke rehabilitation unit? They have been defined as either a team of specialists who are knowledgeable about the care of the stroke patient, and who consult throughout the hospital whenever a patient may be, or a special area of a hospital that provides beds for stroke patients who are cared for by a team of specialists (Bonner, 1973). Another definition which has been suggested is a geographic location within the hospital designated for stroke and stroke-like patients who are in need of rehabilitation services and the skilled professional care that such a unit can provide (McCann & Culbertson, 1976). A major advantage of a special unit is the opportunity for developing a collaborative policy for stroke rehabilitation. Such a policy would include a comprehensive assessment of all aspects of patients' illness and disability, close collaboration between the disciplines involved, identification and awareness of objectives of rehabilitation, and an educational role (Isaacs, 1977).

Many different disciplines have been suggested for inclusion in a stroke rehabilitation team. Feigenson et al. (1977) stated that 19 different disciplines were included in their Stroke Rehabilitation Centre. These included a dietician, a neurologist, an opthalmologist, a chaplain, a

neuropsychologist, and an audiologist. A team should contain at least a physician, nursing staff, a physiotherapist, an occupational therapist, a speech therapist, and a medical social worker and have other specialised services (such as a neurologist and a neuropsychologist) easily available (Borhani, 1974). The constitution and availability of such a group would not alone provide optimal conditions for rehabilitation. Co-ordinated action would be required to formulate and execute an integrated rehabilitation plan suited to the individual problems and disabilities of each patient. This would involve frequent staff conferences and team ward rounds with each member of the team participating in all the activities of the stroke unit.

The concept of the therapeutic community has advanced as a reason for stroke rehabilitation units producing better results than medical units (Abramson, Kutner & Rosenberg, 1963). The rehabilitation unit has been visualised as a community where the close relationship between hospital staff and patients has an important effect in maintaining the rehabilitation gains produced by hospital care. Another advantage is the creation of an atmosphere of stroke awareness in a hospital or community (Borhani, 1974). By working closely together in a highly co-ordinated manner, the members of a stroke team can remove the artificial separation that exists between acute nursing care and the longer-term rehabilitation care of stroke patients. A ward routine adjusted down to the capacity of the stroke patient together with the encouragement and competitive stimulus of group treatment in the company of people with similar afflictions could have an important effect on the therapeutic process (Feigenson, Gitlow & Greenberg, 1979).

McCann and Culbertson (1976) compared the effectiveness of a stroke rehabilitation unit with the medical service of a general hospital. The stroke unit adopted a policy of aggressive rehabilitation with specialisation of nursing and therapy personnel who were concerned only with stroke patients. There was also a major emphasis on family

involvement. No significant difference was found between the stroke unit and medical wards for mild or severe disability ratings, but the stroke unit achieved better results for stroke patients presenting with moderate disability.

Lind (1982) reviewed several studies of rehabilitation for stroke and concluded that spontaneous recovery accounted for most of the noted improvements in functional ability. This could cloud the effect that rehabilitation may have on functional gains, particularly the effect of early rehabilitation. However, Lind felt that the following two points were of importance:

1. Although functional improvements attributable to comprehensive rehabilitation were slight, they could make the difference between institutionalisation and returning home.

2. Carefully selected patients with "marginal functional impairment" could benefit from individualised and comprehensive treatment.

This latter point was further confirmed by a study done in Edinburgh (Smith, Akthar, Garraway & Smith, 1982). Patients with stroke were randomised within a few days after onset to either a "stroke unit" or a medical ward. Length of hospitalisation was shorter and functional independence was greater in the patients in the stroke unit. Patients in the stroke unit received more physical and occupational therapy at an earlier stage. Other important differences were the presence of rehabilitation nursing, a team approach, and a functionally orientated atmosphere that may have encouraged patients to take a more active role and practise their skills more consistently. No single aspect could be isolated as being the most beneficial.

Another study (Ambler, Stevens & Warren, 1984) studied patients at 3 and 12 months after stroke. It found that the percentage of patients living at home was greater for the

group who received rehabilitation in a specialised setting. However, differences in independence for activities in daily living were small. Again this study was unable to isolate any particular aspects of the stroke ward responsible for the differences in outcome.

Prognostic Indications for Outcome in Rehabilitation

The development of clinical criteria for selecting early (within 7 to 10 days) after stroke the patients most likely to benefit from comprehensive rehabilitation would have considerable practical value in patient management. Controversy surrounds many of the symptoms, deficits and other data that have been studied in terms of their usefulness in predicting prognosis after stroke. They are summarised by Dombovy, Sandok and Basford (1986, p.365) in the following table:

Table 3.4

Predictors of Functional Outcome after Stroke

Negative Predictors	Possibly Negative Predictors
Coma at onset	Hemisensory deficit
Poor cognitive function	Left hemiparesis
Severe hemiparesis or	Homonymous hemianopia
hemiplegia	Advanced age
No motor return within	Language disorder
one month	Low premorbid intelligence
Previous stroke	Lack of spouse or close
Perceptual-spatial deficit	family members
Neglect or denial syndrome	Low socio-economic class
Significant cardiovascular	30 days from onset of stroke
disease	to admission
Large or deep lesion on	
computed tomogram	
Multiple neurologic deficits	

Different Aspects of Team Rehabilitation

Cognitive rehabilitation. Most cognitive rehabilitative techniques are based on two major principles of plasticity in the central nervous system (Ruskin, 1982). The first is the polysensory function of the neuron, which receives inputs from the visual system, the auditory system, the vestibular system, etcetera. Therefore, if cells are deprived in one category of input, they are capable of some degree of compensation via other inputs. The polysensory cells are also capable of memory storage, with the degree of complexity to allow for thought and learning. The second basic principle arises from the hierarchical structure of the nervous system as it slowly evolved upward, culminating in the human brain. The autogenetic development of the brain follows to some extent the evolutionary development of the species, so that the phylogenetically older fonts of the brain are the first to mature with the newer cortical (neo) system not fully matured until several years after birth. These subcortical systems permit highly complex, bilaterally integrated sensory and motor functions to take place without impingeing on cortical or conscious awareness. By using these reflexes, both inhibitory and facilitatory, that useful function can be reacquired by the brain-damaged person, and eventually bring under conscious control the ipsilateral and remaining contralateral portions of the brain (Ruskin, 1982).

The general cognitive level after stroke is a useful prognostic sign. Ben-Yishan, Gertman, Diller and Haas (1970) found that measures of intellectual ability after stroke were useful in predicting duration of stay in rehabilitation and ADL outcome. They used the mental arithmetic, digit span, digit symbol, block design, and object assembly subtests of the Wechsler Adult Intelligence Scale (WAIS).

Cognitive rehabilitation is usually directed at the following areas (Wade et al., 1985):

1. Memory. Although little is known about the natural recovery of these functions, it has been found to be a useful prognosis indicator of ADL performance. Aids to improve memory performance have included external devices (such as diaries and computers, which store the memory in the device rather than the patient), external cues to stimulate memory, visual imagery place-loci techniques, the peg system, and reality orientation techniques with confused patients. Proving that any of the techniques work has been difficult, and the area, although scientific, not very large.

2. Visual neglect and tactile perceptual disorders. These could have a profound effect on everyday functioning, such as dressing and reading. Various attempts at rehabilitation have been attempted, such as the use of a "scanning machine" to help overcome the patients' attential bias against the left side (Diller & Weinberg, 1977). Perceptual cognitive retraining, such as on the block design test, has been found to have a general beneficial effect on ADL functions. Attempts to reduce visual field defects and spatial problems are both in their infancy, but would warrant further research.

In general, recovery in cognitive impairments after stroke, tends to be restricted by the patient's age, and possibly the type of stroke. Each deficit shown by a patient also represents a challenge in adding to the theories of brain mechanisms and recovery (Caplan, 1982).

The results of a study involving a comprehensive programme to treat visual perceptual disturbances associated with right brain damage (RBD) revealed interesting facts concerning the maintenance of rehabilitation gains. Three types of previously evaluated perceptual remediation were integrated into a sequentially administered remediation programme; basic visual scanning, somatosensory awareness, and size estimation training and complex visual perceptual

organisation (Gordon & Diller, 1983). It appeared that those patients who returned to environments providing high levels of cognitive stimulation were more likely to maintain and improve in perceptual spheres. Patients with family members who encouraged community involvement and active pursuits showed greater cognitive recovery. Mood state and perceptual functioning appeared to be interrelated, but at four months after discharge most patients appeared to remain moderately depressed.

Rehabilitation of communication losses. Aphasia is the commonest disorder after stroke, with spontaneous recovery occurring most rapidly in the first few months. It would appear that comprehension recovers before expression in those who are severely aphasic. The major prognostic factor is the severity of the initial loss. Age may have an indirect influence, because younger patients tend to have predominantly expressive aphasia which may recover more fully (Wade et al., 1985).

As with any other area of stroke rehabilitation, there is no single universally accepted model for the rehabilitation of communication impairments. Clinicians have learned that they cannot "reteach" lost words. Recovery from brain damage is not only physiological but also involves a psychological process in which residual mental abilities are tapped or reintegrated to support effective communication. Standardised tests enable the clinician to make a fairly accurate statistical prediction of the expected degree of recovery. Family counselling is another important service provided by speech therapists. Education of both hospital staff and family places the patient at less disadvantage when communicating.

The effectiveness of speech therapy has proved a controversial issue. The following would seem to be appropriate in this respect:

The definition of an "effective therapy" depends on the expectation of the definer. Providing a patient with a cane does not eliminate a hemiparesis, but it does effectively help him to walk. The "cure" of a neurogenic communication disorder is beyond the current state of clinical practice in speech-language pathology. There are however, clinical procedures which can, in a direct and dramatic manner, increase the patient's ability to communicate. Controlled studies of aphasia therapy continue to be an important area for research in speech-language pathology. <u>These studies show that patients who receive speech and language therapies do better than patients who do not</u> (Golper, 1984, p.1079).

Patient-directed therapies for aphasia could range from natural conversation approaches (where patients are encouraged to draw upon all the resources they have to convey ideas and meaningful information to the listener) or cueing approaches (where a patient's ability to use self-cues is more elaborated) to stimulation approaches (where selected auditory stimulation is used to help the patient reintegrate language). Patient-directed therapies for apraxia could use melodic intonation therapy or visual auditory association cues, while therapies for dysarthria could use speech facilitating drills, palatal lifts or augmentative non-vocal communication systems (Golper, 1984).

<u>Rehabilitation of physical losses</u>. Most recovery of muscle function occurs in the first few months, but may continue for up to one year in some patients. Sensory function, which is disturbed in about half of all patients, also seems to make most recovery in the early weeks. About 70% to 80% of patients will be able to walk within six months of stroke. Three-quarters of patients initially have reduced arm function, and about 36% will have useless arms at six months. However, 12% of those with initially useless arms will make a good recovery. Functional recovery is most

rapid in the early weeks, and it is difficult to demonstrate recovery after six months. However, it is likely that about 50% of patients will show continued functional improvement (Wade et al., 1985).

The influence of physical therapy is not certain. It seems likely that therapy of an unspecified nature will speed up the recovery process and possibly lead to a better functional outcome, particularly if the service is provided early. The factors which have influenced the development of techniques of physical therapy include the following:

- the importance of sensory input to movement
- the presence of abnormal patterns of movement
- spasticity
- the phenomena of inhibition and facilitation of movement (Indaba, Edberg, Montgomery & Gillis, 1973).

Bobath (1978) concentrates on the quality of movements obtained after therapy, and not the quantity. This is in contrast to the scales used to measure ADL, notably the Barthel scale (Mahoney & Barthel, 1965). This scale measures the quantity of activities the person can perform without the help of another person. No account is taken of the quality of movements used. However, as the major goal of therapy is to engage patients in everyday social living, the Barthel scale has been regarded as the most appropriate and widely used indicator of the results of physical rehabilitation. In a study of 77 patients with hemiplegia (Indaba et al., 1973), the effects of three therapy programmes were compared:

- Group I, a control group, only received training for independence in ADL and selective stretching for contractures.

- Group II received active exercise in addition to functional training and selective stretching.

- Group III received progressive resistive exercise as well as functional training and selective stretching.

Outcome was assessed in terms of patients' performance in ADL and lower limb extension strength. After one month's therapy, 64% of Group III improved in ADL, as did 39% in Group I, and 30% in Group II. Group III also made significant gains in mass extension over Groups I and II. However, after two months of treatment, there was no significant difference between the three groups in either ADL or mass extension strengths. The beneficial effects of early intensive treatment in speeding up recovery have been supported by other studies (Hamrin, 1982).

Eakin (1991) concluded that research has so far failed to demonstrate conclusively that one approach to treatment is more successful than any other. It would appear that physiotherapy should be concentrated on those patients with the optimum prospect of recovery and who are displaying a measurable improvement. The following table summarises these prognostic indicators.

Table 3.5
Possible Prognostic Factors for ADL Recovery (Wade et al., 1985)

Overall severity	Individual parameters
Initial ADL loss	Diagnostic type
Postural control	Site or size of lesion
Arm function	Proprioceptive loss
Incontinence	Neglect
Walking ability	Other sensory disturbance
Motivation	Visual field loss
Aphasia	Cognitive disturbance
	Side of weakness
	Sex of patient
	Age of patient

Physical therapies can be seen conceptually as "purposeful activities" (Chandani & Hill, 1990). The concept sounds deceptively simple in that it stresses action and activity as the means to develop, redevelop or maintain functional skills and promote adaptive behaviour for successful and satisfying living. However, the collaborative relationship formed between therapist and patient focuses on an activity both mental and physical that must have meaning and purposefulness to the patient. This could range from a craft such as macramé to cooking or woodwork. What is important is summed up in the following words:

> Human life includes a process of continuous adaptation. Adaptation is a change in function that promotes survival and self-actualisation. Biological, psychological and environmental factors may interrupt the adaptation process at any time throughout the life cycle. Dysfunction may occur when adaptation is impaired. Purposeful activity facilitates the adaptive process (Chandani & Hill, 1990, p.15).

A summary of a rehabilitation service for stroke. The following is presented as a comprehensive model for stroke rehabilitation:

```
I   MAIN AIMS OF MODEL

    1.  To develop a model service which could be repli-
        cated elsewhere.
    2.  To ensure a co-ordinated approach to care,
        tailored to patients' needs.
    3.  To develop the improved service at little overall
        cost taken over a five-year period.
    4.  To supplement, rather than supplant, existing
        services where possible.
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> If it works, don't fix it!
>
> 5. To provide a centre for the education and train-
>   ing of professionals in stroke management.

II | **FOUR PHASES OF STROKE**
>
> 1. Prevention - 1^o and 2^o
> 2. The first week
> 3. The stage of recovery - up to 6 to 8 weeks
> 4. The stage of adaptation to residural dis-
>   ability - 8 weeks +

III | **PHASE 1:   PREVENTION - 1^o AND 2^o**
>
> 1. BP + detection and control.
> 2. General health advice regarding smoking, weight,
>   diet, etc
> 3. Management of TIA's and partial strokes:
>   (i)   correct diagnosis
>   (ii)   detection and treatment of carotid
>   stenosis
>   (iii)   aspirin
>
>   ACTION   Stroke clinic
>   Written guidance to GPs

IV | **PHASE II: THE FIRST WEEK**

1. Diagnosis of stroke - CT scans
2. Monitor condition
3. Treatment - Neurosurgery
              Anticoagulants
4. Dysphagia
5. Nursing care: Hydration
                  Moving limbs
                  Prevention of pressure
                  Sores and injury

V | **PHASE III: STAGE OF RECOVERY**

1. Assessment and reassessment
2. Recording of information
3. Trained staff who will encourage independence -
   especially nurses
4. Early involvement of family
5. Information
6. Psychological support
7. Proper use of hospital beds
8. Planned discharge
9. Avoidance of complications

```
VI    | PHASE IV(A):   STAGE OF ADAPTATION                        |
      |                                                           |
      | Objectives   1.   Prevent further stroke                  |
      |              2.   Ensure maximum qualify of life          |
      |                                                           |
      | - mobility (driving)                                      |
      | - housing (access to toilet)                              |
      | - communication                                           |
      | - visual problems                                         |
      | - self-care                                               |
      | - psychological problems                                  |
      | - depression                                              |
      | - sexual aspects                                          |
      | - employment/leisure activities                           |
      | - miscellaneous problems (health of spouse, finance)      |
```

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VII   |                                                           |
      | PHASE IV(B):   ISSUES                                     |
      |                                                           |
      | 1.   How long should professional support continue?       |
      | 2.   Balance between hospital and community:   link        |
      |      with local disability services                       |
      | 3.   Role of GP                                           |
      | 4.   Role of volunteer support groups                     |
```

(Langton-Hewer, 1992)

Social Aspects in Stroke Rehabilitation

A stroke is a small death.   It comes on suddenly, after
hitting someone who is quite well for his age, and
leads to obvious physical loss.   The victim is rendered
helpless "at a stroke" and is robbed of his dignity and
independence.

Most sudden role changes are accompanied by some ceremony - marriage by the wedding ceremony, bereavement by a funeral, adulthood by the 21st birthday party, promotion by the office party. But there is no ceremony to accompany stroke; hospitalisation could be developed into one, but at present probably constitutes more of a hindrance to role change than a help (Wade et al., 1985, p.262).

Stroke can be regarded as a family matter. It disrupts family life, work patterns, financial status, and general lifestyle. Other disabling conditions, where there is a slow progressive increase in disability, give the patient, his family and his wider social circle a reasonable time in which to adjust. In stroke, the disability occurs immediately, and there is no time for the normal gradual adjustment processes to come into play. The patient has to start adjustment when he is at his worst. Eventual adjustment might be postponed because the early recovery immediately following stroke might give the impression that there will not be any long-term disability.

Family Responses to Stroke

The greater the alteration in the patient's behaviour, cognition and emotion, the greater the suffering experienced by the family. If a patient is demanding, depressed, irritable, and lacking in the capacity to initiate affection or to empathise with others, it is likely that a family member will respond with depression, anger or guilt (Benson, 1973). Families often experience similar reactions. Initial relief over survival and hope for full recovery of the patient can be reinforced by religious faith. Disbelief in complete recovery could be seen as "lack of good faith" in people accustomed to recovery from broken bones, surgical incisions or colds. When the hoped-for complete recovery does not occur, feelings of despair, isolation and entrapment occur. The spouse might be left without a partner who

is able to participate meaningfully in the activities of life. The partner, instead, becomes another child in the family. If a relationship was poor before the stroke, it will not improve under the stress of organic personality change.

Parkes (1975) proposed a model of bereavement, identifying six features. These were: a process of realisation, an alarm reaction, an urge to search for the missing person, anger and guilt, feelings of loss of self, and identification phenomena. He found that pathological variations could occur, that the reactions could be parallel and that they occurred as well in amputees. He suggested that these reactions could occur in stroke. He also suggested a sequential model involving three phases: the crisis phase, the adjustment phase, and the restoration phase. The following model is suggested by Holbrook (1982, p.102):

Table 3.6
Reaction of Stroke Families

First stage	Third stage
Crisis	Realisation of disability
Shock	Anger
Confusion	Feelings of rejection
High anxiety	Despair
	Frustration
Second stage	Depression
Treatment stage	
High expectations of recovery	Final stage
Denial that disability is permanent	Adjustment
Periods of grieving	
Fears for future - job, mobility, lifestyle, coping	

Holbrook (1982) stated that the second and third stages coincide with discharge from hospital and active rehabilitation. Interruptions to the accepted pattern of adjustment were less likely to occur if role changes experienced by the family occurred without trauma. The change from an executive to a subservient role, or from that of a dependent spouse to executive, dealing with all business and finances, as well as being supportive to a disabled partner, could be traumatic.

Holbrook (1982) investigated the adjustment and residual problems in 92 patients. The main health problem was fear of further stroke. Other problems described were anger, change in lifestyle, depression, frustration, extra work for the spouse, communication problems, loss of confidence, loss of concentration, loss of independence, lack of progress, feeling useless, loneliness, and having to stay in hospital. Adjustment did not necessarily take place if disability was slight, although most of those who felt they had not adjusted were substantially handicapped and many of them had further strokes or complications.

The limits that the condition of stroke places on social interaction suggest that stroke-related variables may interact with changes in family functioning. However, Evans and Bishop (1987) looked at the variables of problem solving, communication, roles, affective involvement, affective response, behaviour control, and general family functioning in relation to a member of the family having had a stroke, and could find no significant relationships. They felt that a broader perspective, such as investigating care-givers' burdens or indirect bases of family problems as directly related variables, was not evident.

Many stroke survivors remain at home for months or years, cared for by their families. This is in most cases a spouse, more specifically the wife. Information from a two-

year longitudinal study on a community sample of 302 pa-
tients with acute stroke was analysed to determine the
effects of the stroke on the mood of the chief carer, the
person living with the patient (Wade, Leigh-Smith & Langton-
Hewer, 1986). Increased anxiety was the most commonly
reported change six months after stroke. Significant de-
pression was seen in 11% to 13% of carers over the first two
years after stroke. The patient's functional disability was
associated with depression in the carer over the first year,
but not at two years. A perceived poor recovery by the
patient, a low level of general activities by the patient
and depression in the patient were also associated with
depression in the carer within the first year. Carers for
patients who have suffered stroke showed anxiety and emo-
tional distress unrelated to the patient's physical disabil-
ity after two years.

Other studies showed similar costs to the families of
stroke patients. About half of these families were found to
suffer financial stress, because someone had to stop work to
care for the patient (Brocklehurst, Morris, Andrews, Richards
& Laycock, 1981). Loss of social life was found to affect
three-quarters of careers (Holbrook, 1982) and disruption of
sleep, the least tolerated aspect of caring for someone, was
also often a problem (Kinsella & Duffy, 1979).

Quality of Life in Patients Discharged Home after Stroke

Quality of life in general refers to an individual's
subjective well-being and life satisfaction, including
mental and physical health, marital well-being, interperson-
al relationships within and outside the family, work and
other activities in the community, personal development and
fulfilment, and active recreation (Anderson, 1982).

In a study carried out by Niemi, Laaksonen, Kotila and
Waltimo (1988), 46 surviving patients were assessed at the
three-month and four-year levels. The areas covered were

working conditions, activities at home, family relation-
ships, and leisure-time activities. Despite good recovery
at time of discharge, ADL and return to work, the quality of
life of most patients was not restored to prestroke level.
Deterioration ranged from 39% (activities at home) to 80%
(leisure-time activities). More severe deterioration of the
quality of life was seen in patients with hemispheral
lesions. Older people (over 65 years of age) had a greater
deterioration in quality of life, due most probably to
increasing disability and health problems. Speech disturb-
ances had no effect on the quality of life. Severity of
stroke and disability did have a direct impact on deterio-
ration of the quality of life, but the authors concluded
that the most important variable seemed to be the patient's
subjective experience of disability and insufficiency. The
incidence of depression (57%) was one of the central pre-
dictors of the quality of life. The following diagram illu-
strates the interrelationships of social, emotional and
functional states:
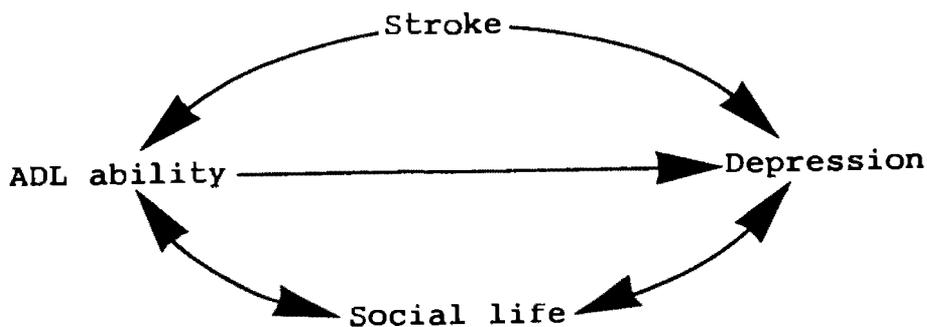
Figure 3.1. The interrelationship of social, emotional and
functional states after stroke (Wade et al.,
1985, p.267).

Other researchers have confirmed in general the find-
ings of Niemi et al. (1988). Deterioration in the social
functioning of 121 survivors was reported as follows:
socialisation outside the home, 50,4%; hobbies and other
interests, 38%; and socialisation in the home, 37,2%
(Ahlsiö, Britton, Murray & Theorell, 1984). They also found

that ADL independent scores were not sensitive to the effect that vertigo, tiredness, memory and cognitive difficulties, impairment of fine motor function, and walking had on limiting opportunities for leisure, intellectual or social functions. Quality of life was not influenced by physical factors alone. Signs of depression and anxiety were found to be of similar importance. The patients' perceived quality of life did not improve during follow-up, although ADL function did. The authors felt that there was too great a discrepancy between efforts invested in physical rehabilitation and in psychological support.

Age as an Important Variable in Social Functioning

Age is a major consideration in quality of life assessments after stroke. Although most stroke patients are elderly, approximately 25,9% in the Western world fall in the age group of 45 to 65 years (Black-Schaffer & Osberg, 1990). This figure is felt to be higher, with 80% being below 70 years, in black Africans (Joubert, 1986). This younger group of patients are in midcareer, with active family and community responsibilities. For them the goals of rehabilitation should include a return to vocational and community functioning, as well as independent self-care and functional mobility.

Studies vary from 3% to 84% on the percentage of patients returning to work after stroke. A study reporting on older patients had less success with vocational rehabilitation (Howard, Till, Toole, Matthews & Truscott, 1985), while a report of patients under the age of 50 years showed more than 80% returning to work (Hindfelt & Nilsson, 1977).

A project which examined vocational outcomes identified prognostic indicators of success or failure in return to work of 79 working-age stroke patients, who underwent comprehensive inpatient rehabilitation treatment in a programme with specific emphasis on prevocational goals (Black-Schaffer & Osberg, 1990).

The picture of the "rehabilitated worker" which emerged from the study was of an individual who had reduced his or her work activities after stroke. Nearly half (48%) of the previously full-time workers returned to work only part-time after the stroke. There were positive associations between return to work and Barthel index on admission ($p = 0,002$) and discharge ($p = 0,0015$). Negative associations were found between return to work and aphasia ($p = 0,0009$), rehabilitation length of stay ($p < 0,0001$), and prior alcohol consumption ($p = 0,03$).

Other prognostic indicators can be identified with some confidence during the first two weeks after stroke. Patients suffering their strokes during activity are more likely to have a good outcome than those in whom the lesions occurred during sleep. This could be a result of different pathology. Patients who are nonassessable at an early stage on tests requiring active co-operation also tend towards a poor prognosis. The reasons could be impaired consciousness, impaired intellect (with or without severe verbal comprehension loss) and lack of co-operation or motivation.

This last point, motivation and mood state, has proned in most studies undertaken to be a highly significant predictor of final employment potential. Patients' attitudes and ability to co-operate with treatment have been found to be as important as the actual amount of therapy available.

Community Resources - The Final Stage of Rehabilitation

A principal aim of a comprehensive stroke service is that it should integrate hospital, primary and community care. The close links which should be developed between all three sectors should assist in creating an atmosphere which will enable smooth discharge of patients from hospital into the community.

The "care" stroke team in the hospital would reach out into the community by doing home visits and assessments, before the patient is discharged. It would also act as a focus for the training and education of professionals such as health workers and district nurses working in the community (Langton-Hewer, 1990).

