

SURVIVAL AND REHABILITATION

FOLLOWING ACUTE STROKE

SURVIVAL, DISABILITY AND SUPPORTIVE
HEALTH CARE NEED AND UTILIZATION
FOLLOWING AN INITIAL ACUTE STROKE

TITLE

SURVIVAL AND REHABILITATION
FOLLOWING ACUTE STROKE

By

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"The Damage done to the brain by a stroke is rather like that done to a town by a bomb It begins with terrifying suddenness and does its damage instantly; but the aftermath of recovery can be a long drawn-out, tedious process"

(CHSA News, 1986).

ABSTRACT

The outcome of acute stroke in 210 white adult patients admitted to Addington Hospital, Durban in 1983 and 1984 was investigated by means of retrospective case-note review. In addition, the level of functional independence of 35 people who, at the time of this study, were survivors of an initial acute stroke was assessed through household survey.

The study was considered relevant and worthwhile for several reasons:

1. Stroke is an important contributor to morbidity and mortality in Whites in South Africa, however, little information is available in respect of the outcome of sufferers of stroke who were admitted to the study hospital.
2. Knowledge of the needs of survivors of acute stroke is necessary if appropriate health care is to be provided.
3. Few community studies have been done in South Africa in which the status of stroke survivors has been established.

The principle aims of the study were therefore:

1. To establish the survival of patients with acute stroke who were admitted to the study hospital.
2. To determine in survivors of an initial stroke their residual functional loss and hence to identify the supportive health care needs of this group.

The most important findings of the study were as follows:

1. Of the 286 stroke admissions identified through the hospital's medical record retrieval system, stroke diagnosis according to the study definition could be confirmed in only 210 (73.4%) cases due to misplaced files or miscoded diagnoses. The need for improvement in the method of recording, storing and retrieving of patient information is indicated by these findings.

2. The overall hospital fatality rate for stroke was 54%. Mortality was highest in the first week after admission (71%).
3. The number of males and females, in respect of whom a final diagnosis of stroke was attributed, was almost equal. A significant difference ($p < .0002$) in respect of age was noted between the sexes. The mean age of onset of stroke was 62.9 and 70.0 years for males and females respectively.
4. The major diagnostic categories (haemorrhagic or occlusive) of stroke could only be ascertained in respect of 30% of cases. This was due to incomplete recording of clinical findings, and possibly, due to the absence of resident brain-scanning facilities at the time.
5. Analysis of the results of the household interviews indicated that:-
 - (i) Of the 36 patients interviewed 13 (37%) were found to be fully independent in self-care and were mobile outside of the home.
 - (ii) The patients' potential for improvement in an appreciable number of cases had been under-estimated by the hospital staff.
6. Patient adjustment following hospital discharge appeared adversely affected by:-
 - (i) Inadequate preparation for discharge, especially where patients were returning to their own homes.
 - (ii) Inadequate explanation given to patients and their families of the meaning and implications of stroke.
 - (iii) The non-involvement of the family during the period of hospitalization.
 - (iv) The absence of appropriate follow-up after discharge.
7. Stroke onset was a traumatic experience in all cases. Amongst the most important reasons given for reduced life-satisfaction post

stroke were confinement to the home, reduced independence and unresolved loss (eg death of spouse, forced retirement).

8. In some cases it was felt that social isolation, general ill-health and old age were more significant problems in the lives of patients than the stroke itself. The advent of stroke merely exaggerated these problems.
9. The advantage of administering a standardized functional assessment at intervals during the rehabilitation of the patients became increasingly clear as the study progressed. It is proposed that functional assessment be considered as important as clinical assessment in the management of stroke patients.
10. Recommendations have been submitted concerning rehabilitation and the provision of supportive services for stroke patients. As the role of the nurse in short and long-term care is central to successful stroke outcome, emphasis has been placed on her role in the team.

The main conclusions formulated in the study were: -

1. Mortality from stroke is high but in survivors an appreciable proportion maintained functional independence.
2. Preparation of patients and their families is important to adjustment following discharge from hospital.
3. Supportive services are important to the maintenance of the stroke patient in the home environment.
4. A team approach, consisting of a wide range of health professionals is appropriate to the management of stroke.
5. Functional assessment is an important component of the clinical examination and should be done prior to discharge and subsequently at regular intervals to assess the patient's competence to exist in the current domestic environment.

INTRODUCTION

Cerebrovascular disease is a major contributor to morbidity and mortality in South Africa⁽¹⁰²⁾ and stroke is an important component of this disease group.⁽¹¹²⁾ Irrespective of its importance, little has been published in the South African literature in respect of either the occurrence or outcome of stroke.

In South Africa acceptably accurate disease-specific mortality data and statistics are available at the national level for the White, Coloured and Asian population groups. This is not however the case for Blacks.⁽¹⁰²⁾ While national statistics are important, regional statistics are of greater relevance in respect of the planning and delivery of health care resources and services. Regional statistics are generally unavailable in respect of Blacks due to the lack of regional population denominators. For Whites both denominator and numerator values are generally available in respect of most disease categories.

In the case of Whites, and to a lesser degree the Asian and Coloured population groups, epidemiological morbidity surveys based upon health services are complicated by the accessibility to and utilisation of private medical facilities. Patient information in respect of these facilities is not available for research purposes. For this reason population-based statistics concerning the incidence and outcome of stroke are unavailable for these population groups.

The present study refers only to Whites who suffered an initial acute stroke and who were admitted to Addington Hospital in Durban during the years 1983 and 1984. This is not a population-based study and therefore incidence rates, for the reasons given above, were not determined.

Attitudes to the outcome of stroke, by both the public and health professionals, are commonly negative.⁽⁷⁷⁾ In the absence of published information regarding the long term effects of stroke it was considered important to establish whether or not pessimism concerning the outcome of stroke was justified.

Stroke outcome is important not only in relation to death or survival but also in respect of the quality of life of survivors. Adjustment to

changed physical circumstances is required by the stroke survivor and his family, in respect of their needs for and use of supportive health care services. Reference to core concepts is made within the context of their influences on the outcome of stroke. These include the philosophy that stroke management is an interdisciplinary activity⁽⁶²⁾ the quality of which has been shown to benefit from the incorporation of standardized functional assessment.^(38, 60) Whilst the specialized stroke unit remains controversial, policy in respect of stroke care influences the planning of resources ie cost, location of facilities and staff training.

It was considered that, in the absence of complete population-based incidence, survival and residual-disability rates, partial information would be of value to objective decision-making concerning the allocation of health care resources to this care group.

In pursuing the above considerations this study was directed to ascertaining the outcome, in terms of both survival and residual-disability, and of need for supportive health care of White patients who suffered an initial acute stroke.

THE RELEVANCE OF THE STUDY TO COMMUNITY
AND HEALTH SERVICES NEED

The study was considered to be relevant for the following reasons:

1. Stroke is an important cause of mortality, morbidity and disability in all population groups in South Africa.
2. It is possible that the potential for improvement in many of those surviving the initial weeks is often underestimated and that there is value in assessing the outcome of stroke in relation to the degree of functional dependence actually experienced.
3. Little is known about patients who survive strokes in South Africa as few studies have been published in this area. It is only by assessing the range of difficulties experienced by the stroke patient in his home, that the problems of this group can be understood and informed decisions be made about the provision of appropriate support.
4. Supportive health care services in Durban are limited and therefore proposals concerning their future development require research directed to the objective assessment of patient needs.

LIMITATIONS OF THE STUDY

In compliance with