In most developed communities the chief service providers for stroke patients are health and local authorities, family practitioners, and voluntary organisations. Each health authority should have a <u>district stroke policy</u> laying down standards, identifying services, and allocating resources. A named individual should be responsible for its implementation and monitoring and for co-ordination with local and other authorities. All patients and their carers should be given information about the nature and causes of their strokes, the risks of recurrence, the speed and nature of recovery and possible complications, and clear advice about the resumption of physical, social and sexual activity. More information rather than less should be given to patients.

The hospital stroke team will refer patients to existing services in the community. These would, in most cases, involve a network of district nurses and health workers.

Voluntary services for stroke patients provide a valuable means of social support and encouragement on a long-term basis. The following outline of an active voluntary association in Bristol, England, gives guidelines on how such a service could function (Eastman & Holbrook, 1983).

The Bristol Stroke Foundation

1. <u>Aim of the foundation</u>. The purpose was to use individual volunteers or groups run by them to help stroke

patients from the Frenchay Hospital Stroke Unit to reintegrate into the community, to broaden their interests, and to restore their self-esteem.

2. Recruitment and training of volunteers. Volunteers were recruited through the personal contacts of the organiser, the hospital, and the volunteers themselves. Social work students were also used. The paid part-time organiser is a professional social worker. The Stroke Unit at the hospital participated actively in the training, which is regarded as an ongoing continuous inservice function.

3. Referral procedure. The patient is usually referred via discussion between the hospital social worker and the organiser to decide whether the patient needs individual or group work, and how these needs should be met. The patient and family must indicate their willingness to use the services of a volunteer.

4. Individual work with patients

- Help to encourage patients (and relatives) to carry out at home the techniques learned in the therapeutic department.

- Bridging the caring gap between hospital and home or community at the end of the treatment period.

- Relieving relatives of some of the strains of constant care.

5. Group activities:

- A skittles group, providing both social contact and physical co-ordination and balance, was a great success, and was held weekly in a local pub.

- The men's group was formed to meet the needs of younger men who could not go back to work and who wanted male company.

- The women's group was started to help women socialise again and to reduce the limitations of limited mobility. The members keep informal contact with one another.

- A gardening scheme was started, where a garden was established next to the Stroke Unit and patients trained in gardening skills.

6. <u>Transport</u>. Transporting patients to social activities is an extremely important part of the work of the volunteer. Shopping trips and social activities reduce isolation and transport helps to lessen the burden of reduced mobility.

The different patterns characterising the rehabilitation of stroke patients have been discussed in this chapter. One pattern emerged from the literature as being of particular significance. Traditionally this pattern has been termed "Depression", and warrants more information as a significant part of the rehabilitation process.

CHAPTER 4

STROKE AS LIFE PUNCTUATION;   DEPRESSION
AND DISCOURAGEMENT

Physical Illness and Depression

Stroke has a high prevalence of associated depressive
disorder. It has been estimated that between 30% and 60% of
post-stroke patients have clinically significant depression
(Robinson & Price, 1982) and that the high-risk period lasts
for two years post-stroke (Robinson et al., 1984). A
tendency to depression was regarded as a central predictor
of quality of life (Niemi et al., 1988), while a strong
correlation between long-standing depression and problems in
social functioning was reported two years after stroke
(Parikh, Lipsey, Robinson & Price, 1987).

The question of depression as related to stroke brings
the whole question of depression in the context of physical
illness to the fore. Clinical impressions of patients with
significant physical illness seen in general hospital
settings, emphasise the differences in this group if com-
pared with general psychiatric patients. The interpretation
of vegetative signs is not as clear-cut, and there seems to
be less emphasis on feelings of low esteem, guilt and
self-blame. Patients with depression are more characterised
by hypochondriacal concerns, lethargy, and behavioural
disturbances. Reactivity of mood is often preserved (Kerr,
Schapira & Roth, 1969).

There are a number of explanations for the association
between physical illness and subsequent depression (Morris &
Raphael, 1987):

- There may be no causal link other than a temporal association.

- Depressive symptoms might reflect an underlying aspect of the symptomatology of the underlying medical illness.

- Depressive disorder may be precipitated by physical illness and its effects on the central nervous system and neurochemical balance. This could be the case in stroke especially.

- Physical illness can cause a loss of self-esteem, independence, employment, and the social network. It becomes a major negative life event for the patient. Adjustment could be in the form of a type of bereavement which could develop into depressive illness.

Hall (1980), too, has documented some of the biological factors that may contribute to depression in the medically ill. These include: hormonal, nutritional, electrolyte, and the multiple physical consequences of systemic and intracerebral disease. Hall also stresses the potential seriousness of psychological stressors of medical illness. These could affect body image, the sense of identity, and the capacity to work and maintain social, family and marital relationships. Loss and bereavement can also accompany medical illness. This could result in a pathological mourning reaction (Spitz, 1942). Lowered self-esteem has been regarded by others as a central component in depression (Cohen & Lazarus, 1979). Depressed mood may arise as part of any intrapsychic conflict. Whether this mood will become clinically significant may depend on several factors, including the coping responses of the individual and social support (Lin & Dean, 1984).

Depression may present in medical patients without obvious cognitive and affective symptoms, but rather with somatic complaints and behavioural disturbances. These could include the following:

1. <u>Somatisation, pain, and abnormal illness behaviour</u>. Here there is selective focusing on the somatic aspects of the mood disturbance with denial or minimisation of the affective and cognitive changes. The diagnosis of depression is often missed as the symptoms are thought to be part of the medical problem.

2. <u>Demential and pseudodementia</u>. Depression and dementia may be confused because of the tendency of depressed patients to exaggerate impairment in memory and other cognitive functions and because of the similarity in clinical manifestations, such as impaired concentration distractibility changes in speech, psychomotor retardation, and sleep disturbance (Klerman & Davidson, 1984). Because of these shared features, depression may remain undiagnosed in medical patients mistakenly thought to be demented.

3. <u>Suicidal behaviour and the refusal of medical treatment</u>. It is likely that a high suicide rate in medical patients is due in part to the greater frequency of depression in this population. It has been noted that the voluntary cessation of life-sustaining medical treatments, such as neural dialysis, may be associated with underlying depression (Rodin, Climara & Ennis, 1981).

Classification of Depression in Physical Illness

The current classification of depression following physical illness is unsatisfactory. In an institutional setting, this can easily lead to problems of misdiagnosis and maltreatment.

According to the DSM-III, there are three categories
into which this type of depression could be classified
(Morris & Raphael, 1987). The first is Adjustment Disorder
with Depressed Mood. Adjustment disorders, according to
DSM-III are maladaptive reactions to an identifiable psycho-
social stressor occurring within three months after the
onset of the stressor. Physical illness is a common preci-
pitant of an adjustment disorder with depressed mood.
Careful assessment is necessary to avoid the unnecessary use
of antidepressant medication, which could affect these
patients adversely.

The term Dysthymic Disorder is used in the DSM-III to
refer to a chronic disturbance of mood (at least two years
in adults) without interruption for more than a few days or
weeks, and of insufficient severity and duration to meet the
criteria for major depression. Again chronic physical
disorder can be a common precipitator of a dysthymic disor-
der. Care must be taken, however, as the symptoms of
lethargy and psychomotor retardation can be produced by the
medical illness itself.

In the DSM-III the term Organic Brain Syndrome refers
to a syndrome in which the disturbance of mood is the
predominant characteristic, specified symptoms are present
nearly every day for at least two weeks, the features of
other organic brain syndromes are not present and there is
evidence of a specific etiological organic factor.

In comparisons of patients with depression following
physical illness with functional depressives, Lipsey,
Spencer, Rabins and Robinson (1986) found that there were no
major differences in symptom profiles in the two groups,
although stroke patients were more likely to be slow and
lethargic. In fact, it was felt that physical factors are a
major cause of depression in patients over 40 years.
Although medical illness has been thought of as a precipi-

tant of depression <u>only</u> in genetically predisposed indivi-
duals, other research suggests that illness, particularly
CNS damage, has a unique impact. This is because depression
here has had a lower loading of constitutional predisposi-
tion than has depression following psychological stress or
antihypertensive drugs (Whitlock, 1982).

The relationship between physical illness and depress-
ion remains unclear. Stroke provides an interesting model
for the biopsychosocial understanding of physical illness,
in view of its impact on the CNS, the physical disability it
causes, and its effect on social functioning.

Lesion Location in Depression after Stroke

Research findings have suggested that mood changes
following brain injury may not be a nonspecific psycholo-
gical response to physical or cognitive disability, but may
be related in some way to the pathophysiology of the lesion.
Borod, Koff, Lorch and Nicholas (1985) found, for instance,
in their research that patients' responses to emotionally
evocative slides were different after brain injury. Right-
brain damaged patients used facial and intonational channels
of communication less frequently than did left-brain damaged
patients and normal control subjects. They concluded that
the right hemisphere has a predominant role in the express-
ion of emotion. The right-brain damaged patients with
frontal pathology were especially limited in their use of
facial expression.

There is general disagreement in the literature,
however, on the nature, intensity and direction of effects
of laterality of brain damage on emotional status. The
symptoms are often different from those of patients present-
ing with psychogenic psychosomatic symptoms and could
influence treatment and rehabilitation (Prigitano, 1987).
Moehle and Fitzburgh-Bell (1988) found no significant
differences in emotional status between right- and left-

hemisphere brain damaged patients when testing a group of 1 986 patients in the MMPI. Moderate elevations were found on scales 1, 2, 3 and 8, suggesting mild depression with significant concern about bodily function, somatic complaints, and aloofness or lack of involvement with others.

Aphasia has been found to play an important role in laterality of lesion studies (Benson & Geschwind, 1975). Aphasia has been linked to emotional-catostrophic reactions. It has been proposed that these reactions come from dysfunctional systems in the left hemisphere that would normally control emotional behaviour. These reactions include depression, agitation and acting out, but then give way to gradual recovery and recompensation over time. On the other hand, right-hemisphere brain damage has been reported to be associated initially with an "indifference reaction" which worsens as the injured person begins alienating family and friends with socially inappropriate or obtuse interpersonal behaviour (Woodward, Brisbee & Bennett, 1984).

Depression is an understandable and possibly inevitable psychological reaction to a physical and mental impairment such as stroke. However, the fact that stroke patients were significantly more depressed than equally impaired orthopedic patients (Folstein & Luria, 1973), and that stroke patients with left interior-hemisphere lesions were more depressed than stroke patients with right-hemisphere lesions (Robinson, Kubos, Starr, Rao & Price, 1984) raised the possible significance of pathophysiology of the lesion. This was focused on in a study undertaken of two groups of patients, both with left-hemisphere brain injury, but one with cerebral infarcts and the other with focal traumatic injury. The findings suggested that the more anterior location of the stroke lesions was in some way responsible for the increased frequency and severity of depression, and there was a strong correlation between the severity of depression and the proximity of the lesion to the frontal pole.

Robinson and Coyle (1980) proposed that the reasons for these results, which were replicated in other studies (Robinson, Starr, Lipsey, Rao & Price, 1984; Robinson, Starr & Price, 1984):

1. Language and cognitive functions are located in different topographic areas of the context and it may be that specific kinds of language or cognitive deficits are associated with increased frequency and severity of depression.

2. Anterior lesions interrupted more catecholaminergic pathways than posterior lesions did, causing a more profound drop in brain nonepinephrine levels, which ultimately led to the behavioural expression of depression.

Robinson, Starr and Price (1984) reported that 27% of patients met DSM-III criteria for major depression following the acute period after CVA. However, his work, despite its pioneering significance and extensiveness, met with severe criticism. This can be summarised as follows (Malec, Richardson, Sinaki & O'Brien, 1990):

1. The groups studied were heterogeneous with some patients having had previous psychiatric and substance-abuse problems.

2. They were not screened for the presence of brain pathology in addition to stroke.

3. They represented a select subgroup (American blacks of lower socio-economic status).

4. The assessments were based on impressions and diagnoses of a single examiner.

5. Other investigators have emphasised the importance of distinguishing verbal reports of depression (mediated

primarily by the left hemisphere) with nonverbal indications of depression, modulated by the right hemisphere (Ross & Rush, 1981).

6. Sinyor et al. (1986) demonstrated significant relationships between depression and coping strategies and between depression and functional impairment.

No association between right-sided weakness and depression was found in a study of 976 patients in a community study (Wade et al., 1987). There was agreement on the incidence of depression (30%), but Wade et al. felt that this could not be explained simply by reference to physical or social disability. They felt that pre-existing personal or social characteristics might have an important influence on the presence of depression after stroke. They also concluded that even if lesion locality (near the left frontal pole) was associated with increased depression, this relationship was overshadowed by a majority of other factors. Their results showed that the presence of depression was associated with the degree of physical disability, loss of social function, and being female while living with someone. These measured factors did not, however, account for much of the depression seen, which the authors could only attribute to other unknown personal or social factors.

In another study investigating 500 consecutive stroke admissions (Collin et al., 1987), no significant relationships were again found between left-hemisphere lesions and depression. Common features of depression which had significantly high scores were related to functional ability and usefulness. They included being edgy and bad-tempered (31%), not managing to keep busy and occupied (38%), not feeling that they were doing things well (38%), not being satisfied with the way they had been carrying out tasks (38%), not feeling capable of making decisions (38%), not being able to enjoy day-to-day activities (44%), and feeling that they were not playing a useful part in things (45%).

Depression in stroke patients could be summarised as being the impact of the stroke on the patient's neurophysiology, social functioning, and adaptive abilities. Some stroke patients may act depressed, but deny depression. Others may complain of depression, but not demonstrate its signs. Others may feel depressed, but be unable to express their feelings, owing to a speech problem. In view of this, Malec et al. (1990) proposed a classification system of depression after stroke that consists of two aspects:

- verbal reports of distress
- vegetative symptoms (sleep and appetite disturbances)

They suggested that the above points should be considered in relation to premorbid personality or psychiatric history, additional brain pathology, marked language disturbance, additional severe illness, social factors related to age, abnormal social stress, and inadequate social support. This might lead, in their view, to a better understanding of a complex and unresolved situation.

Emotional Reactions and Depression after Stroke

The mind is a wonderful thing, and I wish I understood someone's - anyone's would do. There I was on the floor. I knew instantly what had happened: I had had a stroke.

Along with this knowledge, on a sort of parallel track, there rode the sensation of fear. (Charatan, 1987, p.1403)

The above illustration describes the anxieties and fears that accompany the sudden occurrence of stroke. Patients are afraid of being left crippled and helpless, dependent on others for things ordinarily taken for granted. An inability to attend to one's private needs (toileting, feeding and dressing) is both frustrating and embarrassing.

The patient's role is changed. From being independent and autonomous, he is forced to rely on others for his most basic needs.

Stroke is inevitably the result of long-term athero-sclerosis (cerebrovascular disease), which may have resulted in slight affective and intellectual disturbances, unnotice-able as such to the patient, and observed as personality changes, probably related to increasing age, by his family and friends (Schwab, 1972). Impairment of abstract attitude is the most characteristic feature of this type of "initial" brain damage. The patient becomes more stimulus-bound, he has difficulties with attention and judgement, and he tends to react to stress in irrational ways. Irritability, lack of stamina, emotional lability, increased anxiety or depress-ive moodiness are the early results of the patient's attempts to handle an increasingly difficult world (Macrae, 1967). Should a stroke then occur, the emotional reactions expe-rienced afterwards will be a reflection of the preceding cerebrovascular disease, the patient's basic personality characteristics, and the quality of his interpersonal relationships (Schwab, 1972).

> You try to do something and you can't - it's
> heartbreaking. You don't know how many days I sit
> here and I think and I think and I think, and it's
> really depressing. (Charatan, 1987, p.1403)

The fears that a stroke patient could be left with include:

-      fear of being left permanently crippled and handicapped

-      fear of another stroke, and increasing paralysis or
       death

-      fear of impoverishment, and the depletion of emotional
       and financial resources

- fear of loss of love, owing to being a burden, and disfigurement by facial paralysis, excessive drooling or paralysis

These fears, combined with a sense of powerlessness and lack of personal autonomy, could result in patients viewing themselves as permanently ineffective persons (Schwab, 1972).

Stroke considered as a stressful life event incorporates loss, failure and disappointment. For this to be understood, it would have to be "matched" to the patient's existing psychological conflicts (Morris & Raphael, 1987). An example of this would be the effect that a stroke would have on a person whose self-esteem arose mainly from his sense of physical achievement or body image. The unique impact of stroke of each individual must always be considered.

The following table illustrates how factors influencing depression after stroke could be grouped and weighted:

Table 4.1
<u>Time following Stroke - the Weighted Influence of Factors on Depression</u> (Morris & Raphael, 1987, p.328)

Factors	Early	Late
Lesion location	★★★★★★	★
Neuroendocrine abnormalities	★★★★	★★
Lesion size	★★	★★
Cognitive impairment	★★	★★★
Physical impairment	★★	★★★★
Social support	★	★★★★

In evaluating the factors that influence depression after stroke, the role of social support in providing protection from severe life events requires attention. Social support as traditionally perceived (i.e., external to the person) has not been felt to play any part in protecting against a depressive disorder (Henderson, Byrne & Duncan-Jones, 1981). However, support at a time of crisis, such as confiding, noncritical, and emotional sustenance from close relationships, may serve to reduce the impact of a severe event in certain situations. Morris and Raphael (1987) suggested that the hypothesis of a social network of support provided by the professional team to enhance psychosocial recovery should be investigated.

The majority of people suffering from stroke are over the age of 50. The depression that they are confronted with is further complicated by the process of aging. This process results in the individual being confronted with new and specific problems such as declining physical abilities, illness, lost reproductive function, retirement, loneliness due to the death of a spouse, relatives and friends, and the awareness of approaching death itself (Wasylenki, 1982). The impact of stroke occurring in this context could be overwhelming. When the acute stage is over, depression may come to be organised around the frustrations of the physical handicaps, the uncertainty of their resolution, the sexual difficulties, the enforced dependency, and the invalid role. In the longer term, the patient may face loss of job and status, financial insecurity, a sense of uselessness, or the prospect of permanent loss of independence. It is a major life crisis that can be interpreted as a loss or threat. The unsatisfactory resolution of this crisis, imposed on the existing problems of aging, could lead, of course, to depression (Watzlawick & Coyne, 1980).

The Effect of Depression on the
Rehabilitation Process

Stroke may directly cause both physical disability and emotional disturbance, and both of these may in turn affect social life. A reduced social life may not only be a result of depression, but may in itself cause depression. It is also possible for depression to cause a greatly exaggerated, physical disability. Clearly these three parameters are closely linked, but the extent of any causal relationship between them is unknown. There are many other extrinsic and intrinsic factors that must influence all these, but little is known about them (Wade, Wood & Langton-Hewer, 1985).

Despite involvement in rehabilitation programmes, it would appear that the 30% to 60% of adult patients who have had strokes and who are depressed suffer from chronic depression (Ahlsio et al., 1984). Gordon and Diller (1983) reported that the depression scores of right brain-damaged stroke patients at four months and at one year post-discharge were both elevated and stable. Feibel, Beck and Joynt (1979) found that 37% of a sample of 85 stroke patients, who were four months post-rehabilitation discharge, were moderately to severely depressed and 56% were socially isolated. Robinson, Starr and Price (1984) reported that during the first six months following the onset of stroke, the incidence of depression increased from 44% to 60%; 95% of those who were initially depressed remained depressed and 29% of those who were not initially depressed, became depressed during this period.

In a later study Parikh et al. (1987) found a persisting significant association of functional impairment with depression, even at two years post-stroke. Impairment was found not to provoke reactive psychological depression in stroke patients but instead severe depression seemed to sustain severe impairment. They felt, therefore, that the fact that the patients were depressed prevented them from

participating fully in the rehabilitation process. An ability to benefit from a rehabilitation programme would presumably lead to reduced participation in social activities. This was explored in a study carried out by Feibel and Springer (1982).

Feibel and Springer (1982) found that the measure of reduced or lost social activities showed a strong relationship to depression status ($\underline{p} = < 0,01$). This finding occurred without significant relationships between depression status and variables of age, marital status, side of lesion, change in residence after stroke, sex, cognitive status ambulation, and ADL status. These findings supported those of Labi, Phillips and Gresham (1980), who demonstrated that psychosocial disability as defined by failure to resume previous social activities occurred in physically restored stroke survivors.

Depression was not therefore found to be related to any other parameter of recovery after stroke, but once having occurred appears to be a chronic, stable condition interfering with the ability of patients to participate fully in social activities after discharge from rehabilitation. No research appears to document the relationship between depression and environmental issues after discharge.

Researchers concerned with recovery from stroke have stressed the importance of a supportive family or network of friends (Coughlan & Humphrey, 1983). It has also been recognised that people providing support to stroke survivors may face their own adjustment problems. The literature in this area has also characterised specific psychosocial problems reported by others in the aftermath of stroke. Decreased opportunities for social activity, feelings of isolation, lack of companionship, role changes, and lack of time for themselves have been the most frequently expressed complaints. These do not appear to be dependent on the patient's dependency, hemiplegia severity or severity of aphasia (Zarit, Todd & Zarit, 1986).

An attempt has been made to examine more closely the variables involved in a longitudinal study (Tompkins, Schulz & Rau, 1988). The authors created a profile of support persons who might experience prolonged distress and depression if they did not receive appropriate intervention. Those people likely to exhibit high levels of depressive symptoms soon after their partners' strokes, were the spouses of younger, more severely impaired patients with lower household incomes, smaller social networks whom they visited frequently and lower levels of dispositional optimism.

House (1980) stated that the exact nature of the psychological and social factors which predispose to post-stroke mood disorders is a relatively neglected field of study. Feelings of discouragement, personal isolation, and unhappiness emerge as patterns of emotional reactions. These need to be explored in relation to other significant factors in the rehabilitation process.

CHAPTER 5

RESEARCH DESIGN

Introduction

The initial plan of the research project was to create
a neuropsychological test battery to be used for stroke
patients in a South African third world setting, such as
Ga-Rankuwa Hospital. In a traditional medical model, this
would play a part in the initial acute medical treatment, as
an evaluation of the extent of brain-behaviour dysfunction-
ing after the stroke and as a guideline for rehabilitation
of the patient. It was felt that little literature, norms
or research results existed on the subject, and that this
would make a valuable contribution to the field of neuropsy-
chological rehabilitation in this country.

However, at that stage, little was taken into account
of the realities of the situation. When these were
explored, the futility of the medical model type of research
in this particular setting was apparent to the researcher.
The following questions emerged:

- Of what value are tests in memory, language ability, or
  calculation to people who are performing simple,
  labouring work as their means to maintain a family and
  home?

- How is it possible to administer tests on a <u>fine</u>
  <u>deductive</u> neuropsychological level to people who have
  never had the privilege of education?

- How is it <u>ethically</u> possible to enter into a <u>relation-</u>
  <u>ship</u> with people who are desolate, unhappy, forcibly

removed by a devastating and sudden illness into a state of physical disability, _purely_ as an academic exercise to "stop a gap" in neuropsychology?

- Of what use are assessment batteries (however neatly and statistically reliable and valid) to a section of humanity who, owing to their weakened physical state, and the pressing need for survival in a community where only the most basic needs can be considered, have a destiny of increasing muscle spasticity, loneliness, dehydration, and ultimate death lying in "a pool of urine"?

This forced the researcher to abandon her initial plan of research and to turn to a more field-directed, ecological approach.

The role of the hospital was a major consideration in this respect. From the research viewpoint it was considered as:

- a large, already existing, funded building

- held in such high esteem by the patients that a five- or six-hour journey in a train, bus or taxi, or even overnight in a mission hospital ambulance, is not unusual

- containing a professional multidisciplinary staff and a vast number of semiskilled and unskilled staff

- providing an acute and follow-up medical service for stroke patients

A hospital, therefore, is a large existing interacting network of potential care and rehabilitation for the stroke patient. In the light of the synchronous systems model, it was part of the environmental sphere in interaction with the

personal sphere (the patient in interaction with spouse and family) and the biological sphere (the interacting physical functioning and stroke status of the patient) (Janoski & Schwartz, 1985).

At the time the project at Ga-Rankuwa was started, the hospital was far from exercising its potential as an active and supportive part of the rehabilitation process in the environmental sphere.

- Staff worked in isolation from within their own depart-
   ments although "officially" perceived as a team and
   functioning physically as such.

- Patients passed through the hospital system with no
   attention being paid to their fears, lack of knowledge
   about their condition or to their personal and family
   needs.

- Staff and patients did not interact or communicate,
   except as related to the medical condition, or in
   specific individual circumstances.

- There was no contact between the hospital and the
   limited facilities in the community, such as local
   health clinics, in order to extend supportive services
   into the community. This was so extreme that several
   patients had died of dehydration and neglect, although
   within ten minutes walking distance from a community
   clinic.

The researcher was presented with a nursing sister, occupational therapist, a physiotherapist, a speech thera-pist, and a clerk to start a rehabilitation service for stroke patients. Utilising this structure, a weekly "team" meeting was held, and the opportunity was used to educate, change and re-organise. Certain values were stressed throughout, such as:

\-   <u>The patient as person</u>

    * "Who" were the patients?
    * "Where" did they come from?
    * "Where" were they returning to?
    * "What", in terms of family, friends and support
      groups, were they returning to?

\-   <u>The hospital as a therapeutic setting</u>

    * "What" happened in the wards to the patients, besides
      the medical treatment, which was expertly carried
      out?
    * Were stroke patients isolated interpersonally in the
      wards?
    * What happened when stroke patients could not speak?
    * What happened when families visited or were the staff
      aware when they did not visit?

\-   <u>The team members as therapeutic agents</u>

    * The ability to be able to objectify one's actions and
      see them as part of a therapeutic process.
    * The importance of interpersonal interaction and
      communication with patients from the time that they
      were admitted to the ward.
    * Knowing the patient as "person" together with getting
      to know the family as part of the patient system.
    * Responding always to the <u>needs of the patient</u>, rather
      than responding from one's professional perspective.
      (This proved to be difficult for many of the team
      members.)

The grass roots work that was commenced in the wards
and in the weekly team meetings, together with a literature
search, pointed to an ecosystemic approach as a way of
approaching the multifaceted dynamic and changing <u>needs</u> of
stroke patients in such a third-world setting.

An ecosystemic approach has its foundations in field theories. Behaviour is observed in the context of the environment. This assumption complicates the task of the researcher in comparison with laboratory investigations. The term "ecosystem" provides a foundation upon which to build the study of relationships among persons and environments. An ecosystem can be defined as composed of interdependent populations and their related environments, which comprise a definable unitary system. This definition presents the researcher with certain difficulties. From a theoretical point of view, all population variables and all environmental variables are interactive. Ecosystems also vary in size and complexity. As a result, the researcher must define the boundary of the ecosystem to be studied and select particular persons and environmental variables (O'Connor, 1977).

The boundaries of the ecounit to be studied were clearly definable, in that the stroke patient as a biological, emotional and social being, in interaction with the spheres of hospital, family and community functioning, became vitally important. Unlike other models of research done on rehabilitation of the stroke patient (and illustrated by the diagram below), this research would adopt a different angle.
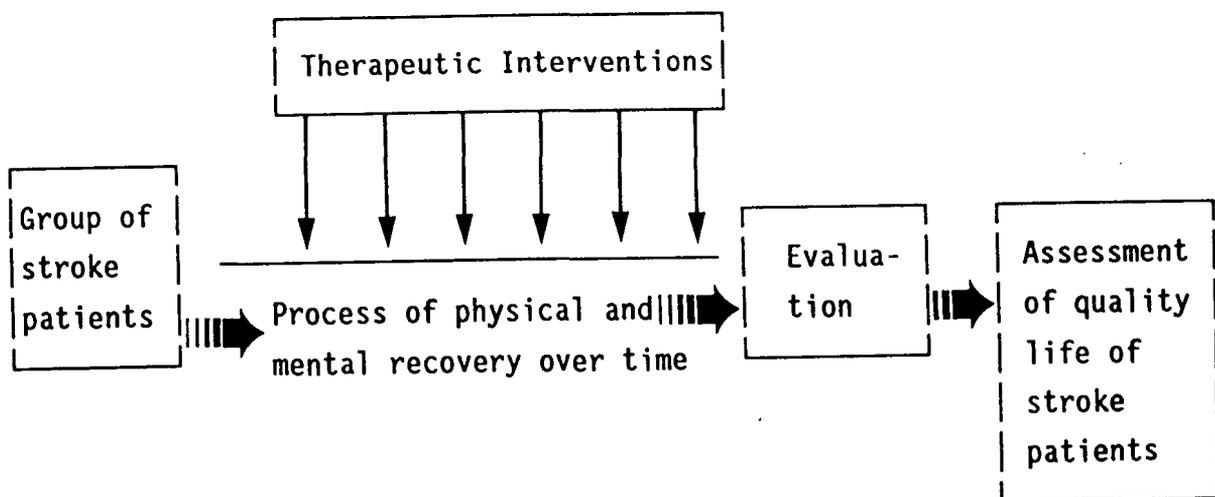
Figure 5.1. Model of stroke rehabilitation research from Western literature.

The research project at Ga-Rankuwa sought to examine the dynamic interacting world of the stroke patient, as it existed, to establish recovery profiles and any significant relationships between variables in order to establish the most therapeutic and cost-effective means of intervention in a situation with limited resources.

The Synchronous Systems Model (Janoski & Schwartz, 1985) was selected as a conceptual background for the design of the research programme (discussed in chapter 2). The model was conceptualised and the ecounit in the study in the following way:

Environ-
mental
Spheres

1. Family support
2. Community support
3. Support from the hospital team members
4. The hospital as the-rapeutic system

Personal
Spheres

1. Depression
2. Anxiety
3. Cognitive abilities
4. Relationship with spouse
5. Relationship with family
6. Involvement in support systems in the community

Biological
Spheres

1. Severity of the stroke
2. Location and size of the lesion
3. Extent of the phy-sical disability

Figure 5.2. The synchronous systems model as applied to the Ga-Rankuwa stroke patient.

The research programme would gather data, therefore, concerning all aspects mention in Figure 5.2, as related to the environmental, personal, and biological spheres and evaluate these over time and in interaction with one another in order to establish in which sphere, and at what level any intervention should take place.

Aims of the Research

The research programme was a holistic attempt to study the needs of stroke patients in the Ga-Rankuwa area, as a phenomenon embedded in an indivisable social and physical context. An attempt was made to concentrate on an analytic description of the complex social and physical organisations surrounding the stroke patient.

This holistic research programme had as its goal an understanding of the phenomena involved and not prediction, control or particular hypothesis testing. This type of approach believes that such an orientation to data generation is warranted on two grounds (Winkel, 1982). The first is that it is premature to expect that social scientists are in any position to develop the elaborate theoretical models that have characterised the physical sciences. Social science has not been able to develop general theories of behaviour in various settings. At this point, it is more possible to develop explanatory systems, based on research strategies kept as close as possible to the contextually embedded phenomena needing explanation.

The second essential element of importance is the way in which the social data are to be interpreted. Holistic research deals with "social reality", which has a specific meaning and relevance to the person situated in a socio-physical setting. The actions of people embedded in the spaces and social organisations within which they live must be appreciated in the light of the assumptive meaning systems utilised by the people in these settings. Glaser

and Strauss (1967) advocated the use of comparative research approaches to understanding phenomena as they are revealed in the various settings. The comparisons are not used to test theory, but rather to supplement the complexity of the theoretical system as a consequence of the comparison groups and settings that are selected.

The holistic investigator therefore plunges immediately into the complex tangle of events that characterise the research setting. The research design and analytic orientation are directed towards the organisation of simultaneously occurring events into categories of explanation that capture as many of the diverse phenomena observed in the setting as possible (Winkel, 1985).

The aim of the Ga-Rankuwa project collided with the general principles mentioned. The aim was to seek an explanation for the complexity of events to which stroke patients were subjected, from the different spheres or social contexts in which they were embedded. It was hoped that the comparison of these events over time (i.e., the natural recovery process from the stroke) would reveal an explanation of any significant variables contributing to their obvious personal distress.

Method

Data collection took place over a period of eight months.

The conceptual frame of reference used was the Synchronous Systems Model (Janoski & Schwartz, 1985). Three spheres or ecounits as related to each patient were therefore explored: Biological, Personal and Environmental. This was done within the multidisciplinary context of the "Rehabilitation Team", which met on a weekly basis. The team consisted of a nursing sister, an occupational therapist, a physiotherapist, a speech therapist, a neurologist

and a psychologist (the researcher). The team meeting developed into a functioning system in which conflict and support were both resolved and given. Three clerks were appointed and given the title of "stroke ladies". They were chosen for their ability to communicate on a warm interpersonal level. Initially their task was the collection and filing of completed forms on the correct dates between weekly team meetings. However, a focus was introduced by the researcher in the training of these personnel to act as "communication" and "supporters", so as to be the "human link" in the hospital system in a future intervention plan.

The data were collected within the then existing hospital system, in other words, no new therapeutic interventions were attempted. The team understood this time to be a "needs study" as a preliminary to initiating an appropriate and cost-effective therapeutic process. In holistic ecological style, therefore, the research attempted to collect data from the events as they existed in the stroke patients' lives. Therapeutic input from occupational therapists, physiotherapists, and speech therapists was given in the same way as it had been previously provided for stroke patients, that is, in one to two 20-minute sessions per week. This was accepted practice for stroke patients at the time.

The research design involved the comparison of data over a period of time. This was formulated in relation to two factors:

1. The existing hospital treatment plan for stroke.

2. An estimation of known recovery profiles after stroke from the literature.

Three assessments on each patient were carried out at the following times:

<u>First assessment</u>. Three days after hospital admission, that is, acute phase of stroke.

<u>Second assessment</u>. Two weeks after hospital admission, that is, at the end of the "usual" length of time spent in hospital.

<u>Third assessment</u>. Three months after hospital admission, that is, an assessment of functioning in the community and at a generally accepted plateau in the recovery profile after stroke.

Subjects

The 50 subjects selected for the study were all stroke patients admitted into the Department of Neurology at Ga-Rankuwa Hospital.

A previous study, carried out in the Department (Joubert, 1986) had shown that most stroke patients in the area were admitted to hospital, with only the <u>very</u> mild cases being kept at home. This was felt to be due to the fact that a stroke is a sudden, unexpected and frightening event for the family to witness, so victims are immediately taken to hospital and not to the local general practitioner. However, the increased use of private hospitals and membership of medical aid societies meant that the sample was probably representative of the lower income groups. (This was later borne out by the statistical analysis of the data.)

Subjects were selected on a consecutive basis, that is, every patient admitted to hospital was assessed as a possible subject for the study. Exclusion criteria were:

- death
- second or subsequent strokes

- patients living in inaccessible rural areas or in other countries, because of difficulties with the third assessment.

Patients were not excluded on the grounds of age, severity of stroke or aphasia. No attempt was made to select patients on the grounds of sex or age group. It was hoped to obtain as representative a sample as possible of the usual hospital stroke population.

Measuring Instruments

A total of 17 measuring instruments were used in order to gain an adequate representation of the variables in the spheres of social contexts in which the stroke patients were embedded. These 17 measuring instruments were referred to as the Questionnaire for the purposes of the study, and for the statistical analysis. Numbers were assigned to each variable in the questionnaire for use in the statistical analysis (Appendix 1). The relevant members of the rehabilitation team completed the area of the questionnaire that related to their particular field of expertise. As such, the questionnaire was divided up into the following sections:

P1   - P29   - Identifying Data (Stroke ladies)
B1   - B28   - Neurology
W1   - W79   - Physiotherapy
W88   - W210 - Psychology
W211 - W231 - Occupational Therapy
W80   - W87   - Speech Therapy

Where necessary, the same nursing sister was used as interpreter for all sections of the questionnaire.

The measuring instruments were related to each sphere of the patient's ecounit, that is, biological, personal and environmental (Janoski & Schwartz, 1985).

Environmental Sphere

1. Ability to interact socially

(i) Activities of Daily Living
(ADL) - Barthel Scale

Social functioning
examination (SFE)

(2. Relationship with spouse
(3. Relationship with children
(4. Relationship with family
(5. Work history
(6. Home environment
(7. Small group involvement
    - Clubs
    - Friends
    - Religion

Personal Sphere

1. Depression
   (i) The Hospital Anxiety
       and Depression Scale
       (HAD)
  (ii) The Wimbledon Self-
       Report Scale

2. Anxiety
   (i) Taylor Manifest
       Anxiety Scale

3. Cognitive abilities
   (i) Mini-Mental Status
       Examination
  (ii) Galveston Orientation
       Test

4. Relationship with
       spouse   ) Social
) Functioning
5. Relationship with   ) Examination
       family   ) (SFE)

Biological Sphere

1. Severity and localisation
   of the stroke

   (i) Glasgow Coma Scale
  (ii) CT Scan

2. Gross Motor Movement

   (i) Rivermead Motor Assessment
  (ii) Motor Club Assessment
 (iii) Motricity Index
  (iv) Six-Minute Walk Test
   (v) Functional Ambulation
       Categories

3. Fine Motor Movement
   (i) Frenchay Arm Test
  (ii) 9 Hole Peg Test

4. Speech Ability
   (i) Aphasia Screening Test

Figure 5.3. Plan of measuring instruments in relation to
the three spheres of functioning.

Discussion of the Measuring Instruments Used

Glasgow Coma Scale

This is a scale used for measuring depth of coma and was originally developed for use with head injury patients (Teasdale, Murray, Parker & Jennett, 1979). It helps to provide an objective assessment of level of consciousness, as clinical assessments are not very reliable. The scale examines motor functioning, verbal response, and eye opening. The motor section alone, when done on the nonparalysed side, has been found to be nearly as reliable a measure of consciousness as the overall test (Jagger, Jane & Rimel, 1983). The scale provides an initial indication of the severity of the stroke.

Computerised Tomography (CT Scan)

Where possible, this was used to indicate in which hemisphere the lesion was located, as well as the size and number of lesions.

The "Mini-Mental State"

This test is used to screen mental functions and is based primarily upon items which relate to orientation and long-term memory. Only a few items relate to the recall of recently acquired information.

The test covers various cognitive abilities – attention and calculation, memory, language, copying a design, and registration (Folstein, Folstein & McHugh, 1975).

Work done on the test has shown it to be a quick and reliable test for bedside screening of mental function. It provides an overall score of cognitive ability ranging between 0 and 30 with a normal range between 26 and 30.

The test was administered through an interpreter. The same nursing sister was used for this task during the research project. The test was translated into Tswana so that the same words were used with every patient.

The Taylor Manifest Anxiety Scale

The shortened form of 20 items was used. The scale measures trait anxiety, described as "state of anxiety that occurs often or continually". It has been described as a measure of reaction rather than chronic anxiety levels, and the validity of the use of this scale with a black South African population was established by White (1982). The shortened form of 20 items has been found to have the highest internal consistency and the highest correlations with clinical ratings of anxiety. A test-retest correlation of 0,78 was established on a sample of 77 students.

The Wimbledon Self-Report Scale (WSRS)

This is a questionnaire for the detection of mood disturbance in patients with neurological disorder or substantial physical illness. Most self-rating scales in use for the detection of mood disturbance employ items concerning activity and somatic or cognitive disorder. They are therefore liable to yield false-positive detections when used with neurological patients owing to questions related to sleep disturbance, tiredness, dizziness, memory concentration, and the ability to cope with or enjoy routine activities and pasttimes. The Wimbledon Scale is a more appropriate rating scale for the detection of mood disturbances in medical patients, one that is based purely on the patient's feelings. The WSRS yields low false-positive and false-negative rates and scores appear unaffected by sex or age, within the 18- to 80-year range (Coughlan & Storey, 1989).

The scale was translated into Tswana, and the patients responded easily through the interpreter (the same nursing sister as in the other tests). The scale was not used on a self-report level because of the low level of literacy of the patients.

The Hospital Anxiety and Depression Scale (HAD)

The reliability of the scale was determined on medical patients and it was found to be a reliable instrument for detecting states of depression and anxiety in hospital patients. It was also found to be a valid measure of the severity of emotional disorder (Zigmond & Snaith, 1983). Later research projects carried out on the scale showed it to be a valid detector of emotional disorder of patients in surgical and medical departments (Barczak, Kane, Andrews & Congdon, 1988; Nyani, 1989).

The Social Functioning Examination (SFE)

The Social Functioning Examination is based on the Geismar Outlike for Profiling Family Functioning, with extensive revision to adapt the examination for use with stroke patients. The scale was validated on black male and female patients from the lower socio-economic classes in Baltimore, Maryland in the United States. Such social functioning as relationships, responsibilities, work satisfaction, financial security, adequacy, and quality of (ADL), use of community resources, and health and illness experiences were assessed. Each applicable item was scored by defined criteria on the 0 to 2 scale (Robinson, Bolduc, Kubos, Starr & Price, 1985).

Albert's Test for Visual Neglect

Albert (1973) standardised an informal technique for eliciting visual inattention, the "Test for Visual Neglect". Patients are asked to cross out lines drawn randomly on a

sheet of paper. The sheet of paper (20 X 26 cm) with 40 lines, each 2,5 cm long, is drawn out at various angles and arranged so that 19 lines are widely dispersed on each side of a central column of four lines.

The test is easily administered at the bedside and is culture free.

Frenchay Arm Test

The assessment of arm function is difficult because the arms are used for a variety of tasks, all requiring some skill. As a result, there are few tests designed specifically to measure arm function, although many of the abilities measured in the Activities of Daily Living Scale (ADL, discussed earlier) depend to a greater a lesser extent on arm function. The Frenchay Arm Test (Wade, Langton-Hewer, Skilbeck & David, 1985) times the subject in his performance of seven manual tasks. It does not test proximal arm function and must therefore be used in conjunction with the "Nine-hole Peg Test".

The Nine-Hole Peg Test

This is a "performance test" for hand function (Sharpless, 1982). The Nine-hole Peg Test requires the patient to place nine pegs of wood, of diameter 0,25 inches, and length 1,25 inches, into holes spaced 1,25 inches apart. The test is timed, and there are normal values for age-matched people.

The Barthel Index of Activities of Daily Living (ADL)

The Barthel Index was derived empirically by Mahoney and Barthel (1965) and has been validated and used extensively in stroke research (Gresham et al., 1980). It measures ten different activities: feeding, grooming, bowels, bladder, dressing, chair/bed transfer, toilet,

mobility, stairs, and bathing. Each activity is scored from 0 to 1 or from 0 to 3 and the index has a total score of 20. ADL scores measure what a patient <u>does</u> rather than what he <u>can</u> do. A top score indicates the ability of a patient to live independently.

Rivermead Stroke Assessment

The aim of this test is to provide an assessment of physical recovery following hemiplegia from stroke. A series of items was selected, ranging from those which the most severely disabled patient in the early stages of recovery can attempt up to those which the minimally disabled patient can pass. Items are divided into three sections - gross function (functional movement), leg and trunk (control of movement), and arm (control and functional movement of the arm). The assessment has been shown to be both reliable and valid, as an indication of the recovery of the particular motor functions mentioned in stroke patients (Lincoln & Leadbitter, 1979).

Motricity Index

This is the most widely used and best known measure of muscle power, and was adapted for use in stroke by Demeurisse, Demol and Robaye (1980). The scale grades motor power at six levels, and displays good sensitivity at the lower range. It is therefore particularly useful in the first four weeks after stroke.

Six-Minute Walk Test and Functional Ambulation Categories

Both these tests measure the walking ability of stroke patients, evaluating the patient's ability to walk without an aid, with an aid, only with the help of a person or not at all. The tests were carried out by the same physiotherapist for all the patients in the research and scores were allocated according to defined criteria.

Statistical Analysis

The usual descriptive statistics such as frequencies, means, and standard deviations, were obtained for all variables. As far as psychometric tests were concerned, principle axis factor analysis with varimax rotation of the factor solution was performed to verify or validate the factorial structures of these tests.

Cronbach alpha coefficients were computed for each psychological sub-test. For the purpose of establishing whether group scores changed between assessments, t-tests for dependent measures were applied. For the purpose of establishing relationships between variables, Pearson Product Moment correlations were computed. All statistical tests were performed at the 0,005 level of significance. This level is more severe than the conventional 0,01 or 0,05. The reason for this was the high number of variables contained in the study. What is known as the Type I error accumulates with each statistical test performed. The stricter level of 0,005 attempts to compensate for the increased Type I error.

CHAPTER 6

ANALYSIS OF RESULTS

Introduction

In terms of an existing hospital treatment plan for stroke patients, three sets of assessments were carried out on each one of 51 patients at three days, two weeks and three months after hospital admission. In this chapter an analysis of the data from these assessments will be presented. The 489 variables in each assessment were grouped into 25 composite variables, according to the areas they measured. In Table 6.1 the composite variables are identified, while Table 6.2 serves to explain the relationship of composite variables to the questionnaire consisting of scales and tests covering the different spheres of functioning -- physical, daily living, cognitive, emotional and social. The grouped composite variables were then examined for significant improvement or deterioration over time, and for significant interrelationships. The plan of the statistical analysis is presented in Table 6.3.

Table 6.1

<u>Variables in the Statistical Analysis</u>

	Description of Variable
1. Walk 1	Gross movement — (Rivermead Motor Assessment)
2. Walk 2	Lower and upper limb activity (Motor Club assessment)
3. Walk 3	Walking speed (Six minute walk test)
4. Walk	Total of Walk 1 and Walk 3
5. Arm	Ability to move arm (Motricity Index)
6. Fin arm	Functioning of arm and hand — grasping, drawing, drinking, combing hair, etc.
7. Fingers	Fine movements of hand and fingers (9 Hole Peg Test)
8. ADL	Activities of Daily Living (Barthel ADL Score)
9. Orient	Orientation of Time and Place (Mini-Mental State)
10. Calc	Attention and Calculation (Mini-Mental State)
11. Memory	Short-term memory (Mini-Mental State)
12. Lang	Ability to understand words and commands (Mini-Mental State)
13. Perc	Copying a design by drawing it on paper (Mini-Mental State)

	Description of Variable
14. WIMB	Depression (Wimbledon Scale for Depression in Neurological Patients)
14. HAD DEP	Depression (Items relating to Depression on the Hospital Anxiety and Depression Scale)
16. HAD ANX	Anxiety (Items relating to Anxiety on the Hospital Anxiety and Depression Scale)
17. TAYLOR	Anxiety (Taylor Manifest Anxiety Scale)
18. SFE 1	Relationship with Spouse (Social Functioning Examination)
19. SFE 2	Relationship with Children (Social Functioning Examination)
20. SFE 3	Ability to carry out responsibilities at home and functioning at work (Social Functioning Examination)
21. SFE 4	(Social Group membership (Social Functioning (Examination)
22. SFE 5	Financial situation (Social Functioning Examination)
23. SFE 6	Accommodation (Social Functioning Examination)
24. SFE 7	Religion (Social Functioning Examination)
25. SFE	Total Social Functioning Score (Social Functioning Examination)

Table 6.2

Relation of Composite Variables to questionnaire

Questionn-
aire
489
variables

3
Assess-
ments

Physical →

Activities of Daily Living →

Cognitive →

Emotional

Social →

WALK I 7 to 22	
WALK 2 23 to 66	
WALK 3 78 and 79	
ARM 67 to 69	
WALK Walk 1 and Walk 3	
FIN ARM 214 to 218	
FINGERS 219 to 221	
ADL 222 to 231	
ORIENT 184 to 193	
CALC 199	
MEMORY 200 TO 202	
PERC 209	
LANG 203 to 208	
WIMB 120 to 149	
HAD DEP 155, 159, 161, 151, 157, 153, 163	
HAD ANX 154, 152, 162, 158, 160, 150, 156	
TAYLOR 164 to 183	
SFE 1 92 to 96	
SFE 2 102 to 104	
SFE 3 105 to 108	
SFE 1+2+3+4+5+6+7	
SFE 4 109 to 110	
SFE 5 112 to 113	
SFE 6 114 to 115	
SFE 7 117	

Table 6.3

Plan of Statistical analysis

	1st Assessment (W = 3 days)	2nd Assessment (Y = 14 days)	3rd Assessment (G = 3 months)
************ * Patient * * with * * Stroke * ************	Physical 1, 2, 3, 4, 6, 7	Physical	Physical
	Activities of Daily Living 8	Activities of Daily Living	Activities of Daily Living
	Cognitive 9, 10, 11, 12, 13	Cognitive	Cognitive
	Emotional 14, 15, 16, 17	Emotional	Emotional
	Social Functioning 18, 19, 20, 21, 22, 23, 24, 25	Social functio- ning	Social functio- ning
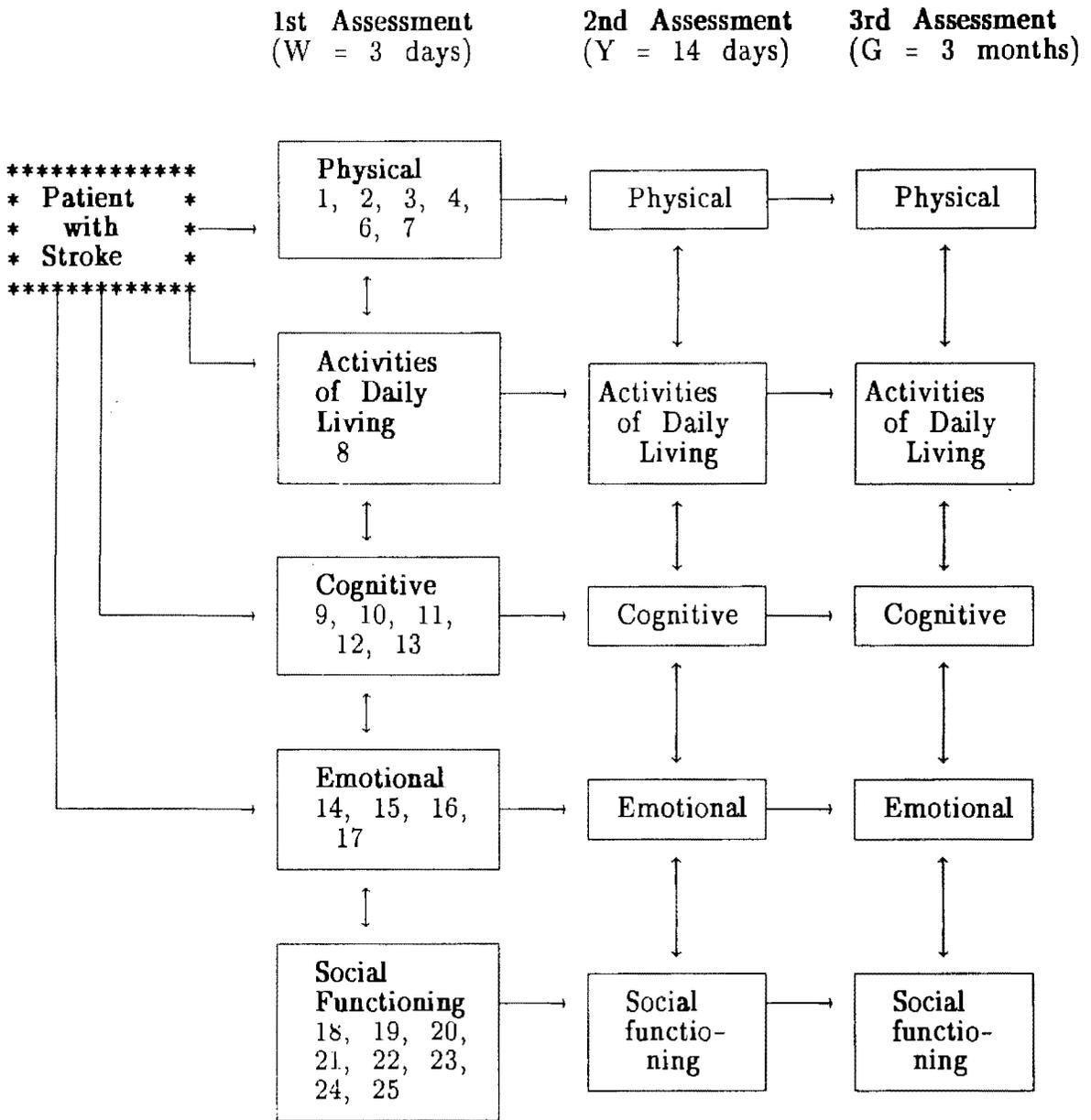
Salient biographical characteristics of the sample are presented in Figures 6.1 to 6.6 and Tables 6.4 to 6.7
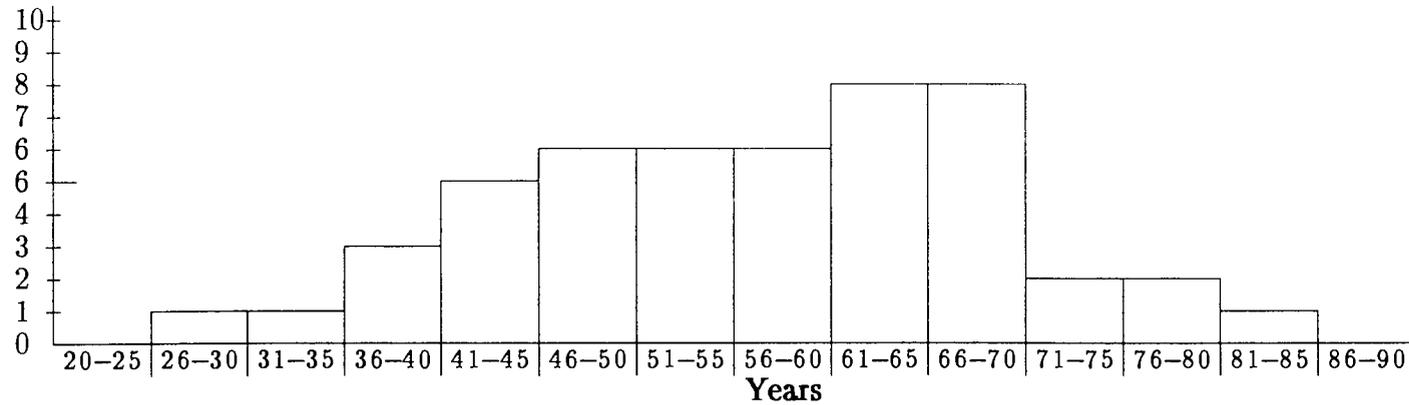
Figure 6.1. Age distribution.

It is apparent from this table that the majority of patients fall into the category between 61 and 70 years, with the age group 46 and 60 years, being the next largest. This indicates a younger population than what is generally reported in Western literature.
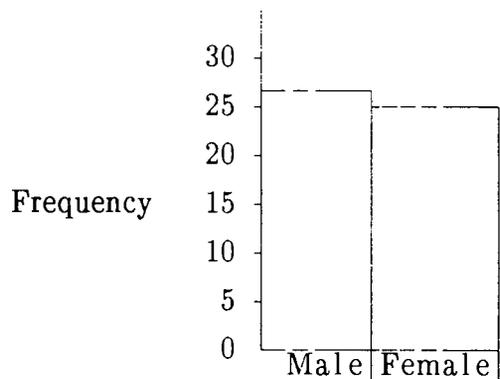
Figure 6.2. Sex distribution.

These were almost an equal number of male and female patients. All statements made about the sample as a whole, are therefore equally related to males and females.
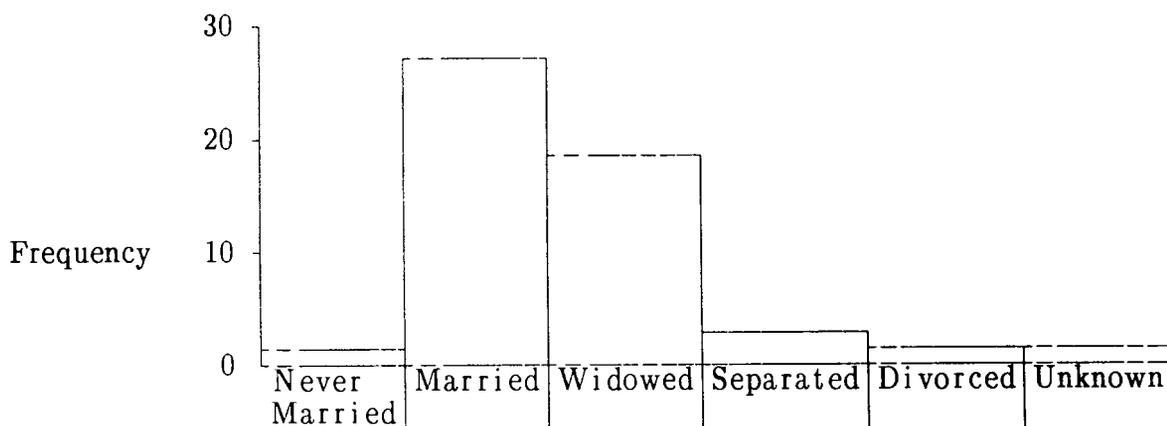
Figure 6.3. Marital status of patients' distribution.

The majority of patients were married (53%) with the next largest group (37%) being widowed. Thus, most of the patients (90%) were embedded in a family system.

Accommodation Distributions
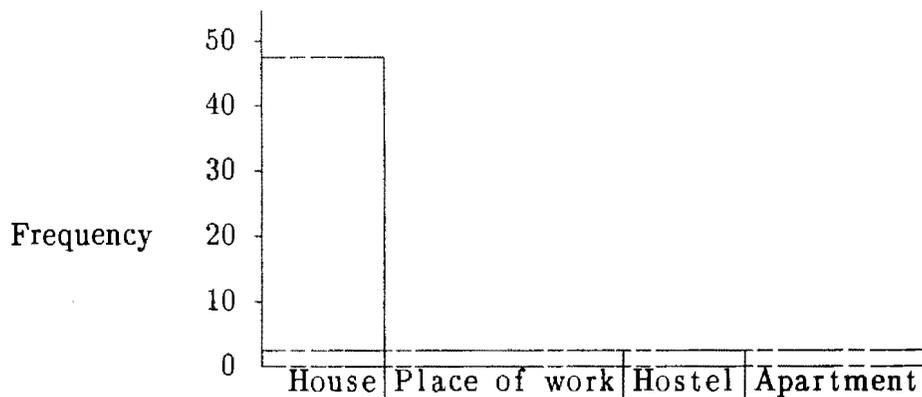
Figure 6.4.   Type of accommodation.
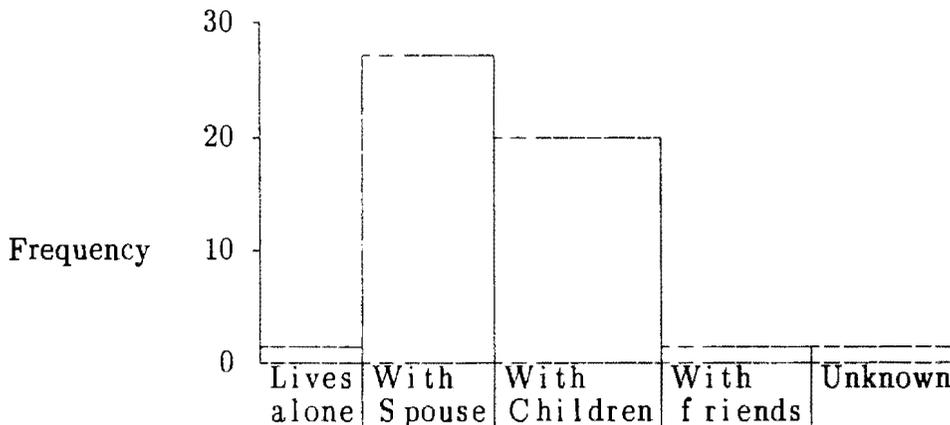
Figure 6.5.   People with whom patient lived.

Most patients lived in   a house. (94%) although they
were not   always   the   owners.   The   majority of   the
sample were strongly enbedded in a family system, with   54%
living with a   spouse, and 20% living with their   children.

Financial Situation
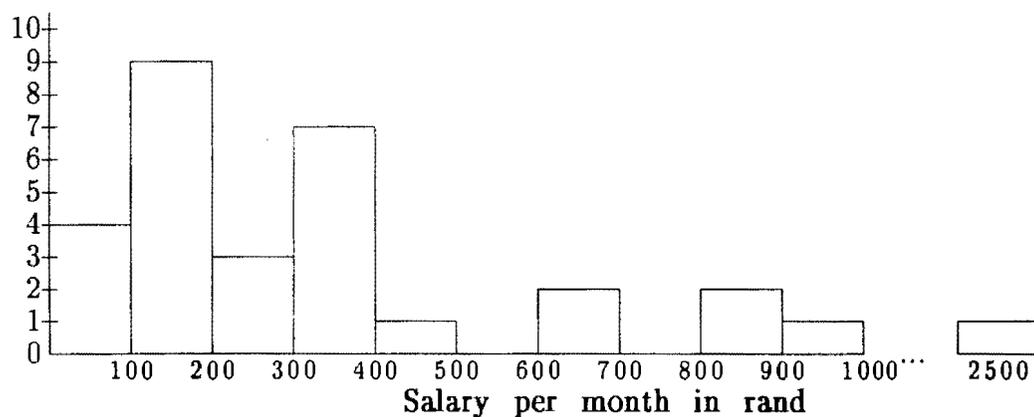
Figure 6.6. Income distribution.

People Dependent on Income of Wage Earner

Table 6.4

Number of People   Frequency Percent

	f	%
2	4	8%
3	8·	16%
4	7	14%
5	1	2%
6	9	18%
7	4	8%
8	5	10%
9	6	12%
10	3	6%
11	1	2%
12	1	2%
13	1	2%

Most people earned a salary of between one to two hundred rand per month (29%) with 26% earning between R300,00 to R400,00 per month. Despite the low earning

capacity of this group, many family members were dependent on the salary of the patient. The number of dependents ranged from six members (18%) to four members (14%) and to three members (16%).

Table 6.5

Employment Situation at the Time of the Stroke

	f	%
Employment	27	53%
Housewife	10	19%
Old Age Pensioner	6	12%
Disability Pensioner	1	2%
Sick Leave	1	2%
Unemployed	6	12%

While 69% of the sample were obtaining a fixed income per month, 12% were not receiving any financial support at all, and were totally dependent on other family members.

Table 6.6

Socioeconomic Class

	f	%
Professional	0	0%
Intermediate (eg teacher, manager, businessman)	2	4%
Skilled non-manual (eg salesman, shopowner)	0	0%
Skilled manual (eg craftsman, welder)	0	0%
Semiskilled manual (eg driver)	4	9%
Unskilled manual (eg labourer)	34	74%
Housewife	6	13%

Table 6.7

Educational Status

	f	%
Never been to school	14	28%
Primary school only	25	49%
High school to Std 8	11	21%
High school to Matric	0	0%
Tertiary Education	0	0%
Unknown	1	2%

Because the majority of the sample (77%) had either never been to school (28%) or to primary school alone (49%), they were mainly employed in unskilled labouring work (74%).

Reliability and validity of measures – a factor-analytic approach

While one of the assessment measures had been standardised on a similar South African population as the one in the sample (Taylor Manifest Anxiety Scale), and the Social Functioning Examination (SFE) had been standardised on a low income Negro population in America, both the Hospital Anxiety and Depression Scale (HAD) and the Wimbledon Scale for Depression in Neurological patients had no data available for the population group under study. As a result of this, factor analyses were performed and Cronbach Coefficient Alpha computed on the data to investigate the reliability and validity of the measures.

The analyses were also performed for the first and second test occasions, but since these results closely confirmed the conclusions from the analysis of the third test occasion, they are not reported here.

The Hospital Anxiety and Depression Scale

The HAD has been discussed elsewhere (see p. 15). This scale is designed to measure two factors, namely anxiety and depression. The items are mixed in the scale. The construct validity of the HAD scale was investigated by factor analysing the intercorrelation matrix of the items. Two factors emerged and the interpretation of these factors confirmed the factorial validity of the two constructs -- Anxiety (Items 154, 152, 162, 158, 160, 150 and 156) and Depression (Items 161, 151, 157, 159, 153, 163 and 155).

These statistics are presented in Table 6.8. All factor loadings of the varimax rotated factor solution higher than 0,4 were considered significant. This decision was an arbitrary one, and coincides with the common *rule of thumb* $\dfrac{3}{\sqrt{N}} = 0,4$ (Green, 1991). Since the same subjects completed this scale, but in three different test situations it was decided to use the third test situation. The three month testing was thought to be an optimal test situation as the subjects had recovered physically from the acute stroke.

Table 6.8

Varimax Rotated Factor Solution of the Hospital Anxiety and Depression Scale (HAD) at the Third Assessment

Item	Depression	Anxiety
W161	0.89	-0.04
W151	0.85	0.09
W157	0.80	-0.08
W159	0.77	0.21
W153	0.75	0.33
W163	0.69	0.17
W155	0.63	0.50
W154	0.56	0.41
W152	0.22	0.83
W162	0.07	0.78

Item	Depression	Anxiety
W158	0.05	<u>0.75</u>
W160	-0.04	<u>0.55</u>
W150	0.26	<u>0.54</u>
W156	0.30	0.34

In order to establish a measure of reliability of the Hospital Anxiety and Depression Scale Cronbach Coefficient Alpha was calculated. The statistics are presented in Table 6.9.

Table 6.9

<u>Cronbach Coefficient Alpha of the Hospital Anxiety and Depression Scale</u>
<u>(HAD) at the third Assessment</u>

Deleted Variable	Correlation with Total	Alpha[1]
Item		
1	0.48	0.89
2	0.74	0.88
3	0.53	0.89
4	0.77	0.88
5	0.68	0.88
6	0.77	0.88
7	0.47	0.89
8	0.63	0.88
9	0.34	0.89
10	0.74	0.88
11	0.22	0.90

Deleted Variable	Correlation with Total	Alpha[1]
Item		
12	0.69	0.88
13	0.36	0.89
14	0.64	0.88
Alpha = 0,89		

The alpha values of the scale with item omitted for test situation 3 alone have been presented. The results for the other test situations have been calculated, but the results again cross validate one another. In test situation 3, Cronbach Alpha Coefficient or alpha = 0,89 was found. This indicates an acceptable degree of the internal consistency of the scale. According to the literature, this internal consistency coefficient provides a lower bound of the true reliability of the test (Lemke & Wiersma, 1976).

The Wimbledon Scale for Depression

The Wimbledon scale was administered to subjects as part of the total Questionnaire at all three test situations. A Varimax Rotated Factor Solution Transformation revealed six factors at each assessment time. These factors corresponded to the following emotions being asked about in the scale -- sadness, feeling unwanted and in social isolation, anger, guilt, tension and fear. The factor loading therefore confirmed the construct validity of the scale.

In order to establish a measure of the reliability of the scale, Cronbach Coefficient Alpha was performed on results obtained at all three test situations. The results for all three test situations cross validated one another, so the statistics for the third test situation alone, are presented in Table 6.10. A Cronbach alpha coefficient of 0,96 was found, indicating an acceptable degree of the internal consistency of the scale. This again provides a lower bound of the true reliability of the test (Lemke & Wiersma, 1976).

Table 6.10

Cronbach Coefficient Alpha of the Wimbledon Scale for Depression at the third Assessment

	RAW VARIABLES	
Deleted Variable	Correlation with Total	Alpha
Item		
1	0.80	0.95
2	0.64	0.95
3	0.64	0.95
4	0.52	0.95
5	0.80	0.95
6	0.38	0.96
7	0.72	0.95
8	0.87	0.95
9	0.86	0.95
10	0.82	0.95
11	0.55	0.95
12	0.87	0.95
13	0.25	0.96
14	0.81	0.95
15	0.43	0.96
16	0.56	0.95
17	0.48	0.95

	RAW VARIABLES	
Deleted Variable	Correlation with Total	Alpha
Item		
18	0.55	0.95
19	0.29	0.96
20	0.77	0.95
21	0.26	0.96
22	0.47	0.95
23	0.85	0.95
24	0.70	0.95
25	0.86	0.95
26	0.86	0.95
27	0.39	0.96
28	0,82	0.95
29	0.43	0.96
30	0.88	0.95
Alpha = 0,96		

The Social Functioning Examination (SFE)

This examination was carried out on all 51 subjects at the three different test situations. To establish construct validity Varimax rotated factor solutions were obtained for the data collected from all three test situations. The results cross validated one another. Eight factors emerged from the factor analysis of the intercorrelational matrix. These eight factors related to items on the scale that covered the following areas; relationship with spouse, relationship with significant others in the home, relationship with children, role responsibility at home and at work, social group membership, financial situation, accommodation and religion. The factors that emerged were those expected from the theoretical aspect of the scale.

In order to obtain a measure of reliability, Cronbach Coefficient Alpha was performed on the data obtained at all three test situations. The statistics for the third assessment are presented in Table 6.11. Once again, the results of all three test situations crossvalidated one another. In the third test situation a Cronbach Alpha Coefficient of alpha = 0,83 was obtained. This indicated an acceptable degree of internal consistency, and a lower bound of the true reliability of the test.

Table 6.11

Cronbach Coefficient Alpha of the Social Functioning Examination (SFE) at the Third Assessment

Deleted Variable	RAW VARIABLES	
	Correlation with Total	Alpha
Item		
1047	0.47	0.83
1048	0.21	0.85
1049	0.56	0.83
1050	0.55	0.83
1051	0.40	0.84
1057	0.61	0.83
1058	0.43	0.83
1059	0.54	0.83
1060	0.35	0.84
1062	0.43	0.83
1063	0.47	0.83
1064	0.38	0.84
1065	0.45	0.83
1066	0.50	0.83
1067	0.55	0.83
1068	0.59	0.83
1069	0.43	0.83

	RAW VARIABLES	
Deleted Variable	Correlation with Total	Alpha
Item		
1070	0.50	0.83
1072	0.14	0.84
1073	0.11	0.84
1075	-0.15	0.85
Alpha = 0,83		

The Taylor Manifest Anxiety Scale

Although statistical evaluation of this scale had been performed on a black South African population (White, 1982) this was repeated in order to establish the significance of this scale for a sample of neurologically impaired stroke patients.

Construct validity was established by means of Factor Analysis. Varimax rotated factor solution was obtained for the intercorrelational matrix of items. One factor emerged from the factor solution matrix, namely anxiety. An acceptable degree of internal consistency of the scale, (alpha = 0,86) was found using Cronbach Alpha Coefficient. This internal consistency coefficient again provided a lower bound of the true reliability of the test. The statistics of Cronbach Coefficient Alpha at the third assessment are presented in Table 6.12. Again, the results of all three test situations cross validated one another, so only the third test situation is presented.

Table 6.12

Cronbach Coefficient Alpha of the Taylor Manifest Anxiety Scale at the Third Assessment

Deleted Variable	RAW VARIABLES	
	Correlation with Total	Alpha
Item		
1	0.12	0.86
2	0.41	0.85
3	0.40	0.85
4	0.59	0.84
5	0.64	0.84
6	0.40	0.85
7	0.45	0.85
8	0.71	0.84
9	0.20	0.86
10	0.54	0.85
11	0.60	0.84
12	0.14.	0.86
13	0.36	0.85
14	0.48	0.85
15	0.21	0.86
16	0.55	0.85
17	0.71	0.84
18	0.52	0.85
19	0.40	0.85
20	0.35	0.85
Alpha = 0,86		

Profile of the Sample at the Time of
the Three Assessments

The statistics will be presented in relation to the 25 grouped variables, as delineated in Table 6.1. Frequency, cumulative frequency and cumulative frequency percent tables were obtained on all variables.

Physical Abilities

Table 6.13

Profile of Ability to Perform Simple Physical Tasks at the First, Second and Third Assessments

	First	Second	Third
Unable to perform simple physical tasks	47%	28%	8%
Able to perform simple physical tasks only with full assistance	18%	50%	25%
Able to perform simple physical tasks with partial assistance	25%	36%	42%
Able to perform simple physical tasks independently	11%	14%	26%

Because of the fact that a large number of the sample were seriously ill, many of the physical assessments were unable to be performed. This was an indication of the severity of their physical condition. This was also shown in the Statistical Analysis. An examination of the variable W WALK I showed that 47% were unable to perform any simple functions (such as rolling over, sitting on the edge of the bed or standing), 18% were able to perform these tasks with full assistance, 25% with aid and only 11% without

aid. A similar picture was presented in Variable W WALK 2 upper and lower limb activity). Here 44% were unable to perform any tasks, 38% with assistance and only 18% independently. On the variable W ARM, where drawing, grasping, picking up and combing hair movements of the arm were evaluated, 46 people were unable to be tested at all. Of the remainder, 36% were unable to perform any movements at all, 37% with assistance and only 27% independently. The picture obtained from analysis of the physical variables showed that approximately 66% of the sample were severely physically disabled during this acute phase of stroke, as assumed on most fine and gross physical parameters.

At the second assessment the patients showed an improvement in this area. The variable Y WALK I showed that while 28% were unable to perform simple tasks (sitting, rolling over, etc.), 50% were able to do this with full assistance, 36% with aid and 14% were independent.

Analysis of variable Y WALK 2 (upper and lower limb activity) showed that 2% were unable to do anything, 50% with assistance, and a further 48% performed independently with the variable Y ARM, all patients were able to be tested, 19% were unable to perform the tasks adequately, 51% with assistance, and the remaining 30% were virtually independent.

By the third assessment there was an obvious improvement. Variable G WALK 1 showed that all patients were able to perform the tasks, 8% with much assistance, 25% with a little aid from staff, 42% with practically no help, and 26% were completely independent in walking, sitting, getting in and out of bed, etcetera. Upper and lower limb activity also improved with everyone being able to perform the tasks, 27% with assistance, 68% with little assistance, and 5% being able to perform perfectly. Fine movements of the arm and hand also improved with 22%, performing independently, and 69% performing with only a little help. All aspects of motor activity therefore showed a substantial improvement.

Activities of Daily Living

Table 6.14

Profile of Ability to Perform Activities of Daily Living (ADL) at the First, Second and Third Assessments

	First	Second	Third
Unable to perform any ADL	21%	8%	0%
Able to perform ADL with assistance	69%	68%	61%
Independent in performing ADL	12%	24%	39%

Analysis of the variable W ADL at the first assessment showed, the link between basic physical skills and the ability to perform activities of everyday life such as bathing, dressing, feeding, and toilet use. A cumulative percent of 69% of the sample were unable to perform these tasks without assistance from staff, 21% were unable to do anything at all, and only 12% were independent.

At the second assessment there was a general improvement in the ADL abilities of the patients. Only 8% were unable to do anything, 68% were able to perform with assistance, and 24% were independent in most tasks related to daily living.

At the third assessment 39% of the sample were independent in all aspects of activities of daily living, with 61% needing some assistance. This shows a definite improvement regarding ADL.

Cognitive Abilities

Table 6.15

Profile of Cognitive Abilities of Patients at the First, Second and Third Assessments

	First	Second	Third
Problems with Orientation regarding Time and Place	72%	40%	6%
Problems with detective Short Term Memory	52%	30%	12%
Problems in understanding Simple Words and Commands (Language)	30%	14%	6%
Problems in executing a Perceptual-Motor Task	87%	72%	50%

Statistical analysis of the first assessment showed that 72% of the patients had difficulties with relating to time and place (Variable W ORIENT), 52% had problems with short term memory, (W MEMORY), 30% had difficulties in understanding simple words and commands (W LANG) and 87% obtained a score below the norm when asked to copy a drawing a perceptual motor task. (Variable W PERC.) On the latter task, 30% were unable to initiate the task at all. A profile is therefore presented of the majority of the patients having problems with cognitive abilities.

Spontaneous brain recovery had taken place by the second assessment, as was shown by the general improvement in cognitive abilities.

At the second assessment, frequency tables showed that 40% of the sample were still having problems with regard to orientation of time and place, 30% with short term memory, 14% in understanding simple words and commands, and 72% obtained a score below the norm on copying a figure, with 20% unable to initiate the task at all.

Analysis of the variables at the third assessment showed that 94% were orientated for time and place, 12% had problems with short term memory, 94% were able to understand the meaning of simple words and respond to simple commands, but 50% scored below the norm in the perceptual motor task. There was thus a marked improvement in cognitive abilities.

Emotional Aspects

Table 6.16

Profile of Depression at the First, Second and Third Assessments

	First	Second	Third
No depression	13%	8%	6%
Slight feelings of depression	43%	41%	32%
Marked feelings of depression	44%	51%	36%
Constant depression	0%	0%	32%

Analysis of the variable W HAD DEP at the first Assessment showed that while 13% had no feelings of depression, 43% showed tendencies towards depression, while a further 44% experienced marked depression.

At the second assessment 41% of the patients were showing some feelings of depression. Depression had increased in 51% of the patients

Increased feelings of depression were expressed by the majority of patients at the third assessment. Only 6% showed no feelings of depression, 32% slight feelings of depression, 36% marked feelings of depression and 32% constant feelings of depression.

Social Functioning

Table 6.17

Problems in Social Functioning of the Stroke Patients at the First, Second and Third Assessments

	First	Second	Third
Problems related to spouse	3%	13%	25%
Problems related to children	13%	20%	30%
Problems in role responsibilities at home and at work	12%	22%	61%
Problems with, or lack of membership of small groups	37%	20%	79%
Problems with accommodation	15%	23%	49%
Problems with, or lack of religious affiliation	40%	40%	40%
Problems in overall social functioning	0%	16%	32%

At the first assessment the variables W SFE 1, 2, 3, 4, 5, 6, 7 and SFE, can be regarded as an indication of the pre-morbid social functioning of the sample. Statistical analysis showed that 97% were happy with their spouse, 87% happy with their relationship with their children, 87% happy at home and (if working) at work, 63% were members of small groups in the community, 85% content with their accommodation, 60% content with their religious affiliation, and 100% overall, of the sample, stated that they were not experiencing any serious problems in their social life.

Statistical analysis of the second assessment showed that the patients were experiencing more problems in this area, although they were still hospitalised.

The Y SFE variables revealed that 88% were happy in their relationship with spouse, 80% had a good relationship with their children, 78% happy with their home or work situation, 78% content with their accommodation and 84% were not experiencing any serious social problems.

At the third assessment there was a general increase in problems experienced in areas of social functioning.

Analysis of the G SFE 1, 2, 3, 4, 5, 6 variables showed that 25% of the sample had problems in their marital relationship, 30% problems with their children, 61% problems with work, 79% problems with their membership of small groups, 56% serious financial problems, 49% problems with accommodation, and 40% experienced problems regarding their membership of religious institutions.

In general, while physical, cognitive, and activities of daily living improved over three months, depression, anxiety and social problems increased.

Descriptive Statistics and t tests for Dependent Variables

In Tables 6.13 and 6.14 descriptive statistics of scores on the 25 composite dependent variables are presented. The results of t tests for dependent measures assessing differences between first, second and third assessments on the 25 composite variables are also presented in these tables.

Table 6.18
Comparison of first to Second Assessments of Stroke Patients regarding Composite Variables: T-tests for Dependent Measures

Composite Variables	3 days			14 days			t	p-value
	Mean	St Dev.	N	Mean	Std Dev	N		
WALK 1	1,44	0,96	39	1,97	0,89	39	3,44	0,0014
WALK 2	1,03	0,59	34	1,23	0,62	34	2,03	0,0504
WALK 3	128,00	149,71	12	127,91	145,87	12	-0,00	0,9963
WALK	16,22	34,13	39	12,00	33,18	39	-1,43	0,1597
ARM	12,10	11,19	36	18,17	11,26	36	5,24	0,0001
FINE ARM	0,57	0,42	24	0,80	0,34	24	3,98	0,0006
FINGERS	14,25	8,12	21	17,66	3,41	21	2,14	0,0447
ADL	0,83	0,73	45	1,27	0,69	45	5,31	0,0001
ORIENT	0,55	0,38	42	0,68	0,36	42	3,33	0,0018
CALC	6,48	3,29	27	7,92	2,47	27	3,70	0,0010
MEMORY	0,53	0,47	42	0,61	0,43	42	1,13	0,2625
LANG	0,84	0,27	45	0,95	0,12	45	2,90	0,0057

Composite Variables	3 days			14 days			t	p-value
	Mean	St Dev.	N	Mean	Std Dev	N		
PERC	2,57	2,54	45	3,37	2,83	45	2,64	0,0113
WIMB	3,30	0,59	37	3,50	0,69	37	1,81	0,0780
HAD DEP	1,05	0,82	36	1,25	0,71	36	1,68	0,1007
HAD ANX	2,82	0,49	36	2,91	0,58	36	0,91	0,3661
TAYLOR	0,27	0,22	36	0,18	0,20	36	-2,19	0,0350
SFE	0,32	0,53	46	0,41	0,50	46	2,00	0,0508
SFE2	0,32	0,49	44	0,43	0,62	44	1,33	0,1898
SFE3	0,45	0,37	43	0,56	0,43	43	1,39	0,1697
SFE4	0,58	0,56	43	0,74	0,61	43	1,96	0,0557
SFE5	0,91	0,71	41	1,06	0,75	41	1,86	0,0699
SFE6	0,37	0,55	41	0,40	0,55	41	0,40	0,6883
SFE7	0,74	0,93	39	0,66	0,89	39	-0,68	0,4984
SFE	0,51	0,39	47	0,62	0,43	47	1,79	0,0793

Table 6.19
Comparison of Second to Third Assessments of Stroke Patients regarding Composite Variables: *T*-Tests for Dependent Measures

Composite Variables	14 days			3 months			*t*	*p*-value
	Mean	St Dev.	N	Mean	Std Dev	N		
WALK 1	1,82	0,95	42	2,38	0,71	42	4,53	0,0001
WALK 2	1,16	0,65	39	1,53	0,62	39	3,56	0,0010
WALK 3	78,68	64,20	19	168,71	133,75	19	3,07	0,0065
WALK	17,12	26,93	42	43,01	40,76	42	3,68	0,0007
ARM	16,53	11,52	37	21,94	9,32	37	3,59	0,0010
FINE ARM	0,70	0,40	31	0,72	0,39	31	0,20	0,8421
FINGERS	18,77	6,92	27	16,84	4,96	27	-0,95	0,3507
ADL	1,31	0,69	47	1,71	0,38	47	4,93	0,0001
ORIENT	0,64	0,37	46	0,76	0,33	46	2,69	0,0098
CALC	7,45	2,75	33	8,12	3,27	33	1,13	0,2655
MEMORY	0,60	0,43	45	0,83	0,31	45	3,67	0,0006
LANG	0,94	0,15	46	0,98	0,07	46	1,77	0,0832

Composite Variables	14 days			3 months			t	p-value
	Mean	St Dev.	N	Mean	Std Dev	N		
PERC	3,36	2,92	47	4,70	3,19	47	4,82	0,0001
WIMB	3,45	0,67	43	3,53	0,50	43	0,90	0,3711
HAD DEP	1,24	0,72	40	1,52	0,89	40	2,25	0,0298
HAD ANX	2,88	0,57	39	3,02	0,46	39	1,45	0,1540
TAYLOR	0,20	0,24	40	0,21	0,20	40	0,19	0,8471
SFE	0,38	0,51	45	0,45	0,47	45	-0,42	0,6723
SFE2	0,46	0,62	43	0,34	0,50	43	-1,40	0,1664
SFE3	0,51	0,36	44	0,72	0,48	44	2,87	0,0063
SFE4	0,73	0,,57	44	0,86	0,65	44	1,40	0,1684
SFE5	1,08	0,73	43	0,94	0,72	43	-1,39	0,1714
SFE6	0,45	0,56	42	0,40	0,54	42	-0,62	0,5336
SFE7	0,65	0,87	38	0,55	0,79	38	-1,07	0,2911
SFE	0,59	0,38	47	0,65	0,43	47	0,84	0,4010

From these two tables, various profiles of recovery at the 0,005 level of significance emerged. These profiles are presented in Figures 6.7, 6.8, 6.9, 6.10, 6.11.

Recovery took place between the first two assessments (3 days and 14 days) that is, during the period of hospitalisation -- in WALK I ($\underline{t}$ = 3,44; $\underline{p}$ = 0,0014), ARM ($\underline{t}$ = 5,24; $\underline{p}$ = 0,0001), FINE ARM ($\underline{t}$ = 3,98; $\underline{p}$ = 0,0006), ADL ($\underline{t}$ = 5,31; $\underline{p}$ = 0,0001) ORIENT ($\underline{t}$ = 3,33; $\underline{p}$ = 0,0018), CALC ($\underline{t}$ = 3,70; $\underline{p}$ = 0,0010), and LANG ($\underline{t}$ = 2,90; $\underline{p}$ = 0,0057). During this time patients received the conventional hospital programme of therapeutic intervention as described on page ??, chapter 5.

During the second and third assessments (14 days and 3 months) recovery is demonstrated by a significant increase in the variables WALK I ($\underline{t}$ = 4,53; p = 0,0001), WALK 2 ($\underline{t}$ = 3,56; $\underline{p}$ = 0,0010), WALK ($\underline{t}$ = 3,68; $\underline{p}$ = 0,0007) ARM ($\underline{t}$ = 3,59; $\underline{p}$ = 0,0010), ADL ($\underline{t}$ = 4,93; $\underline{p}$ = 0,0001), MEMORY ($\underline{t}$ = 3,67; $\underline{p}$ = 0,0006) and PERC ($\underline{t}$ = 4,92; $\underline{p}$ = 0,0001). During this time patients had been discharged into the community and had had no further contact with hospital staff.

3 days to 14 days
ie in hospital

14 days to 3 months
ie in the community
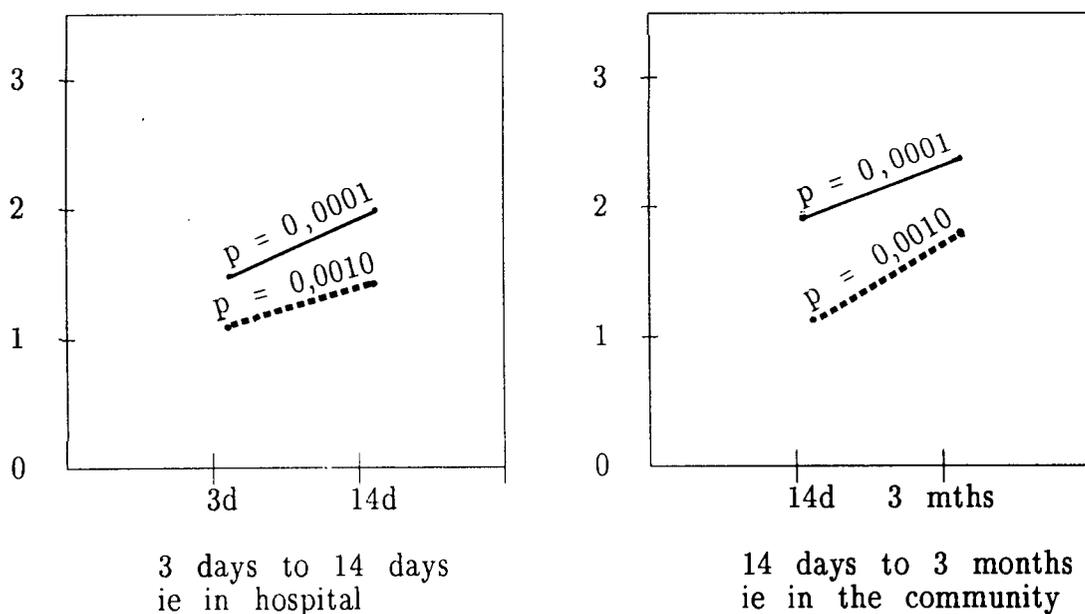
Figure 6.7. Graph demonstrating the recovery profile of walking.

This graph (Figure 6.7) demonstrates that spontaneous recovery of gross motor movements, that is, sitting, walking, rolling over and standing, took place at a significant level once the patients had been discharged from hospital, despite the fact that they received no therapy. Spontaneous recovery in these spheres was therefore significant.

3 days to 14 days
ie in hospital

14 days to 3 months
ie in the community
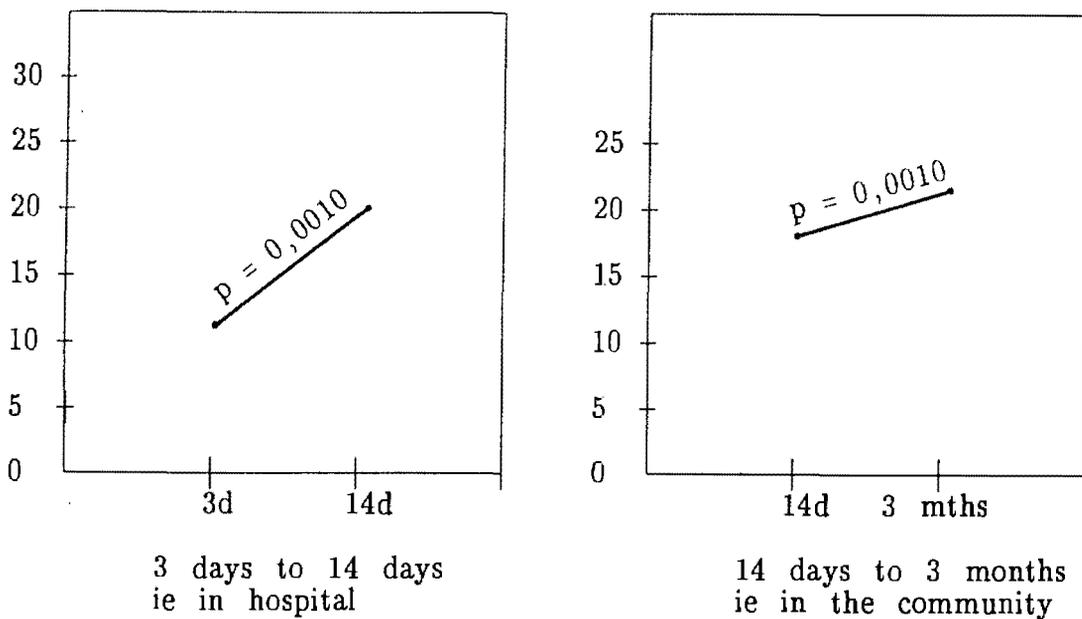
Figure 6.8. Graph demonstrating the profile of recovery in movements of the arm

The graph (Figure 6.8) shows that arm movements, which recovered significantly during the hospitalisation period, continued to recover once the patient was discharged into the community. This again demonstrates that significant spontaneous recovery occurred in this area of motor functioning.

3 days to 14 days
ie in hospital

14 days to 3 months
ie in the community
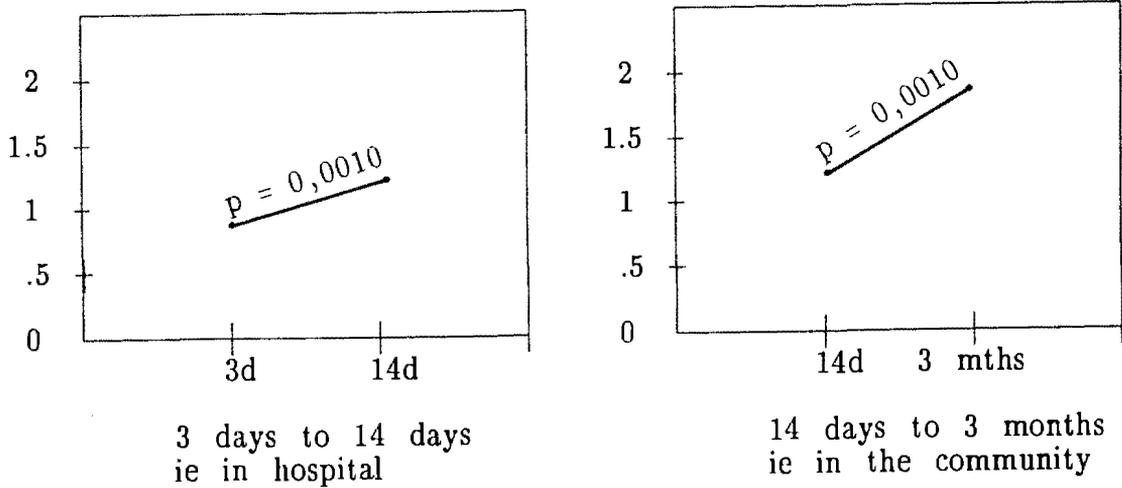
Figure 6.9.   Graph demonstrating the pattern of recovery in Activities of Daily Living (ADL).

There was a significant recovery in activities of daily living (ADL), especially once the patient had been discharged into the community (Figure 6.9). This indicates that the patients were more able to cope with activities related to their personal independence and autonomy such as feeding, dressing, bathing and going to the toilet.

3 days to 14 days
ie in hospital

14 days to 3 months
ie in the community
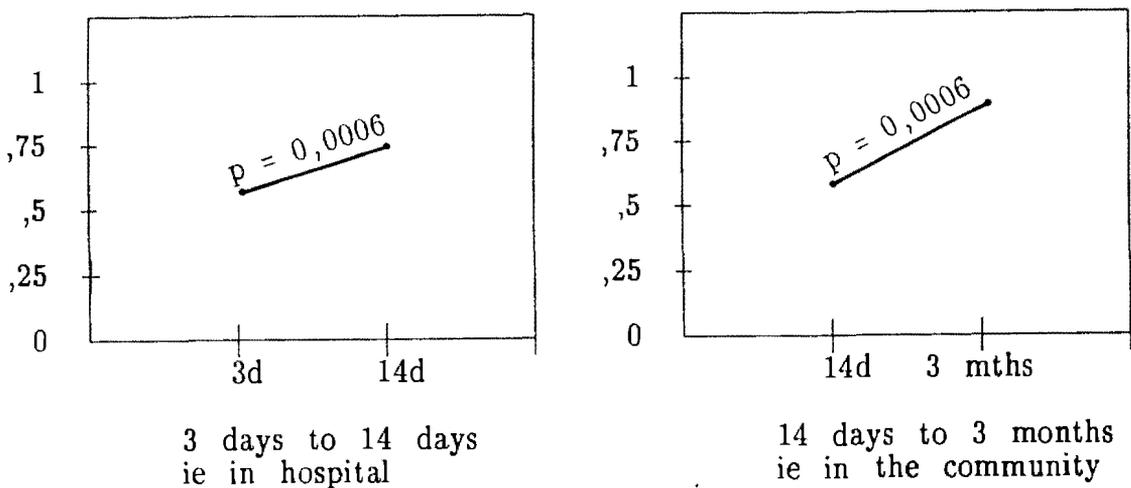
Figure 6.10.   Graph demonstrating the recovery profile of memory.
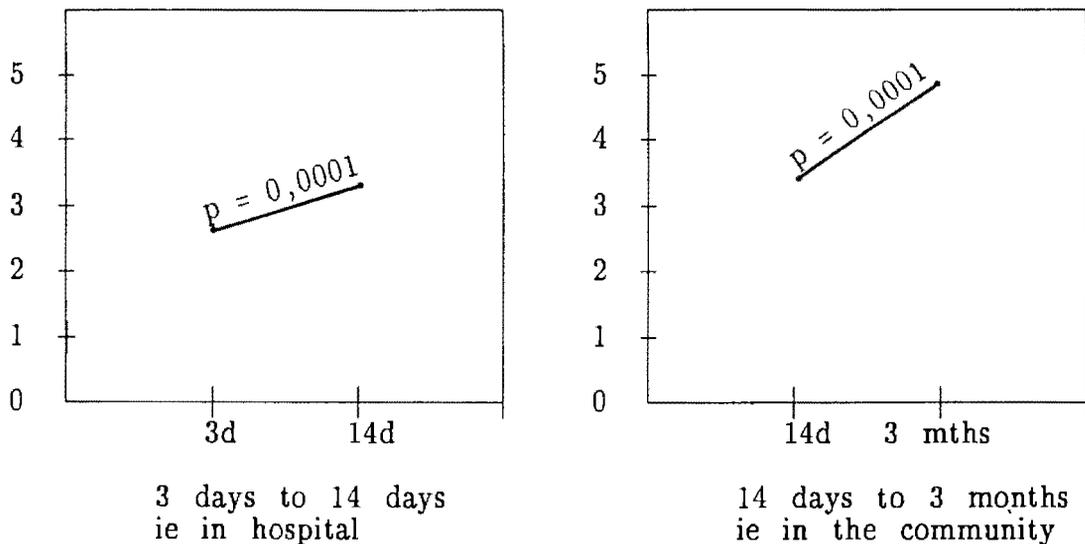
Figure 6.11. Graph demonstrating the recovery of perception.

Figures 6.10 and 6.11 demonstrate the significant recovery of the neuropsychological functions of memory and perception. These reflect the spontaneous cerebral recovery taking place post stroke over a period of three months.

Areas of Deterioration

Although there were significant profiles of recovery in the physical sphere such as walking, arm movements, and activities of daily living, as well as in areas of neuropsychological functioning such as memory and perception, two spheres tended towards significantly high profiles of deterioration.

These were the emotional sphere of depression and the social sphere of interaction at home and in the work· environment.

At the second assessment, depression, that is composite variable HAD DEP, did not tend towards a significantly high value (t = 1,68; p = 0,1007). This changed, however, at the three month assessment once the patient had been in the community for at least two months (t = 2,25; p = 0,02). Therefore, despite the significantly high recovery in both physical and neuropsychological spheres, depression increased significantly.

Similarly, interaction at home and at work approached a significantly high problematic level at the three month assessment ($\underline{t}$ = 2,87; $\underline{p}$ = 0.006). This is especially interesting in view of the fact that the ability to walk, sit, and perform autonomous personal activities (feeding, dressing, etc.) had improved significantly. The physical improvement did not therefore reflect an improvement in the emotional and interpersonal spheres of social interaction.

The Nature of Relationships among Composite Dependent Variables

Pearson Product Moment correlations were performed on all composite variables. The intercorrelation matrices between depression scores and all other composite variables at the 14 day assessment (Table 6.20) and the 3 month assessment (Table 6.21) are presented.

Table 6.20

Correlates of Depression (HAD) at 14 Days

Variable	r	p-value	N
1. Physical			
Y WALK 1	0,60	0,0001	36
Y WALK 2	0,57	0,0003	35
Y WALK 3	0,18	0,4398	20
Y WALK	0,37	0,0226	36
Y ARM	0,50	0,0028	33
Y FINEARM	0,47	0,0109	28
Y FINGERS	0,01	0,9522	27
2. Activities of Daily Living			
Y ADL	0,60	0,0001	41

Table 6.20 (cont.)

Variable	r	p-value	N
3. Cognitive			
Y ORIENT	0,31	0,0413	42
Y CALC	0,57	<u>0,0005</u>	33
Y MEMORY	0,31	0,0458	41
Y LANG	0,28	0,0701	42
Y PERC	0,52	<u>0,0005</u>	41
4. Social			
Y SFE 1	-0,18	-0,2526	41
Y SFE 2	-0,05	0,7544	40
Y SFE 3	0,01	0,9198	40
Y SFE 4	0,09	0,5491	40
Y SFE 5	-0,02	0,8781	37
Y SFE 6	0,09	0,5588	38
Y SFE 7	0,03	0,8493	37
Y SFE	0,08	0,5751	42

Table 6.21

Correlates of Depression (HAD) at 3 Months

Variable	r	p-value	N
1. Physical			
G WALK 1	0,45	0,0019	45
G WALK 2	0,35	0,0172	44
G WALK 3	0,42	0,0078	38
G WALK	0,47	0,0010	45
G ARM	0,32	0,0338	43
G FINE ARM	0,32	0,0457	38
G FINGERS	0,11	0,5021	37
2. Activities of Daily Living			
G ADL	0,54	0,0001	47
3. Cognitive			
G ORIENT	0,41	0,0034	47
G CALC	0,55	0,0002	40
G MEMORY	0,32	0,0239	47
G LANG	0,22	0,1370	47
G PERC	0,56	0,0001	47
4. Social			
Y SFE 1	-0,27	0,0773	43
Y SFE 2	-0,23	0,1415	42
Y SFE 3	-0,46	0,0014	44
Y SFE 4	-0,43	0,0028	44
Y SFE 5	-0,20	0,1810	43
Y SFE 6	-0,36	0,0151	43
Y SFE 7	-0,20	0,2273	38
Y SFE	-0,39	0,0066	45

At 14 days a significant relationship existed between depression scores and walking;

      Y WALK I -- r = 0,60; p = 0,0001

      Y WALK II -- r = 0,57; p = 0,0003

depression and the ability to carry out movements of the arm:

      Y ARM -- r = 0,50; p = 0,0028

and depression and activities of daily living (feeding, dressing, bathing, etc):

      Y ADL -- r = 0,60; p = 0,0001.

In the cognitive sphere at 14 days a positive relationship existed between depression scores and orientation to time and place:

      Y ORIENT -- r = 0,31; p = 0,0414

depression and the ability to calculate numerically:

      Y CALC   -- r = 0,57; p = 0,0005

and depression and perceptual abilities:

      Y PERC   -- r = 0,52; p = 0,0005.

There were no significant relationships between depression and the spheres of social, family, and inter personal functioning at 14 days. These scores are a reflection of the sample's pre-morbid social, family, and inter personal functioning.

At three months, the situation changed. In the biological physical spheres, significant relationships were found between depression and walking:

      G WALK I -- r = 0,45; p = 0,0019

      G WALK   -- r = 0,47; p = 0,0010

and depression and activities of daily living:

      G ADL   -- r = 0,54; p = 0,0001.

In the cognitive sphere, significant relationships were found between depression and orientation to time and place:

G ORIENT -- $r = 0,41$; $p = 0,0034$

depression and the ability to calculate numerically:

G CALC -- $r = 0,55$; $p = 0,0002$

and depression and perception

G PERC -- $r = 0,56$; $p = 0,0001$.

In the social and interpersonal spheres, at three months, significant relationships were found between depression and problems in interpersonal interaction at home and at work:

Y SFE 3 -- $r = 0,46717$; $p = 0,0014$

and depression and the lack of involvement in small groups in the community;

Y SFE 4 -- $r = 0,4395$; $p = 0,0028$.

A tendency towards a significant relationship between depression and problems in all areas of social functioning emerged:

Y SFE -- $r = 0,39903$; $p = 0,0066$.

Review of Results

Review of Descriptive Statistics

The descriptive statistics revealed biographical characteristics both pre-morbidly and at three months after the life disrupting event of the stroke. The sample were mainly between 46 and 70 years of age with equal numbers of men and women. They were strongly embedded in a family system, either with a spouse, or as part of an extended family. The majority lived together with their families, sharing accommodation, duties in the house, sharing child

rearing, as well as contributing to the financial support of the family ecounit.

The income earned by the sample was low, averaging between R200,00 to R400,00 per month. However, large numbers of family members (up to 13) were dependent on the income earned by the patient. An inability to return to previously held employment usually resulted therefore, in financial stress for the family system. Due to the low educational status of the sample, with the majority either having never attended school or only up to primary level, pre-morbid employment was in general, unskilled manual labour. Any long term physical disability after stroke therefore, would necessitate a reframing of employment possibilities to suit reduced physical capacity. Most patients in the sample professed themselves to be happy in their family and social environment, and able to cope with the physical, emotional and social demands of their life style. The majority were involved in church or local groups and were strongly connected in family, friend and work relationships.

At the three month assessment, however, after the occurrence of the life threatening and disruptive stroke, the biographical data changed. Problems co-evoluted throughout the different levels of social functioning. Although physical functioning since the stroke had improved significantly, the majority of the sample were still not at their pre-morbid level of physical or cognitive functioning. As a result many of the sample were unable to return to previous employment, and experienced serious financial problems. These co-evoluted into other levels of social functioning, and problems with spouse, children and friend relationships increased significantly. Due to personal and physical limitations and a lack of community facilities, membership of religious affiliations and other small groups was severely curtailed. Relationship connectedness on social and family levels was also disrupted.

Review of Reliability and Validity of Scales

The construct validity of the Hospital Anxiety and Depression Scale (HAD), the Wimbledon Scale for Depression, the Social Functioning Examination (SFE) and the Taylor Manifest Anxiety Scale were investigated by means of Factor Analysis. Varimax rotated factor solutions were obtained for the intercorrelation matrices of all the scales, for all three test situations. In all the scales, the results from the three test situations cross validated each other. Two factors emerged from the Factor Analysis of the HAD scale, thus confirming the factorial validity of the two constructs -- anxiety and depression. One factor emerged in each instance from the Taylor Manifest Anxiety Scale and Wimbledon Scale for Depression thus confirming the factorial validity in each case of anxiety and depression respectively. Eight factors emerged from the Varimax rotated factor solution of the Social Functioning Examination (SFE). These demonstrated the construct validity of the areas covered by the scale -- relationship with spouse, children, and significant others in the home, role responsibility at home and at work, and the financial situation.

Cronbach Coefficient Alpha was computed on the HAD Scale, Taylor Manifest Anxiety Scale, the Wimbledon Scale for Depression and the SFE, for all three test situations. The results of the test situations cross validated one another. The Cronbach Alpha Coefficients for each scale were as follows:

HAD (3rd test situation)	: alpha	=	0,98
Wimbledon (3rd test situation)	: alpha	=	0,96
Taylor (3rd test situation)	: alpha	=	0,86
SFE (3rd test situation)	: alpha	=	0,83

The coefficients obtained indicate an acceptable degree of the internal consistency of the scale, and as such, a lower bound of the true reliability of the test.

Acceptable levels therefore, of statistical measures of construct validity and reliability were obtained on all four scales.

Review of Significant Differences Across Assessments

Descriptive statistics of the 25 composite variables were performed. The results of t tests for dependent measures assessing differences between the first, second and third assessments revealed changes over time of the composite variables. The level of significance was taken at the 0,005 level.

Two recovery periods were evaluated. The first, between the first and second assessments, referred to the period of hospitalisation (that is during the first 14 days post stroke).

During this period, the patients received medical treatment for the acute phase of the stroke, and twice weekly therapy sessions from hospital staff members. As such the sample was connected to the hospital system. Contact with the family system was varied.

Significant recovery profiles emerged in both the physical and neuropsychological spheres. Walking, arm movements and activities of daily living (ADL) all improved significantly, as well as perception and memory. The first 14 days can then be regarded as the first plateau of physical recovery with the sample connected to, and physically dependent upon the hospital system.

The second period of assessment was from 14 days to 3 months. During this time patients were discharged back into the community. No contact was maintained with the hospital, and the sample was again embedded in the family and community spheres. Certain recovery profiles emerged, in the physical and neuropsychological spheres. Walking movements,

and arm function, activities of daily living, memory and perceptual abilities, all improved significantly at the 0,005 level.

However, despite these marked improvements over time, the majority of the sample were unable to return to previously held employment positions, or to occupy roles and perform responsibilities as they had done pre-morbidly.

Significantly, two other spheres demonstrated tendencies towards significant changes over time, but in a negative direction. These were the emotional spheres of depression, and the social sphere of role functioning at home and at work. They emerged as profiles of deterioration.

Review of Significant Relationships Among Dependent Variables

Pearson product moment correlations were performed on all composite variables, at the 14 day and 3 month test situations. Depression scores were a reflection of the patients' feelings of isolation, unhappiness, apathy, distress, feelings of inferiority and desperation. As such they reflected the quality of life the patients experienced post-stroke.

A trend emerged in the significant relationships that were found between depression and the composite variables at the two test situations. At the 14 day test situation depression was significantly related to the physical spheres of walking, arm movements and capabilities, and activities of daily living, as well as to the neuropsychological spheres of calculation and perception. No significant relationships were found between depression and any social spheres. This is understandable as the patients were still strongly embedded in the supportive hospital sphere.

No significant relationship was found between depression and hemispheric localisation of lesion. However, the significant relationship between the depression scores and the neuropsychological functions of calculation and perception indicate the importance of systemic brain functioning on the depression scores during this acute phase.

At the three month test situation other significant relationships emerged. The sample were now embedded in the community sphere. Depression was again significantly related to physical functioning (walking, arm functions and activities of daily living) and higher cerebral functioning (calculation, orientation and perception.) However, other significant relationships also emerged. Depression was also related to problems in the interpersonal relationship spheres (both at home and at work) the lack of involvement in groups in the community, and in general, to problems in all areas of social functioning.

In summary, a review of the relationships between dependent variables and depression revealed a process of deterioration. Initially depression was significantly related to physical and cerebral functioning. Three months past the event of stroke, however, the patients were exposed to pre-morbid levels of social and personal responsibilities and expectations which they were unable to meet. At that stage the pattern was different. Depression was significantly related to social functioning in general, and to problems interpersonally at home and at work, and to group affiliation, in particular.

CHAPTER   7

AN ECOLOGICAL VIEW OF REHABILITATION AFTER STROKE -
A DISCUSSION OF THE RESULTS

Introduction

The results of this study could be interpreted on
various levels of the human systems that touch the lives of
the stroke patients in the Ga-Rankuwa area. Not only could
they be interpreted hierarchically, with each level more
complex than the one before and encompassing all those that
preceded it (Bronfenbrenner, 1979), but also according to
the concept of coevolution (Bateson, 1972), where change in
one system level affects and is affected by change in other
system levels.

This interpretation reflects a change in a "world view"
of health. Nicholas and Gobble (1991) stated that while
theoretical models and theories (typically confined to one
or two disciplines) are designed to generate testable
hypotheses, world views are philosophically-based frames of
reference for ordering and organising an understanding of
reality. The authors state that three world views of health
have emerged as being dominant. The first is <u>formism or
categorical thinking</u>, where objects and events in the world
are viewed as "either/or". Objects or events either have
similar, identical characteristics and thus belong to a
similar class or category or they do not, and thus belong to
a different class or category. In terms of health, one is
either sick or healthy; a person either has a disease or
not; there is no continuum of health.

<u>Mechanism</u>, the second world view, is linear, direct,
local, cause oriented thinking. Kitchener (1982) stated
that in mechanistic thinking the whole is not greater than

the sum of its parts, but is rather the aggregate or additive sum of its subparts. As such, the whole can be reduced to irreducible, basic parts. An example of this type of thinking is found in smoking cessation programmes in the public health field (Nicholas & Gobble, 1991).

Event A	Event B	Event C
(Fewer employees)	(Fewer illnesses)	(Fewer medical claims, Fewer deaths, Fewer health care costs)

This linear and sequential view of cause and effect is a prototype example of the mechanistic world view. Much of the research done on stroke patients has been carried out according to this type of thinking.

Event A	Event B	Event C	Event D	Event E
Pre-morbid stroke patient with etio-logical life style, habits, and state of health	Stroke	Intervention in acute phase - mainly medical and technological	Intervention | Rehabilitation using various therapeutic techniques	Return to community | increased "Quality of Life"

This model of research has met with success in the acute phase of stroke, where technical and medical life-saving measures are of paramount importance. This has been shown in the advances made in the diagnosis, intensive care, and pharmacological treatment of stroke as well as the prevention of further cerebral vascular accidents (Wade et al., 1986). Problems have arisen, however, in research conducted in the area of rehabilitation and the "quality of life" of stroke patients after discharge.

Research on the concept of "quality of life" as an aim of rehabilitation therapies, although presenting "promising horizons", has also been fraught with miscommunication

random effort and faulty reasoning (Fava, 1990). Fava identified three major factors influencing quality of life in the medically ill:

- functional capacity (i.e., the abilities to perform activities of daily life, social function, intellectual function, emotional function, and economic status)

- perceptions (i.e., levels of well-being and satisfaction with life)

- effects of symptoms of disease (i.e., with resultant impairment)

Fava (1990) stressed that the goal of therapy for most patients with chronic impairments after illness should not be "cure" but improvement of function. This approach is, however, two-dimensional and ignores features that can modify the meaning of illness for a patient in such a way as to make it stressful, such as psychological distress, social functioning, and illness behaviour (Fava, 1990). Lipowski (1969, 1198) states:

How a person experiences the pathological process, what it means to him, and how this meaning influences his behaviour and interactions with others, are all integral components of disease viewed as a total human response.

This consideration of disease underlies the concept of quality of life as a final common pathway of various interlocking mechanisms, at the neurophysiological, biochemical, experiential, and behavioural levels. It should therefore shift research into a more holistic approach, with research being undertaken in areas such as the social and behavioural levels that are most often dismissed or dealt with as categories of "possible" or "probable" importance.

We must find improved research techniques to enhance stroke management for the months and years after the immediately post-ictal period. During the crisis stage, when life hangs in the balance, neurologists and other specialists rule supreme. After the crisis, we in rehabilitation have the responsibility for helping the patient to achieve an optimal role back in the family and society. But our research efforts face a set of time locks that are unique to the post-acute recovery and chronic stages. Most daunting of these is our shocking lack of a clear classification and natural history of the great variety of outcomes. As a result, stroke patients are lumped together as clinical re-search subjects in idiosyncratic ways that spell doom for most, if not all studies. (Basmaijain, 1989, p.92)

The third-world view of health (as proposed by Nicholas & Gobble, 1991) of Organiscism or Systemic Thinking provides some hope for including the "great variety of outcomes" after stroke, referred to above.

Organic thinking emphasises unique emergent properties out of the dynamic interaction of its subparts. The root metaphor is the living organism, growing, changing, evolv-ing, and constantly interacting with its environment. The living organism is an open system that takes in nutrients from its environment and changes the form of these nutrients to supply the varied needs of the organism while also constantly altering the form of its subparts. It is a dynamic evolving system that can only be understood when examined in the context of the entire system. The parts can only have meaning when viewed in the context of the whole (Kitchener, 1982). The focus of study is the integrated system and therefore the whole is greater than the sum of its parts. This world view represents a shift from a simplistic reductionistic cause-and-effect view of health to a complex, holistic, interactive hierarchical model.

The Mandala of Health

In an attempt to describe the role of the "sick care system" in human ecology, Hancock (1985) proposed a model of the Mandala of Health (Figure 7.1). An ecological model of human health is consistent with the broad field of human ecology. This has been defined as

the study of the interactions of man and human society with the environment. It is concerned with the philosophy and quality of life in relation to the development of biological and geological resources, of urban and rural settlements, of industry and technology, and of education and culture. (Dansereau (1972, p.1)
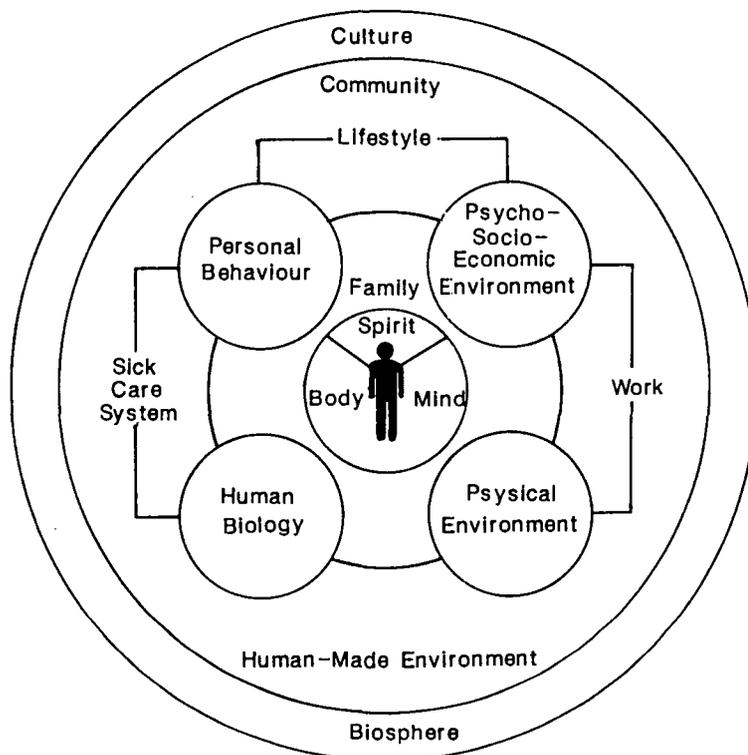
Figure 7.1. A diagrammatic representation of the Mandala of Health.

In the Mandala, a circular symbol of the universe, the individual - comprising body, mind and spirit - although the centre or focus, is not seen in isolation but rather as within a family, a primary source of health. In view of its buffering, sheltering and supportive role, the family can be

regarded as the most important mediating structure between persons and institutions.

The model describes four factors as affecting the health of the individual. These are human biology, personal behaviour, psychosocial environment, and physical environment.

The structure provided by this model and the synchronous systems model (described on p.19) enables an ecological analysis to be made of the stroke patient sample in this research premorbidly and at three months after the occurrence of the stroke (i.e., after being discharged into the community).

Premorbidly the stroke patients described themselves as not having any serious problems in their social functioning, and over 80% of the sample were happy with their spouses, had satisfactory relationships with their children, were able to meet the demands of the home and work environments, and regarded their living circumstances as meeting their needs. More than 60% were involved in religious affiliations and had strong friendship ties. The sample as a whole (74% of whom were manual labourers) were embedded in a social system which, while poor and lacking in material benefits, met their needs on an emotional and social level.

Stroke then occurred, disrupting these patterns of interaction at all levels. The effects of this biological crisis co-evoluted through the levels of interpersonal, social, family, employment, and emotional functioning. This was reflected in the ecological analysis of the sample at three months post-stroke.

On the biological level, significant improvement had occurred in gross motor function, arm and hand movements, and in general abilities to perform everyday essential tasks

(activities of daily living). However, although physical improvement had occurred, the sample was not biologically on the same level as premorbidly. This is shown by the fact that only 39% were fully independent in activities of daily living.

This had co-evolved in other levels as well. Although cognitive ability after stroke had improved and 91% of the sample were orientated for time and place at the three-month stage, 12% still had problems with short-term memory and 50% scored below the norm in the perceptual motor task. However, despite the fact that there was considerable improvement at the biological level, negative change occurred at the emotional and social levels or spheres, with patients having significantly increased feelings of depression, problems in marital and child relationships, and problems in their membership of small groups and religious affiliations, with accommodation and at work.

Anxiety and depression are common emotional responses in a medical setting. An acute serious medical illness suddenly interrupts a person's way of life and readily arouses feelings of discouragement and loss. Stroke, a life-disrupting event, as is shown by the results of this study, had such an effect on the research sample. Patients with feelings of discouragement, isolation, and unhappiness are less likely to feel encouraged to use rehabilitation services fully, and this affects their ultimate motivation to integrate and function socially. Quality of life is therefore closely linked to depressed feelings after stroke, and is a major focus of attention in rehabilitation pro-grammes. The results of this study indicated that while an organismic model, such as the Mandala of Health (p.157), can provide structures to evaluate the hierarchical embedded ecosystems of the stroke patients, it is unable to concept-ualise the processes taking place over time in the lives of the patients after the life-disrupting event of the stroke.

The concept of coevolution seeks to explain how the systemic levels are generally intertwined. It states that one system level adapts in reaction to a state of disequillibrium which may be imposed by internal and/or external forces (Bateson, 1972). A change at one level therefore affects and is affected by changes at other levels. The systems are said to co-evolve with one another. But there is no simple cause-and-effect relationship in the idea of co-evolution. Rather, each sets the stage for the other. Changes in the physical levels of the stroke patients' functioning will therefore co-evolve into other levels such as the social and emotional levels. The concept of co-evolution does not, however, define the <u>direction</u> of change nor why it should occur. The results of the project showed that depression levels deteriorated while physical levels improved.

The Synchronous Systems Model for Health

The Synchronous Systems Model for Health (p.19) describes change in the biological, individual or environmental spheres in terms of the disregulation of the change and the regulation of stability. Central to human bio-ecology and the synchronous model are the ways in which human beings maintain themselves in continually changing yet restricted internal and external surroundings. The synchronous system always changes in order to maintain stability.

The model describes <u>optimal environments</u> as those which encourage <u>optimisation</u> by the person so that he can actively work on the environment as a context to meet his goals and satisfy his needs. This is regarded as a state of synchrony or health. In malsynchrony or stabilised dysynchrony or disease, the person is forced to seek help from health professionals, who try to disrupt the malsynchrony.

The results of the study identify a group of people in a state of malsynchrony owing to a disregulation in the biological sphere, that is, stroke. The model describes the

events at the time of the stroke, and explains why patients with breakdowns in their spheres of interaction are isolated, discouraged and unhappy. However, despite intervention in the biological sphere and in the social sphere from hospital professionals and significant improvement occurring in the biological sphere, feelings of discouragement and unhappiness together with increasing environmental sphere dysynchrony occurred at three months.

The inability of these systemic models of health to explain the changes in time found in the stroke patient sample of this study is reflected in the words of Bateson (1972). He stated that mere purposive rationality, that which emerges on our screen of consciousness (p.37), can only deal with a skewed sample of events of the total system of which we are a part. By confining ways of knowing to purposeful rational knowing, the descriptions created only take into account a fragment of the ecological relationship one is attempting. The line of thinking therefore again becomes linear, reductionistic and mechological.

Keeney (1979) stated that diagnosis should be seen as the process of knowing the ecological relationship system that emerges in the process of diagnosing. Information is not sought in any strict format, but receptiveness occurs towards the experience. The experience happens instead of being made to happen. As such, diagnosis is not a process apart from therapy - the two are inseparable (Minuchin, 1974).

This view represents a change in epistemological thought. A dictionary definition of epistemology is "the study or a theory of the nature and grounds of knowledge" (Webster's New Collegiate Dictionary, in Auerswald, 1985). Auerswald (1985) defines epistemology in a more definite way: "a set of immanent rules used in thought by large groups of people to define reality" (p.1).

Auerswald (1985) defined the epistemology underlying the ecosystemic paradigm in terms of the list of differences between "New" Science and Newtonian Science and Batesonian evolution and Darwinian evolution.

Concepts Common to Both New Physics and Batesonian Evolution

1. Both assume a monistic universe. (both/and)

2. Both use concept of four-dimensional timespace.

3. Both view linear clocktime as a heuristically useful concept that does not, however, establish causative relationships between events.

4. Both include abstract ideas or mind as part of the field of study.

5. Primary focus of both is patterned events in four-dimensional context.

6. Both discard certainty. Truth is seen as heuristic.

Concepts Common to Newtonian Physics and Darwinian Evolution

1. Both assume a dualistic universe. (either/or)

2. In both, space and time are treated separately.

3. Both view linear clocktime as real time in which one event is causative in relation to the next event.

4. In both, the field of study is mechanistic and separate from the studying mind.

5. Primary focus of both is atomistic examination of entities in space and progression of events in linear clocktime.

6. Both accept certainty. Truth, therefore, is seen as absolute.

(Auerswald, 1985, pp.4-5)

The process of "diagnosis", of "knowing", and identifying the ecological eventshape in time and space is most important in ecosystemic epistemology. The approach uses the metaphors and ideas from linear epistemology, in an attempt to clarify and examine the system under study. Bateson (1972) described this task as being that of the circular scientist, whom he distinguished from the "humanist".

> The humanist like the artist, can act spontaneously out of his own integrity and need not always stop to determine exactly what he is saying. On the other hand, the humanist will never create a cumulative science for he cannot clearly transmit his wisdom to his successors.... The artist must always leave his own systems of codification implicit and unexamined. The precise and even compulsive examination of such systems is the task of the scientist. (Bateson, 1972, pp.270-271

In this chapter the ecological eventshape of the stroke patient premorbidly and at three months post-stroke, has been presented in a linear statistical mechology. The situations represent two ecological eventshapes in time and space along the developmental line of this sample of stroke patients.

Pre-morbid	Stroke	Post-stroke
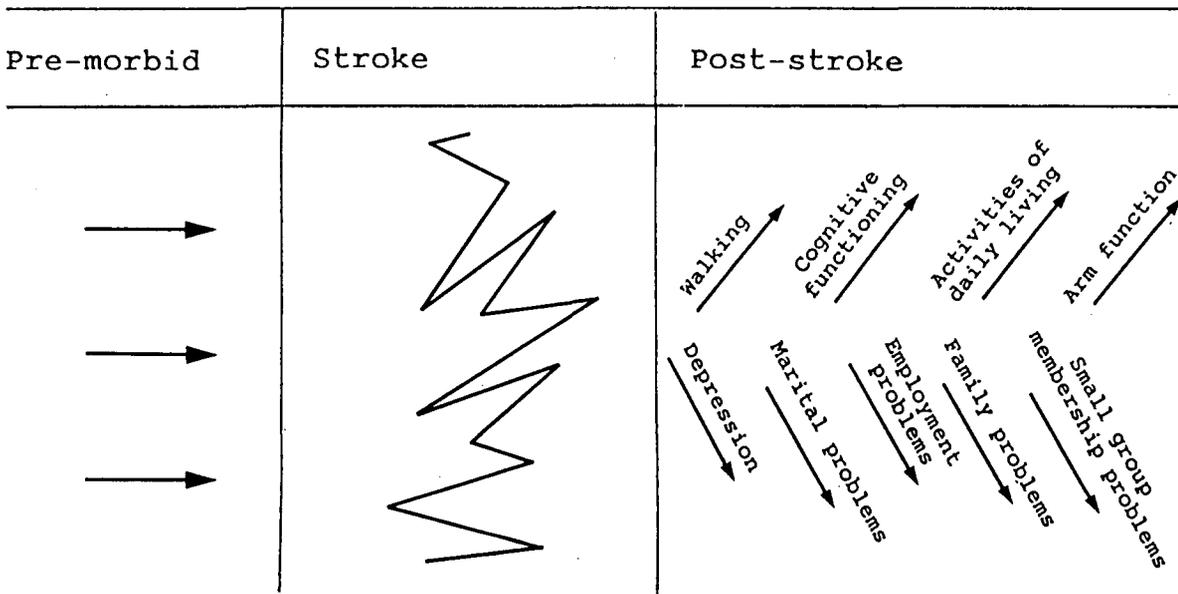
Figure 7.2. Developmental line of stroke patients.

Stroke is a severe disruption of the developmental line. It represents a severe, traumatic, eventshape. Despite excellent advanced medical and technological intervention during that time, the person emerging into a post-stroke developmental line is not the same as premorbidly. The results showed that despite significant physical recovery only 39% were independent in ADL at three months post-stroke.

Stroke cannot be regarded as a mechanical "breakdown" able to be "put right", with the person restored to optimal functioning. "Quality of life" as an aim of rehabilitation services for stroke patients should strive to reshape the stroke patient as an ecological being.

The Development of an Ecological Rehabilitation Model for Stroke Patients in the Ga-Rankuwa Area

This research study has examined the relationships between systems in the ecology of the stroke patient. This area is perceived as being of importance in the rehabilitation process, but as warranting closer examination:

> Other external factors affect recovery of the stroke patient because they are sociologic and once more involve neglect - usually a benign neglect of a broader sort. Assuming the patients reach a plateau at a very early stage, society, health professionals, and the family rapidly turn away from encouraging the individual. (Basmajian, 1989, p.93)

The results showed that stroke patients felt increasingly discouraged, unhappy, isolated, unmotivated, and anxious once they had been discharged from hospital. They experienced significantly more problems with their spouses and children, were unable to maintain their previous affiliations with religious and other social groups in the commun-

ity and felt in general that their quality of life had deteriorated. Despite the fact that there was a significant improvement in physical abilities (arm, walking and ADL), coupled with neuropsychological recovery (memory, calculation and orientation), most of them were unable to return to their previous work.

Auerswald (1990) described this type of situation as one of relational disconnectedness, a state of apartness in the relational domain of human life. There are two kinds of hunger. The first is somatic hunger, the result of deprivation of an adequate supply of nourishing food. The other is relational hunger, the hunger for connectedness that is experienced as essential loneliness. Auerswald states that the latter is the result of the mechological nature of Western society. He defines mechological by saying that: "I refer to the logic which Western/mechanistic thinkers generally refer to as 'common-sense'. We adhere to it when we want to be 'rational', to 'make sense'" (Auerswald, 1990, p.28).

Mechologic is a system of thought that requires that people, communities, cultures, and societies be thought of directively as things. As a result society becomes fragmented into different specialities, divided into institutionalised systems and subsystems, each constructed to deal with a part of human life, in a mechological way that ignores the relationship domain. Auerswald (1990) believes that this rigidity, an "either/or" dualism and reductionalism, can only interfere with the ecological balance and flow of relational connectedness. At the time of the stroke, patients experience the problem of relational disconnectedness at two levels:

-   the physical onslaught of the stroke reducing personal autonomy and forcibly severing the links that the patient has with work, the family, and his ecounit in society

- the dependence of the stroke patient on the highly mechological specialised institutionalised hospital system which will provide life-saving technological measures

The hospital can either increase the relational distance experienced by the patient by operating in a linear, cause-effect manner or reduce the effect of the severance of physical links with other levels in the patient's ecounits by applying skilled therapies in an ongoing ecosystemic diagnostic process that seeks to meet the patient's needs and reshape stroke patients as part of a different ecosystemic "matching".

The various professional institutionalised groups in the hospital provide a microcosm of the fragmentation of specialised health services that exists in mechologised, highly developed Western societies. Ga-Rankuwa, as a poverty-stricken community, does not have this multitude of fragmented services, but Ga-Rankuwa does have a structure of highly trained specialists each operating from his own frame of reference in the institutionalised departments within the hospital system. The structure of these independently functioning systems within the larger hospital system is a reflection of the emphasis on "team-care" that is regarded as the basis of hospital care in Western societies. It is based on the philosophy of treating the "whole person" and not the "disease", with an understanding that illness affects all aspects of the patient (Siegrist & Junge, 1989).

This again links up with the concept of quality of life discussed earlier. However, increasing specialisation of knowledge and career development in these different professions (occupational therapy, physiotherapy, social work, nursing, speech therapy, psychology) leads to their operating autonomously from within their own departmental policies

and regulations. As a result they can become disconnected from one another, disconnected from the lives of those very people they are trying to help, and may even work at cross-purposes with each other in the rehabilitation process.

The therapeutic process may be conceptualised as follows:

Event A	Event B	Event C
Patient with a problem related to medical illness	Apply a therapy	Patient should improve either to premorbid level or as near as possible

This linear model is difficult to examine in the research context as Event C is difficult to evaluate either statistically or clinically, especially in the stroke patient, where spontaneous recovery may occur naturally. Each department in the hospital system usually works out its own plan for recovery. The patient is therefore confronted with many different and fragmented therapies which he knows very little about, and this only increases the relational disconnectedness resulting from the stroke. The family of the stroke patient is not only confronted with the shock of the event itself, but also with the knowledge that their family member is "different" - physically, cognitively and in his personality. The well-organised specialised system of the hospital appears beyond their knowledge and area of social expertise. They are, in fact, relatively disconnected from their family member.

Auerswald (1990) described his work in the fragmented health and human services milieu of New York. He outlines three major issues that need to be dealt with in initiating an ecological framework of care:

1. In order to deal with specialist fragmentation in the health services, there needs to be a single "point of entry" into a system which can respond in an integrated way to all the interrelated issues that are causing distress.

2. An integrated front-line system made up of medical and behavioural science specialists could replace the concept of the "old country doctor" who knew and understood the biological problems of his patients in the context of their families and social and physical environments.

3. The distress of an individual human being can never be understood outside the socio-environmental context of his or her life, and the most important system making up that context is the family.

These issues could be of paramount importance in the Ga-Rankuwa hospital context, which is a microcosm of the fragmented specialised services model. Here a rehabilitation programme for the stroke patients could have a single point of entry through the neurology service. There could be a continuous ecological evaluation approach to patients implemented by means of a multidisciplinary stroke team which would meet regularly and function according to an ecosystemic epistemology. This would enable patients to connect relationally with the hospital system as part of an initial therapeutic process after a stroke. Discharge from the hospital back into an interacting community sphere would be the next event in time and space on the development line of the stroke patient. An examination of the depression scores of the stroke patients in the present study confirms the significance of this event. At the three-day and two-week assessment (i.e., still during hospitalisation) significant relationships were found between depression and such memory, orientation, calculation, and perceptual-motor ability (i.e., soft neurological signs). No significant relationships were found between hemispheric localisation of

the lesion and depression scores. However, the other statistically significant scores indicate a relationship between depression and brain damage per se during the acute hospitalisation phase of stroke recovery. At the three-month assessment, depression scores were significantly related to problems in employment and at home. Relationships at home and with membership of religious and other groups (such as the friendship circle) became increasingly difficult. Overall, depression was related to an increased incidence of problems in all aspects of social and family functioning. The results show the stroke patients becoming increasingly more depressed, discouraged, and unhappy as they found that they were becoming interpersonally disconnected from family and old friendship circles and unable to fit into previous patterns of work and social functioning.

The Ga-Rankuwa community is characterised by grinding poverty and a lack of community facilities. The data in chapter 6 indicate that 74% of the sample had been employed as simple manual labourers with an average monthly income of R200,00 to R600,00. Auerswald (1983) states that the context of health care delivery systems has always been medical with socio- environmental issues seen as "ancillary". For affluent people whose lives as social beings are positive, this is a system that works well. However, when people living under social circumstances of poverty bring all the problematic aspects of their lives to the health system and only have their essential physical needs attended to, this is incongruous. The "culture of poverty" concept has been globally represented to mean many different things. Descriptions of the psychological state and the behaviour observed at the level of the individual include a primary orientation to the present time, a failure to postpone gratification and a tendency to action and impulsivity, a sense of human nature being fixed and therefore of one's fate being both predetermined and unchangeable. There is also a resentment of authority as well as a sense of being

victimised. This goes together with a sense of aloneness and an inability to trust others or form lasting relationships. There is a tendency to dependency rather than self-reliance. In general there is a disinclination to adhere to salaried employment. The stroke population of Ga-Rankuwa is, as it is elsewhere in the world, characterised by increased age. Statistical analysis showed that the majority of the sample of patients in the study fell into the 61 to 70 years age group. When a health crisis occurs, the poor family with an aged member who is the ill person becomes weighed down by negative feelings, such as powerlessness, grief, anger, shame, and self-doubt. At such a time, many elderly people may feel that their lives might just as well end. With no-one to turn to for advice, the patient and the family may easily fall into despair. The experiencing of inadequacy about his or her own performance as well as a feeling within the family that it cannot function as a family unit as well as it did before may rob the family of its identity as a unit. Prior to their strokes, many of the Ga-Rankuwa patients had contributed significantly towards the support and well-being of the families. Either they were still employed and thus contributed financially or, in traditional African fashion, they cared for the small children and did the household chores while the younger members were away at work during the day. Suddenly a meaningful and worthwhile role that they had played was gone and they had become liabilities to their families. Put in another way, the equilibrium of the family was suddenly and catastrophically disturbed and it was robbed of a contributing source and confronted with a dependent one. Without any community resources to assist the family, stroke patients become increasingly isolated in their relationships with the family system, increasingly discouraged, unhappy and depressed.

Ecologically orientated therapy has two essential features:

- the understanding of patients within their cultural, historical and class background

-    the orientation of the treatment to the matrix of the
     social-ecology of the patients where the individual,
     the family, and the society meet.

The results of this study show that these two features
must be part of an ecological process of rehabilitation for
the Ga-Rankuwa stroke patients.

The way that a physiological phenomenon affects the
individual depends on many factors: the family, the person-
ality of the individual, the way the culture relates to the
illness and so on. None of these factors stands alone -
over time they are woven into a complex fabric. There is
also a dynamic equilibrium between these factors. Thus, as
any one factor changes, so does the other (Harvey & Dym,
1987).

It may be necessary to alter the context surrounding a
problem such as depression before intervening with the
patient himself. Therapy must therefore be directed towards
the total ecological field. Walker (1991) stated that the
ecosystemic therapist is interested in the adaptive fit
between the individual, the family, and the environment.
What was previously defined as "psychology" and subjected to
normalising intervention is now viewed as an attempt to fit
with and to maintain integrity in a problematic environment.
In an ecosystemic model, intervention involves an analysis
of the recursive loops between individual problem bearer,
family, environment, and culture. The goal of intervention
is to disrupt critical and repetitive problem-generating
premises and their resulting behaviours.

An ecological model for the rehabilitation of stroke
patients in the Ga-Rankuwa area, should be formulated around
the following principles:

- The impetus for a stroke rehabilitation service arose from an awareness of patients' needs in the Neurology Department at Ga-Rankuwa Hospital. A rehabilitation service should link the support systems of the neurology ward with informal and formal support systems in the community. The Neurology Department would serve as a point of entry for the patient into the rehabilitation process.

- The conceptualisation of stroke as a disruption of the life line of patients (chapter 7, p.163) should be taken as the conceptual framework for the rehabilitation process. Within the framework three phases can be formulated:

Phase   I   -   premorbid, prehospitalisation social functioning.

Phase   II   -   acute, hospitalisation phase.

Phase III   -   re-entry into the community.

- Phase I ends with the catastrophe of stroke and with the patient's entry into the hospital system. Acute life-saving measures are necessary and the emphasis is on the physical emergency.

- Phase II starts with stroke having disrupted the life and family system of patients in an abrupt, frightening and extreme fashion. Relationships have been cut off and physical autonomy destroyed. The family is confronted with a "patient" rather than the family member they know so well as part of their everyday personal sphere of functioning.

The rehabilitation process should start here. At this stage the emphasis will be three-fold:

*   to obtain an ecological assessment of the personal, biological, and environmental spheres of the

patient prior to the stroke. This would be obtained from the family.

* to create relational connectedness between the patient and the hospital system, as a bridging facility to deal with the crisis of broken relationships in the patient's personal and environmental spheres.

* to create relational connectedness between the patient's family and the hospital system, helping the family to reframe and accept the new identity of their family member.

The existing hospital team would be used in this initial phase of the rehabilitation process. The nursing sister, as the key person in this initial phase of the process, would co-ordinate the "stroke ladies" (p.99), who would be responsible for developing relationships with the patient and his family. Weekly meetings with all the disciplines involved would ensure that a continuous, assessing, diagnostic, therapeutic approach would be utilised. Most important would be the focus on the needs of the patient as a dynamic pivotal point of different, interacting and co-evolving levels of personal, biological and environmental spheres. This would mean that the chairman of the meetings would need to educate and guide the approach away from the fragmented specialisation of the disciplines involved toward a co-ordinated systemic interpersonal involvement with the patient. As the patient emerged from the critical stage of the stroke, ongoing assessment and clarification of changing residual disabilities would help him and his family to become part of a process of reframing and accepting a new and realistic identity. Group meetings of stroke patients in the ward would reinforce relational connectedness within the hospital system around jointly expressed fears, support and plans for the future. Informal community support groups could be created in this way.

- Phase II ends with the patient's discharge into the community. This will be a natural sequence in the rehabilitation process. The patient and his family will by now have moved to a point in the process where initial recovery and assessment of long-term disability have taken place. The team will have evaluated the ecounit to which the patient will return in terms of the personal and environmental spheres. Although formal support groups are scarce in Ga-Rankuwa, informal support networks will be utilised and encouraged wherever possible. Examples of these include:

- existing religious affiliations
- existing friendship groups
- existing family systems
- extension of patient support groups established in hospital
- exploration of previous employment sphere to see whether the patient can return and satisfy job expectations as part of his reframed identity
- linkage to district nurse services for continued support in the biological sphere
- linkage to local welfare offices if needs exist for civil pensions, family and individual casework, and support.

The individuality of each patient's ecounit will be of paramount importance as the transfer from phase II to phase III takes place. Contact with and involvement in the hospital system will extend into phase III as an ongoing facet of the biological sphere. The knowledge that the hospital system is always accessible will act as continuing support linking phase II and phase III.

- In phase III the rehabilitation process extends into linking the patient, characterised by a reframed identity, with new support networks that will assist in meeting or reframing the expectations of the old networks of work,

family and social functioning of the specific ecounit of which the patient is an integral part.

A dynamic, mutually satisfying and connected network of relationships can therefore be reconstituted.

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Appendix A

QUESTIONNAIRE

SECTION D: SOCIAL BACKGROUND

( ) <u>AGE</u>: ☐☐☐   P1

( ) <u>SEX</u>: [Male]   [Female] P2

( ) <u>RACE</u>:   Pedi [1]   Shangaan [4] P3
                Zulu [2]   Venda [5]
                Tswana [3]   Other [6] (specify: ....)

( ) <u>MARITAL STATUS OF PATIENT</u>:

                * NEVER MARRIED [1]
                    * MARRIED [2]
                    * WIDOWED [3]   P4
                    * SEPARATED [4]
                    * DIVORCED [5]
                    * UNKNOWN [6]

( ) <u>WHERE DOES PATIENT LIVE?</u>

                    * HOME [1]
                    * WORK [2]   P5
                    * HOSTEL [3]
                    * APARTMENT [4]
                    * UNKNOWN [5]

( ) <u>WHO DOES THE PATIENT LIVE WITH?</u>

                    * LIVES ALONE [1]
                    * WITH SPOUSE [2]
                    * WITH PARTNER [3]
                    * WITH CHILDREN [4]   P6
                    * WITH PARENTS [5]
                * WITH FAMILY/FRIENDS [6]
                    * UNKNOWN [7]

( ) TOTAL HOUSEHOLD INCOME MONTH?   R _____   Unknown ☐P7

( ) NUMBER DEPENDENTS ON INCOME?   : ☐☐☐☐   Unknown ☐P8

ACCOMMODATION

( ) NO OF ROOMS? ☐☐ Unknown P 9

( ) KITCHEN? Yes No Unknown P10

( ) TOILET INSIDE? Yes No Unknown P11

( ) TOILET OUTSIDE? Yes No Unknown P12

( ) **EMPLOYMENT AT TIME OF STROKE?**

* WORKING 1

* HOUSEWIFE 2

* RETIRED (AGE) 3 P13

* RETIRED (HEALTH) 4

* OFF SICK 5

* UNEMPLOYED 6

* OTHER 7 (SPECIFY: ....)

* UNKNOWN 8

( ) **HANDEDNESS?**

* LEFT 1

* RIGHT 2

*USES BOTH EQUALLY 3 P14

* UNKNOWN 4

( ) **SOCIOECONOMICAL CLASS**

* PROFESSIONAL eg. DOCTOR, LAWYER, ACCOUNTANT 1

* INTERMEDIATE eg. MANAGER, TEACHER, BUSINESSMAN 2

* SKILLED NON-MANUAL eg. SALESMAN, SHOPOWNER 3

* SKILLED MANUAL eg. CRAFTSMAN, WELDER 4

* SEMISKILLED MANUAL eg. DRIVER 5 P15

* UNSKILLED MANUAL eg. LABOURER 6

* HOUSEWIFE 7

* UNKNOWN 8

( ) **EDUCATION**   * NEVER BEEN TO SCHOOL [1]

                               * PRIMARY SCHOOL ONLY [2]

                          * HIGH SCHOOL TO STD 8 [3]

                     * HIGH SCHOOL TO MATRIC [4]   P16

      * UNIVERSITY/TRAINING COLLEGE/TECHNICON [5]

                                    * UNKNOWN [6]

LANGUAGE ABILITY OF PATIENT

( ) **AFRIKAANS?**

        * UNDERSTAND ONLY [1]

            * CAN READ [2]

          * CAN WRITE [3]   P17

           * UNKNOWN [4]

( ) **ENGLISH?**

        * UNDERSTAND ONLY [1]

            * CAN READ [2]

          * CAN WRITE [3]   P18

           * UNKNOWN [4]

( ) **HOME LANGUAGE (SPECIFY** _____)

            * CAN READ [1]

          * CAN WRITE [2]   P19

           * UNKNOWN [4]

SECTION E: PRIOR DISABILITY/HANDICAP

DATE:

| Y Y | M M | D D |

BOWELS:

0 = incontinent ☐

1 = occasional accident ☐

2 continent ☐ P20

BLADDER:

0 = incontinent or catheterised & unable to manage ☐

1 = occasional accident (max 1xper 24 hours) ☐ P21

2 = continent (for over 7 days) ☐

GROOMING:

0 = needs help ☐ P22

1 = independent, face/hair/teeth/shaving ☐

TOILET USE:

0 = dependent ☐

1 = needs some help, but can do something ☐ P23

2 = independent (on & off, dressing, wiping) ☐

FEEDING:

0 = unable ☐

1 = needs help cutting, spreading butter etc. ☐

2 = independent ☐ P24

TRANSFER:

0 = unable ☐

1 = major help (1/2 people, physical) ☐

2 = minor help (verbal or physical) ☐ P25

3 = independent ☐

MOBILITY:

0 = immobile ☐

1 = wheel chair independent including corners etc. ☐

2 = walks with help of 1 person (verbal or physical) ☐ P26

3 = independent (but may use any aid, e.g. stick) ☐

SECTION E: PRIOR DISABILITY/HANDICAP (CONT.)

DRESSING:

0 = dependent ☐

1 = needs help, but can do about half unaided ☐

2 = independent ☐ P27

STAIRS:

0 unable ☐

1 = needs help (verbal, physical, carying aid) ☐

2 = independent up and down ☐ P28

BATHING:

0 = dependent ☐

1 = independent ☐ P29

TOTAL: ☐

NEUROLOGICAL EXAMINATION

NECK STIFFNESS: Absent A   Present B B1

LEVEL OF CONSCIOUSNESS: Alert A   Drowsy B   Stuporose C   Coma D   B2

GLASGOW COMA SCALE:

RESPONSE		SCORE DETAILS	
(A)	**EYE OPENING**		
	None	1	To pain
	To pain	2	Pain applied to sternum or limb
	To speech	3	Non-specific response, not ne= nessarily to command	B3
	Spontaneous	4	Eyes open; not necessarily aware
(B)	**MOTOR RESPONSE**		
	None	1	To pain; limbs remain flaccid
	Extension	2	'Decerebrate': shoulder adducted and internally rotated, forearm pronated
	Abnormal	3	'Decorticate': shoulder flexes/ adducts
	Withdrawal	4	Arm withdraws from pain, shoulder abducts	B4
	Localizes pain	5	Arm attempts to remove supraorbi= tal chest pain
	Obeys commands	6	Follows simple commands
(C)	**VERBAL RESPONSE**		
	No response	1	As stated
	Incomprehensible	2	Moans/groans; no words
	Inappropriate	3	Intelligible, no sustained sen- tences
	Confused	4	Responds with conversation, but confused	B5
	Oriented	5	Aware of time, place, person

SCORE: [   ]

(A)   CEREBRAL INFARCTION (Proven by CT)

CLASSIFICATION

1. **Atherosclerotic infarction unspecified**

   CT proven infarction with **at least** 2 risk factors present in the absence of another pathology **but** doppler and angiography **unavailable.**

2. **Atherosclerosis with stenosis**

   Narrowing $\geq$ 50% in appropriate artery (doppler/angiogram) in the absence of another etiology.

3. **Atherosclerosis without stenosis**

   Plaque or narrowing $<$ 50% stenosis in appropriate artery (doppler/angiogram) with at least 2 risk factors present, but in the absence of any other etiology.

4. **Infarction due to embolism from a cardiac source:**

5. **Lacunar Stroke**

6. **Mixed etiologies** (combinations of the above)

7. **Infarction due to unusual etiologies:**

   (arteritis, spasm, dissection, hypercoagulability etc)

8. **UNDETERMINED**

   (CT proven infarction, with none of the above etiologies)

RISK FACTORS
Age   50 yrs
Hypertension
Diabetes Mellitus
Cigarette smoking
Hypercholesterolaemia

B6

CEREBRAL SITE (Primary lesion)　(INFARCTION)

) Side: ☐

Right	=	1	
Left	=	2	
Middle	=	3	B7
Both	=	4	

No longer seen ☐

Superficial infarct ☐

Deep, small infarct ☐　　　　　　B8

Deep large infarct ☐

Superficial + deep infarct (combined) ☐

Frontal ☐

Parietal ☐

Temporal ☐

Occipital ☐

Fronto-parietal ☐

Tempero-parietal ☐　　　B9

Parieto-occipital ☐

Operculum ☐

Insula ☐

Operculum plus insula ☐

34

)

Caudate ☐
Putamen ☐
Lentiform nucleus ☐
Thalamus ☐

Internal capsule (as whole) ☐
Anterior limb ☐
Genu ☐   B9
Posterior limb ☐

Corona radiata ☐
Centrum semiovale ☐
Corpus callosum ☐

Midbrain ☐
Pons ☐
Medulla ☐
Cerebellum ☐

Vertebrobasilar infarcts

Brainstem ☐
Cerebellum ☐
Superficial ☐
Deep (Thalamus) ☐   B10
Entire PCA territory ☐
Multiple ☐

Size Scale: Absent   ☐

                 < 1cm   ☐

                 ^{1}/2 lobe   ☐

     ^{1}/2 but < 1 lobe ☐ B11

                 = 1 lobe   ☐

                 > 1 lobe   ☐

Mass effect: Absent   ☐

                 Mild   ☐
                                  B12
                 Moderate   ☐

                 Marked   ☐

Haemorrhage: Absent   ☐

                 Mild   ☐

                 Moderate   ☐ B13

                 Marked   ☐

Cortical Atrophy: None   ☐

                 Slight   ☐

                 Moderate   ☐
                                  B14
                 Severe   ☐

Hydrocephalus: None   ☐

                 Minimal   ☐

                 Moderate   ☐ B15

                 Marked   ☐

Diameter in mm ☐☐ B16

No of lesions seen on CT ☐ B17

VASCULAR TERRITORY

			Primary Lesion	Secondary	
Anterior Cerebral Artery	A1	Anterior Internal Frontal	☐	☐	
	M1	Middle Internal Frontal	☐	☐	
	HA	Heubner's Artery	☐	☐	
	CC	Arteries of Corpus Callosum	☐	☐	B18
	P1	Posterior Internal Frontal	☐	☐	
	PAC	Paracentral	☐	☐	
	IP	Superior and Interior Internal Parietal	☐	☐	
Middle Cerebral Artery	PF	Prefrontal	☐	☐	
	AT	Anterior Temporal	☐	☐	
	MT	Middle Temporal	☐	☐	
	IB	Insular Branches	☐	☐	
	PC	Precentral	☐	☐	B19
	LS	Lenticulostriate	☐	☐	
	CS	Central Sulcus	☐	☐	
	PT	Posterior Temporal	☐	☐	
	TO	Temporo-Occipital	☐	☐	
	PP	Anterior and Posterior Parietal	☐	☐	
	AN	Angular	☐	☐	
Posterior Cerebral Artery	LB	Lateral Branch	☐	☐	
	THP	Thalamoperforating,	☐	☐	B20
		Thalamogeniculate and	☐	☐	
		Posterior Choroidal	☐	☐	
	MB	Medial Branch	☐	☐	
	CC	Arteries of Corpus Callosum	☐	☐	
Internal Carotid Artery	ACH	Anterior Choroidal and	☐	☐	
		Additional Small Branches	☐	☐	
		of Internal Carotid Artery	☐	☐	

Watershed infarction   Yes ☐   No ☐

. **VOLUME** _____   **(ICH)**

Diameter in mm _____   B21

Size Scale: $<$ 1cm   ☐

                $<^{1}$/2 lobe   ☐

        ^{1}/2 but $<$ 1 lobe   ☐
                                        } B22
                1 lobe   ☐

                $>$ lobe   ☐

Oedema: Absent   ☐

                Mild   ☐

                Moderate   ☐ B23

                Marked   ☐

Mass-effect: Absent   ☐

                Mild   ☐
                                        } B24
                Moderate   ☐

                Marked   ☐

Break-through
Haemorrhage :   None   ☐

                Intraventricular extension ☐

                Cisternal extension   ☐ B25

                Both   ☐

Number of lesions: ☐   B26

SITE OF HAEMORRHAGE

Frontal ☐

Parietal ☐

Temporal ☐

Fronto-parietal ☐

Parieto-temporal ☐

Parieto-occipital ☐

Caudate nucleus ☐

Putamen ☐

Lentiform nucleus ☐

Thalamus ☐

B27

Internal capsule ☐

Corona radiata ☐

Centrum semiovale ☐

Corpus callosum ☐

Brainstem (unspecified) ☐

Midbrain ☐

Pons ☐

Medulla ☐

VASCULAR TERRITORY INVOLVED

LENTICULO-CAPSULAR   ☐

LOBAR- FRONTAL   ☐

      TEMPORAL   ☐

      PARIETO-OCCIPITAL ☐   B28

THALAMIC   ☐

BRAINSTEM   ☐

CEREBELLAR   ☐

PHYSIOTHERAPY ASSESSMENT

NAME: _____   AGE: ☐☐☐

DATE OF STROKE: _____   STROKE NO: _____

AFFECTED SIDE: ☐L ☐R ☐Both   SEX: ☐M ☐F

DATE OF ASSESSMENT: _____

ASSESSMENT NUMBER: _____

MENTAL STATE: ☐Coma   ☐Stuperous   ☐Normal

COMMUNICATION: Normal ☐
                  Reduced ☐

SENSORY LOSS	IMPAIRED	APPARENTLY NORMAL	UNKNOWN
Arm	W1		
Leg	W2		
Eyesight (Hemia=nopia/Diplopia)	W3		

1

RIVERMEAD MOTOR ASSESSMENT

GROSS FUNCTION

Sit unsupported 1

Lying to sitting on side of bed 2

Sitting to standing 3

Transfer from wheelchair to chair towards unaffected side 4

Transfer from wheelchair to chair towards affected side 5

Walk 10 metres indoors with an aid 6

Climb stairs independently 7

Walk 10 metres indoors without an aid 8

Walk 5 metres, pick up bean bag from floor, turn and carry back 9

Walk outside 40 metres 10

Walk up and down 4 steps (without rails) 11

Run 10 metres 12

Hop on affected leg 5 times, on the spot 13

W4

LEG AND TRUNK

Roll to affected side 1

Roll to unaffected side 2

Half bridge 3

Sit to stand 4

Half crook lie; lift affected leg over side of bed and return 5

Standing step unaffected leg on and off block 6

Standing tap ground lightly 5 times with unaffected foot 7

Lying, dorsiflex ankle with leg flexed 8

Lying, dorsiflex ankle with leg extended 9

Stand with affected hip in neutral position, flex affected knee 10

W5

2

‐

Rivermead Motor Assessment (Continued)

ARM

Lying, protract shoulder girdle with arm in elevation 1

Lying, hold extended arm in elevation with some external rotation 2

Flex and extend elbow, with arms as in 2 3

Sitting, elbow into side, pronate and supinate forearm 4

Reach forward, pick up large ball with both hands and place down. 5

Stretch arm forward, pick up bean bag, release on mid thigh on
affected side, repeat five times 6

As in 6, but using pencil 7

Pick up and release a piece of paper from table top in front 8

Cut putty with knife and fork and put into container 9

Standing, pat large ball on floor with palm of hand 5 times 10

Oppose thumb to fingers individually, over 14 times in 10 seconds 11

Supinate and pronate onto palm of unaffected hand 20 times/10sec. 12

Standing, hand on wall, shoulder 90 flex, elbow extended 13

Place string around head and tie bow at back 14

"Pat-a-cake" seven times in 15 seconds 15

W6

Examination of functional movement activities

0 = Impossible (no cooperation from patient; 2 or more operators required)

1 = Assistance required (patient cooperates; 1 operator required)

2 = Independent with use of aid

3 = Independent

X = Not tested (specify why)

Activities	Notes	Grade	Comments
1. Supine to left lying	Pulling on edge of bed – aid		W 7
2. Supine to (R) lying	Pulling on edge of bed – aid		W 8
3. Bridging	Using unaffected leg to help affected leg to straighten		W 9
4. Sitting balance (60s)	Using hands for support – aid		W10
5. Sitting touch floor and return	Using hands for support going up not down – aid		W11
6. Sitting to standing	Use hands to push down on chair for standing – aid		W12
7. Standing balance (30s)	Must have both feet on floor – use stick; chain–aid		W13
8. Standing on (L) Leg (5s)	Use chair etc – aid		W14
9. Standing on (R) leg (5s) aid	Use stick, chair etc –		W15
0. Standing – get down floor	Use stick etc – aid		W16
1. Half kneel standing (L) (5 sec)	Use stool etc – aid		W17

Activities	Notes	Grade	Comments
3. Half kneel stan- ding (5 sec)	Use of stool-aid		W18
. Get up from floor to standing	Use of stool - aid		W19
5. Transfer - sitting on chair to lying on bed	Use of tripod or stick to transfer - aid. Support on bed/chair - aid		W20
. Walking (15 m)	Type of aid _____ _____		Time/Sec W21
. Stairs (up + down 10 steps)	Type of aid _____ _____		Time/Sec W22
TAL SCORE			

5

MOTOR CLUB ASSESSMENT

Examination of upper and lower limb activity

Scale of movement:

0 = no movement

1 = limited ROM (+ or - for detail)

2 = complete ROM (compare to other side)
    coordination need not be normal but range should be full

X = activity not tested

Positions

a = Good side lying

b = Lying

c = Sitting

d = Standing

Lower limb activities

		a	b	c	d
1.	Hip and knee bending (from straight)	W23-W26			
2.	Knee flexion (Isolate knee flexion - thigh immobilised)	W27-W30			
3.	Dorsiflexion i) Hip and knee straight and supported	W31-W34			
	ii) Hip and knee bent Dorsiflex the ankle from midposition	W35-W38			

Muscle tone in lower limb (Comment)

Upper limb activity	a	b	c	d
4. Shoulder shrugging (Elevation shoulder girdle)		W39- W42		
5. Arm thrusting (Forward extension of arm from flexed position)		W43- W46		
6. Arm lifting (Upward extension of the arm from flexed position)		W47- W50		
7. Forearm supination (Supination of forearm from prone position [Elbow at right angle in front of body])		W51- W54		

8. Wrist cocking
    i) Forearm supported
   ii) Forearm unsupported – straight arm
       raised in front
       Extend wrist from midposition
		W55-
		W58		

9. Fingers extending
    i) Forearm supported
   ii) Forearm not supported – straight arm
       raised in front
       Extend fingers from midposition
		W59-
		W62		

10. Pinch grip
   i) Arm supported   **Score:** Yes No
  ii) Arm unsupported   2   0
		W63-
		W66		

Muscle tone upper limb (Comment)

MOTORICITY INDEX - GUIDELINES

Six limb movements are tested. The patient should be sitting in a chair or on the edge of the bed, but they can be tested lying if necessary. The grading is derived from the Medical Research Council (MRC) grades, but weighted scores are given. The test takes 1-2 minutes to complete and gives a useful summary of limb power.

PINCH GRIP

Ask a patient to grip a 2,5 cm (1") object (cube) between his thumb and forefinger. Object should be on flat surface (e.g. book). Monitor any **FOREARM or SMALL HAND** muscles.
19=drops object when lifted (examiner may need to lift wrist).
22=can hold in air, but very easily dislodged.

ELBOW FLEXION

Elbow flexed to 90±, forearm horizontal and upper arm vertical. Patient asked to bend elbow so that hand touches shoulder. Examiner resists with hand on wrist. Monitor **BICEPS**.
14=IF no movement seen, may hold elbow out so that arm is horizontal.

SHOULDER ABDUCTION

With elbow fully flexed and against chest, patient asked to abduct arm. Monitor contraction of **DELTOID**; movement of shoulder girdle does not count - there must be movement of the humerus in relation to scapula.
19=abducted more than 90±.

ANKLE DORSIFLEXION

Foot relaxed in plantar flexed position. Patient asked to dorsiflex foot ("as if standing on your heels"). Monitor **TIBIALIS ANTERIOR**.
14=less than 50% of full range of dorsiflexion.

KNEE EXTENSION

Foot unsupported, knee at 90±. Patient asked to extend(straighten) knee to touch examiner's hand held level with knee. Monitor contrction of **QUADRICEPS**.
14 = less than 50% of full extension (i.e. 45± only)
19 = knee fully extended, but easily pushed down.

HIP FLEXION

Sitting with hip bent at 90±. Patient asked to lift knee towards chin. Check for associated (trick) movement of leaning back but placing hand behind back and asking patient not to lean back. Monitor contraction of **QUADRICEPS**.
14=less than full range of possible flexion (check passive movement).
19=fully flexed, but easily pushed down.

MORTRICITY INDEX

Scoring:

(a) Test 1:

0	No movement
11	Beginnings of prehension (any movement finger or thumb)
19	Grips cube, but unable to hold against gravity
22	Grips cube, held against gravity but not against neck pull
26	Grips cube against pull, but weaker than other side
33	Normal grip

(b) Test 2 - 6:

0	No movement
9	Palpable contraction in muscle, but no movement
14	Movement seen, but not full Rom against gravity
19	Movement - full Rom against gravity, but unable to move against minimal resistance
25	Movement against resistance, but weaker than other side
33	Normal power

Tests (in sitting)

Arm

Test 1:   Pinch grip - 2,5cm cube between thumb and
            forefinger   W67 _____

Test 2:   Elbow flexion from ninety degrees voluntary
            contraction   W68 _____

Test 3:   Shoulder abduction: from against chest   W69 _____

Leg

Test 4:   Ankle dorsiflexion, from plantar flexion   W70 _____

Test 5:   Knee extention: from ninety degrees voluntary
            contraction   W71 _____

Test 6:   Hip flexion, usually from ninety degrees   W72 _____

Arm Score = Test 1 + 2 + 3 + 1 (+1 to make 100)

          = ▢ + ▢ + ▢ + 1

                                                             W73
          = ▢

Leg score = Test 4 + 5 + 6 + 1 (+1 to make 100)

          = ▢ + ▢ + ▢ + 1

                                                             W74
          = ▢

Side score= Arm + leg/2 = ▢ + ▢ /2

                                                             W75
          = ▢

FUNCTIONAL AMBULATION CATEGORIES

Number	Category	Guidance/criteria
0	Non-functional (unable	Patient cannot walk, or requires help of two or more people
1	Dependent – level 2	Patient requires **firm continuous support** from one person who helps carrying weight and with balance
2	Dependent – level 1	Patient requires **continuous or intermittent support** from one person to help with balance or coordination
3	Dependent – supervision	Patient requires **verbal supervision or stand-by help** from one person **without physical contact**
4	Independent – on level	Patient can walk **independently on level ground,** but requires help on stairs, slopes or uneven surfaces
5	Independent	Patient can walk **independently anywhere**

NOTE: This classification ignores the aid used

SCORE = ☐   W76

WALKING SPEED AND ENDURANCE (timed tests)

TEN METRE TIMED WALK

Ask the patient to walk a measured ten metres **at his own preferred speed, using any aid wished (including support from a person).** Time him in seconds.

Express result as metres/sec or time in seconds. Normal results depend upon age, and patients should usually **DO BETTER THAN:**

```
60 yrs 10 secs     1 metre/sec
60 - 69 yrs        11 secs  0.8 m/sec
70 + 15 secs       0.6 m/sec
```

= ☐ _____Metres/Sec W77

SIX MINUTE WALK TEST

The patient is asked to walk up and down a measured 20 metre length of corridor for 6 minutes, or until he feels unable to continue, whichever is the shorter. (i.e. maximum time is 6 minutes). He is encouraged to go at his own preferred speed, using any aid he wishes. The distance covered (to nearest 10 metres), and the time taken if less than 6 minutes, is recorded.

Results can be expressed as:

Distance covered (and time taken if more than 6 minutes)
Speed as Dist/6 minutes **OR** Dist/time if more than 6 minutes

Normal data:

    None available for comparative group

If less than 6 minutes

_____Metres/Time **W78**

If 6 minutes

_____ Metres **W79**

APHASIA SCREENING ASSESSMENT

A. **Preliminary conversation**

-   Response to greeting. (Q. 'How are you today')

-   Response with 'yes' or 'no'. (Q. 'Have I tested you before')

-   'What is your full name?'

-   'What is your address'

Open ended conversation - "What kind of work were you doing before you became ill?" "Tell me what happened to you?"

B. **AUDITORY COMPREHENSION OBJECTS**

1. 'Point to the one I say'

    chair

    spoon

    shoe

    apple

    pen

    knife

2. **Body part identification**

    eye

    ear

    nose

    mouth

    knee

    elbow

Phrases

1. Show me washing

2. Show me running

3. Show me drinking

4. Show me eating

Understanding of Logical-Grammatical structions
Simple

1. Put the spoon in the cup

2. Put the cup on top of the key

Compare constructions (True or False)

1. A fly is bigger than a cow

2. An elephant is smaller than a fly

Expressive Ability

A. Articulation of Speech sounds:

B. **Repetitive speech**
   Single word

   Cat

   Dog

   Man

   House

   Apple

Word series: (3-5)

1. Cat

2. Hat

3. Dog

1. Hat

2. Boy

3. Mouth

4. Chair

1. Flower

2. Pen

3. Car

4. Tree

5. Dog

Naming function
Object

1. chair
   spoon
   shoe
   apple
   pen
   knife

2. **Body parts**

   Ear
   Nose
   Mouth
   Knee
   Elbow

3. **Pictures**

   book
   comb
   bicycle
   kettle
   horse

Naming from description

1.   What do you wear when you are cold

2.   What is the thing you drink from?

Narrative Speech

1.   **Automatic Speech**

   a)   count one to ten

   b)   tell me the days of the week

   c)   tell me the months of the year

Predictative speech

   a)   What did you have for lunch today?

   b)   Tell me about your family

Complex grammatical expression:

a)   Winter is very .... (cold, blue, sick)

b)   Water is very .... (wet, dry, pink)

Writing function:

1.   Copy these shapes (set of pictures)

2.   Copy these letters (set of letters)

3.   Write your name and address

4.   Write these words that I say

Reading Function

1. What is this letter (set of letters)

    P ...   M ...   A ...   T ...   O ...   K ...

2. Read this word

3. Read this sentence

Arithmetic Function

What is the answer to this sum?

Addition: 2 + 2 = ____ ;   5 + 4 = ____

                       9 + 3 = ____ ;   3 + 2 = ____

Multiplication: 2 x 4 = ____ ; 3 x 3 = ____ ;   5 x 4 = ____

                       3 x 6 = ____ ; 12 x 2 = ____

Subtraction: 2 - 1 = ____ ; 10 - 5 = ____ ; 15 - 6 - ____

                       28 - 9 = ____

Division: 4 - 2 = ____ ; 20 - 5 = ____

Test for Oral Apraxia

Look for tremor (T);   paresis (P);   deviation (D);

perseverance (P$^+$);   salivation (S);   Groping (G);

Normal (N)

Do what I ask you to do

1.   Show me your teeth

2.   Stick out your tongue

3.   Blow up your cheeks

4.   Smile

5.   Bite your lower lip

Oral Peripheral Examination

-    lips (spread; purse; seal; alternating movement)

-    Tongue (elevate;   depress;   lateral;   lick;   alternating movement

-    Soft palate (movement on a:)

-    DDK (pntnkn)

-    drooling

-    feeling/drinking

-    swallowing

-    voicing (cough; [a:] for 15 seconds)

-    volume (1-5) with increasing volume

-    prosody in speech lpihh regular

SUMMARY OF O.P.E.:

SUMMARY OF SCREENING EVALUATION:

4

APPENDIX 1

DYSPHAGIA:

Criterion: If patient is unable to drink 50 ml water, or if he chokes more than once during drinking on 2 occasions, he fails the test.

- Repeat test every 48 hours during first week after stroke, then twice a week until patient has no difficulty in swallowing 50 ml water.

- Omit testing patients who have choked on fluids that day

- Check for chest infections

1. **SIDE OF HEMIPARESIS:** ☐R ☐L ☐Bilateral ☐Unknown

   W80

2. **Conscious:** ☐

   Stuporose: ☐   W81

   Comatose: ☐

3. **Handedness:** ☐R ☐L ☐Both ☐Unknown

   W82

4. **C.T. Scan:** Haemorrhage ☐   Infarction ☐   Normal ☐

   W83

LANGUAGE ASSESSMENT

DYSARTHRIA: [None]   APRAXIA OF SPEECH

[Mild] W84   [Yes]   [No]

[Severe]   W85

(UNTESTABLE   [ ]   –   REASON _____)

APHASIA: [None]

[Expressive]

[Receptive]   W86

[Conduction]

[Global]

(UNTESTABLE   –   REASON _____)

DYSPHAGIA: [Yes]   [No]   W87

NEUROPSYCHOLOGICAL ASSESSMENT

A. **GENERAL INFORMATION**

NAME: _____

HOSPITAL NO: _____ STROKE REHABILITATION NO: _____

SEX: [Male] [Female]

AGE: _____

AFFECTED SIDE: [Left] [Right] [Bilateral] W88

STATE OF CONSCIOUSNESS: [Coma] [Semi-comatose] [Consciousness] W89

COMMUNICATION: [Normal] [Reduced]   W90

B. **EVALUATION**

			Y Y M M D D
1.	Social Functioning Examination:	DATE:	□□□□□□
2.	Wimbledon:	DATE:	□□□□□□
3.	Taylor manifest anxiety scale:	DATE:	□□□□□□
4.	HAD Scale:	DATE:	□□□□□□
5.	Mini-Mental State	DATE:	□□□□□□
6.	Albert's Test at Unilateral Neglect	DATE:	□□□□□□
7.	Emotional Liability	DATE:	□□□□□□
8.	Death and Dying	DATE:	□□□□□□

MRF _____

TOR _____

3 TIME _____ : _____

1 DATE _____

4 TYPE OF VISIT _____

763 Type of F.U._____

6 PHYSICIAN CODE_____

SOCIAL FUNCTIONING EXAMINATION

(For question 1-28, not applicable is scored as "3")

1044._____ Exam No.

1046 _____ Informant
    1 = Patient   W91
    2 = Closest other - Spouse
    3 = Closest other person - not spouse
    4 = Other relative (Specify) _____
    5 = Other friend or acquaintance (Specify) _____

I.   Relationship with significant other

Who are you closest to? _____
How close are you?

Is _____ affectionate?   W92
Is _____ considerate of your feelings?

1047 _____ **1.   Rate closeness of relationship**

Do you and _____ have separate interests or activities?
What kind of interests and activities?
Do you or _____ depend on others to help with everyday acti-
vities?

1048 _____ **2.   Rate independence**   W93.

What do you and _____ usually disagree about?
How often?
Resolution

1049 _____ **3.   Rate compatibility**   W94

(If applicable)
Are there difficulties in your sexual relationship?
Satisfaction
Extra-marital relationship

1050 _____ **4. Rate sexual adjustment** W95

How happy have you been with _____?
Has _____ been the kind of _____ that you wanted?

1051 _____ **5. Rate satisfaction with relationship** W96

II. Relationship with spouse or other partner in the household
    (Ask questions below only if spouse, common-law, or boy-
    friend/girlfriend of opposite sex and living in the house-
    hold is not named in I.)

Do you have a close relationship with _____?
Is person affectionate?
Is person considerate of your feelings?

1052 _____ **6. Rate closeness** W97

Do you and _____ have seperate interests and activities?
What kind of activities?
Are you or _____ dependent on others for routine daily acti-
vities?

1053 _____ **7. Rate independence** W98

What do you and _____ usually disagree about?
How often?
Resolution

1054 _____ **8. Rate compatibility** W99

Are there difficulties in your sexual relationship?

1055 _____ **9. Rate sexual adjustment** W100

How satisfied are you with this relationship?

1056 _____ **10. Rate satisfaction** W101

III. Relationship with children — for patients who have living
     children (and/or stepchildren)

Do you have a close relationship with any of your children
(and/or stepchildren)?
Are you and they affectionate?
How often do you see them or talk with them?

1057 _____ **11. Rate closeness of parent-child relationship** W102

IV. Family relationships

Does your family pull together in good times and bad?
Give an example
Do you have family reunions?
Has someone been a major source of strength and support for
the family over the years? Is that person available now?
Has someone taken over that role?

1058 _____ **12. Rate family solidarity** W103

V.   Other persons in household (if person lives with others in a household arrangement)

Are you and others in the household close?
Do you spend much time together?
Do they help with household chores?

1059 _____   13.   **Rate relationship with household others**   W104

VI.   Home and family responsibilities

What are your respondibilities at home?
Are you responsible for the care of others, at your home or elsewhere?
Who does most of the household work?
Do others look to you for care and help?

                                                                  W105
1060 _____   14.   **Rate performance of home and family responsibilities**

Is there anybody in your family who is now sick or disabled or needs a lot of care?

Who? _____   Who takes care of that person? _____

1061 _____   15.   **Rate family energy devoted to other ill or dependent members**   W106

VII. Work experience

Do you (did you) enjoy your job?

1062 _____   16.   **Rate satisfaction with work experience**   W107

1063 _____   17.   **Rate presumed loss of job satisfaction due to present illness**   W108

VIII.   Social activities

What are your social and leisure activities?
Do you belong to any groups, organizations, church?
How often do you attend?
How important are these groups to you?
What kinds of things do you do there?
What do you and your friends do together?
How often?

1064 _____   18.   **Rate formal groups in patient's life**   W109

1065 _____   19.   **Rate informal groups in patient's life**   W110

IX.   Spiritual beliefs

Have your religious beliefs helped you through difficult times?
In what way?

1066 _____ 20. Rate religious beliefs in coping with difficulties W111

X. Economic practices

How financially comfortable are you?

1067 _____ 21. Rate usual financial security W112

1068 _____ 22. Rate stability of family income in light of present ill-
ness. W113

XI. Living environment

What is it like where you live?
What would you most like to change about where you live?

1069 _____ 23. Rate (physical) adequacy of the residence W114

What is your neighbourhood like?
What would you most like to change about your neighbourhood?

1070 _____ 24. Rate adequacy of neighbourhood W115

XII. Use of community resources

What social agencies do you have dealings with?
What is the nature of your contact with those agencies?

1071 _____ 25. Rate use of social agency services W116

XIII. Health and illness experiences

How is the health of family members?
Where do you go for checkups?

1072 _____ 26. Rate general health of the family W117

When family members become ill, who do they go to for medical
care?
What problems arise in following a medical care plan?

1073 _____ 27. Rate health practices W118

Has anybody in your family been sick for a long time or needed
a lot of care?

Who?_____ Who took care of that person? How was the family
affected by all this? W119

1075 _____ 28. Rate family coping with prolonged illness/disability

---

1075 _____ No points scored - Social Functioning

1076 _____ No. applicable questions - Social Functioning

1077 _____ Score Functioning Exam

THE WIMBLEDON SELF-REPORT SCALE

NAME: _____ DATE: _____

The words in capital letters below describe how people sometimes feel. With each word there are four choices – (a), (b), (c) and (d) – that can be used to show how often you have had that feeling. Please indicate how often you have had each feeling **in the past 6–7 days** by underlining one of these choices each time.

1. WORTHLESS (GO TLHOKA MOSOLA)   W120
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

2. RELAXED (GO PHUTHOLOGA)   W121
    (a) Not at all   (b) Only occasionally (c) Quite often   (d) Most of the time

3. DESPERATE   W122
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

4. PANICKY (GO TSHOGA)   W123
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

5. HELPLESS (GO SA ITSE SE O KA SE DIRANG)   W124
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

6. QUILTY (GO NNA MOLATO)   W125
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

7. CONFIDENT (GO ITSHEPA)   W126
    (a) Not at all   (b) Only occasionally (c) Quite often   (d) Most of the time

8. DISCOURAGED (GO KGOBEGA MARAPO)   W127
    (a) Most of the time   (b) Quite often   (Only occasionally   (d) Not at all

9. MISERABLE (GO TLHONAMA)   W128
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

10. LONELY (GO JEWA KE BODUTU)   W129
    (a) Most of the time   (b) Quite often   (c) Occasionally   (d) Not at all

11. IRRITABLE (GO TENEGA-TENEGA)   W130
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

12. GLOOMY (GO SA ITUMELA)   W131
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

13. NERVOUS   W132
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

14. HAPPY (GO ITUMELA)   W133
    (a) Not at all   (b) Only occasionally (c) Quite often   (d) Most of the time

15. ANNOYED (GO TENEGA)   W134
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

16. UNWANTED (GO SA BATLEGE)   W135
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

17. TENSE (GO SA PHUTHULOGA)   W136
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all
18. STUPID (BOTLAELA)   W137
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

19. AS IF I AM BEING PUNISHED FOR SOMETHINE (JAAKA O KARE KE OTLHAELWA SEGWE)   W138
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

20. IN GOOD SPIRITS (MOYA O MONTLE)   W139
    (a) Not at all   (b) Only occasionally (c) Quite often   (d) Most of the time

21. FULL OF REGRETS (GO ITSHOLA)   W140
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

22. FIGHTENED (GO TSHOGA))   W141
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

23. AS IF MY LIFE HAS BEEN RUINED (JAAKA E KETE BOTSHELO JWAME BO SENTSWE)   W142
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

24. WORRIED ABOUT MY FUTURE (GO TSHWENYEGELA BOKAMOSO JWA ME) W143
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

25. CHEERFUL (GO ITUMELA)   W144
    (a) Not at all   (b) Only occasionally (c) Quite often   (d) Most of the time

26. USELESS (GO TLHOKA MOSOLA)   W145
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

27. FED UP (GO TENEGA)   W146
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

28. HOPELESS (GO TLHOKA TSHOLOFELO)   W147
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

29. ANGRY (GO NGALA/GO TENEGA)   W148
    (a) Most of the time   (b) Quite often   (c) Only occasionally   (d) Not at all

30. CONTENT (GO KGOTSOFALA)   W149
    (a) Not at all   (b) Only occasionally (c) Quite often   (d) Most of the time

Please check you have answered all the questions

Thank you

HAD Scale

Name: Date:

Doctors are aware that emotions play an important part in most illnesses. If your doctor knows about these feelings he will be able to help you more.

This questionnaire is designed to help your doctor to know how you feel. Read each item and place a firm tick in the box opposite the reply which comes closest to how you have been feeling in the past week.

Don't take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought-out response.

Tick only one box in each section

I feel tense or 'wound up':
Most of the time W150
A lot of the time ....
Time to time, Occasionally ....
Not at all ....

I still enjoy the things I used to enjoy:
Definitely as much ....
Not quite so much ....
Only a little ....
Hardly at all ....

I get a sort of frightened feeling as if something awful is about to happen:
Very definitely and quite badly ....
Yes, but not too badly ....
A little, but it doesn't worry me ....
Not at all ....

I can laugh and see the funny side of things:
As much as I always could ....
Not quite so much now ....
Definitely not so much now ....
Not at all ....

Worrying thoughts go through my mind:
A great deal of the time ....
A lot of the time ....
From time to time but not too often ...
Only occasionally ....

I feel cheerful:
Not at all W155
Not often ....
Sometimes ....
Most of the time ....

I can sit at ease and feel relaxed:
Definitely ....
Usually ....
Not often ....
Not at all ....

W150
W151
W152
W153
W154
W155
W156

I feel as if I am slowed down:
Nearly all the time ....
Very often ....
Sometimes ....
Not at all ....

I get a sort of frightened feeling like 'butterflies' in the stomach:
Not at all ....
Occasionally ....
Quite often ....
Very often ....

I have lost interest in my appearance:
Definitely ....
I don't take so much care as I should.....
I may not take quite as much care ....
I take just as much care as ever ....

I feel restless as if I have to be on the move:
Very much indeed ....
Quite a lot ....
Not very much ....
Not at all ....

I look forward with enjoyment to things:
As much as ever I did ....
Rather less than I used to ....
Definitely less than I used to ....
Hardly at all ....

I get sudden feelings of panic:
Very often indeed ....
Quite often ....
Not very often ....
Not at all ....

I can enjoy a good book or radio or TV programme:
Often ....
Sometimes ....
Not often ....
Very seldom ....

W157
W158
W159
W160
W161
W162
W163

Do not write below this line

HAD Scale

Name: Date:

A

	3
	2
	1
	0

D

3	
2	
1	
0	

D

0	
1	
2	
3	

A

	0
	1
	2
	3

A

	3
	2
	1
	0

D

3	
2	
1	
0	

D

0	
1	
2	
3	

A

	3
	2
	1
	0

A

	3
	2
	1
	0

D

0	
1	
2	
3	

D

3	
2	
1	
0	

A

	3
	2
	1
	0

A

	0
	1
	2
	3

D

0	
1	
2	
3	

FOR HOSPITAL USE   Patients Name/No:

D(8-10) _____

A(8-10) _____

TAYLOR MANIFEST ANXIETY SCALE

1.	No more nervous than others	W164	True/False
2.	Work under great strain	W165	True/False
3.	Can't keep mind on one thing	W166	True/False
4.	Feelings more easily hurt	W167	True/False
5.	Often find myself worrying	W168	True/False
6.	Usually calm/not upset	W169	True/False
7.	Anxious almost all the time	W170	True/False
8.	Happy most of the time	W171	True/False
9.	Too restless to sit in chair	W172	True/False
10.	Can't overcome difficulties	W173	True/False
11.	Feel useless at times	W174	True/False
12.	Hard to keep mind on a job	W175	True/False
13.	More self-conscious than most	W176	True/False
14.	I take things hard	W177	True/False
15.	I'm a very nervous person	W178	True/False
16.	Life often a strain for me	W179	True/False
17.	At times think I'm no good	W180	True/False
18.	Not at all confident	W181	True/False
19.	Feel I'm going to crack up	W182	True/False
20.	Don't like to face difficulty	W183	True/False

MINI-MENTAL STATE

1. ORIENTATION

    1.1   What is the

        1.1.1   Year/Ngwaga   ☐   W184

        1.1.2   Season/Letlha   ☐   W185

        1.1.3   Date|Go dikae   ☐   W186

        1.1.4   Day/Labokae   ☐   W187

        1.1.5   Month/Kgwedi   ☐   W188

    1.2   Where are we

        1.2.1   Town/Toropo   ☐   W189

        1.2.2   Country/   ☐   W190

        1.2.   Province/   ☐   W191

        1.2.4   Hospital/Sepetlele ☐   W192

        1.2.5   Ward/Wato   ☐   W193

2. REGISTRATION

Name objects : Bread/Borotho
                  Shirt/Hempe
                  Cup /Kopi

TRIALS

    [2.1]   [2.2]   [2.3]   [2.4]   [2.5]

☐ ☐ ☐   ☐ ☐ ☐   ☐ ☐ ☐   ☐ ☐ ☐   ☐ ☐ ☐

  W194   W195   W196   W197   W198

3. ATTENTION AND CALCULATION

Serial 2's and 7's

3.1.1 [2]   3.1.2 [4]   3.1.3 [6]   3.1.4 [8]   3.1.5 [10]

3.2.1 [7]   3.2.2 [14]   3.2.3 [21]   3.2.4 [28]   3.2.5 [35]

                                  W199

4. **Recall**

Without saying what, they are again asked;

Bread/Borotho   4.1 ☐   W200

Shirt   4.2 ☐   W201

Cup /Kopi   4.3 ☐   W202

5. **Language**

   5.1   Show/Bontsha

               Pen/Pene 5.1.1 ☐   W203

               Watch   5.1.2 ☐   W204

   5.2   Follow Command

       Take a paper in your right hand 5.2.1 ☐   W205
       Tsaya pampiri ka letsogo la moja

       Fold it in half   5.2.2 ☐   W206
       E mene ka bogare

Put it on the floor   5.2.3 ☐   W207
E beye fa fatshe

6. Close your eyes   6.1   ☐   W208
   Tswala matlho

7. Copy a design
   Kopisa setshwantsho
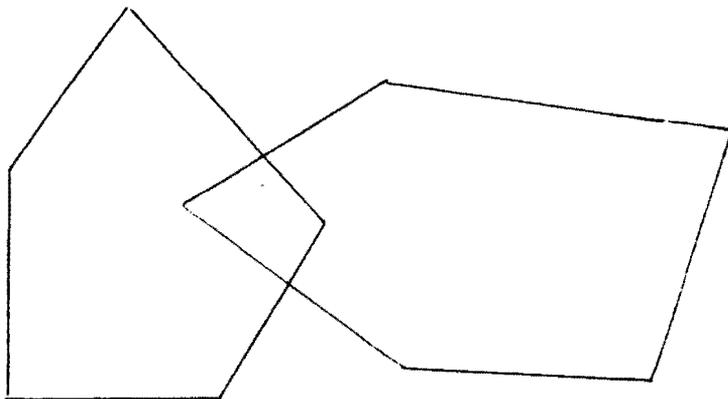
W209

ALBERT'S TEST AT UNILATERAL NEGLECT
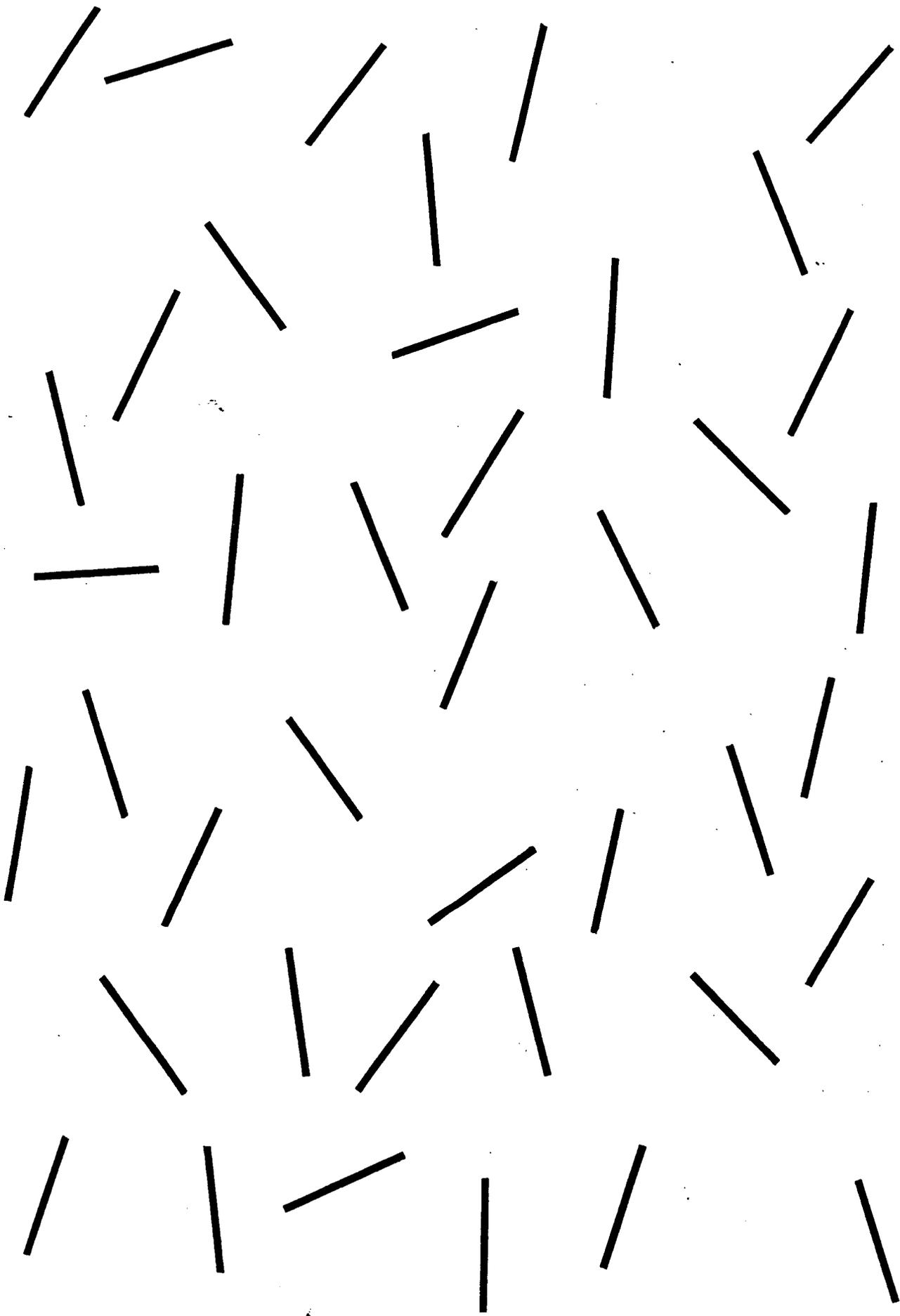
EMOTIONAL LIABILITY

1. Have you been crying more than last month?   Y232

2. Does the weeping suddenly come without warning? Y233

3. If crying comes can you control yourself and stop yourself
    from crying?
                                                   Y234

OCCUPATIONAL THERAPY NEUROLOGY

EVALUATION NO. _____

A. GENERAL PATIENT INFORMATION

1. Name: _____

2. Hospital No. _____ Stroke No. _____

3. Sex: | Male | Female |

4. Age: _____

5. Affected side: | Left | Right | Bilateral |

6. Dominance: | L | R |

7. State of consciousness: | Coma | Semi-comatose | Conscious |

W211

B. EVALUATION

1. Galveston   DATE: _____

2. Frenchay arm test DATE: _____

3. 9-Hole peg test   DATE: _____

4. Barthel   DATE: _____

1. GALVESTON ORIENTATION AND AMNESIA TEST

1. What is your name (2) _____ ▭

    When were you born? (4) _____ ▭

    Where do you live? (4) _____ ▭

2. Where are you now? (5) City _____ ▭

                             Hospital (5) _____ ▭
    (Unnecessary to state name of hospital)

3. On what date were you admitted to this hospital(5)_____ ▭

    How did you get here? (5) _____ ▭

4. What is the first event you can remember **after** the
    injury? (5) _____ ▭

    Can you describe in detail (e.g. date, time, companions)
    the first event you can recall after the injury? (5)

    _____ ▭

5. Can you describe the last event you recall **before** the
    accident? (5) _____

    _____ W212 ▭

    Can you describe in detail (e.g. date, time, companions)
    the first event you can recall **before** the injury? (5)

    _____ ▭

6. What time is it now? _____ ▭
    (-1 for each ^{1}/2 hour removed from correct time to
    maximum of -5)

7. What day of the week is it? _____ ▭
    (-1 for each day removed from correct one)

8. What day of the month is it? _____ ▭
    (-1 for each day removed from correct date to maximum
    of -5)

9. What is the month? _____ ▭
    (-5 for each month removed from correct one to maximum
    of -15)

10. What is the year? _____ ▭
    (-10 for each year removed from correct one to maximum
    of -30)

                                   Total Error Points ▭

                Total Goat Score (100 total error points) ▭

                        76-100 = NORMAL
                        68-75   = BORDERLINE
                        65   = IMPAIRED

2. <u>FRENCHAY ARM TEST</u>

Time: Less than 3 minutes
Use affected arm and hand

	PASS 1	FAIL
a) Stabilise a ruler, while drawing a line with pencil in other hand. Ruler must be held firmly to pass W214		
b) Grasp cylinder, set on its side approximately 15 cm from table edge. Lift it about 30 cm and replace without dropping W215		
c) Pick up glass, half full of water positioned about 15 to 30 cm from edge of table. Drink water and replace without spilling W216		
d) Remove and replace sprung clothes peg from dowel. Base is 15 to 30 cm from table edge. Not to drop peg or knock dowel over W217		
e) Comb hair (or imitate). Must comb across top, down the back and down each side of head W218		
TOTAL SCORE		
/5		

3. 9 HOLE PEG TEST

Instruction: Take 9 dowels from table top and put it into the 9 holes

Cut-off at 50 seconds!

Score: a)   Time for 9 pegs
(only when under 50 seconds)

b)   Number of pegs
50 seconds

c)   Number of pegs per second

W219

W220

W221

The BARTHEL ADL Index

DATE

BOWELS
- 0 = incontinent
- 1 = occasional accident
- 2 = continent

W222

BLADDER
- 0 = incontinent or catheterised & unable to manage
- 1 = occasional accident (max 1x per 24 hours)
- 2 = continent (for over 7 days)

W223

GROOMING
- 0 = needs help
- 1 = independent, face / hair /teeth / shaving

W224

TOILET USE
- 0 = dependent
- 1 = needs some help, but can do something
- 2 = independent (on & off, dressing, wiping)

W225

FEEDING
- 0 = unable
- 1 = needs help cutting, spreading butter etc.
- 2 = independent

W226

TRANSFER
- 0 = unable
- 1 = major help (1-2 people, physical)
- 2 = minor help (verbal or physical)
- 3 = independent

W227

MOBILITY
- 0 = immobile
- 1 = wheel chair independent including corners etc.
- 2 = walks with help of 1 person (verbal or physical)
- 3 = independent (but may use any aid, e.g. stick)

W228

DRESSING
- 0 = dependent
- 1 = needs help, but can do about half unaided
- 2 = independent

W229

STAIRS
- 0 = unable
- 1 = needs help (verbal, physical, carrying aid)
- 2 = independent up and down

W230

BATHING
- 0 = dependent
- 1 = independent

W231

TOTAL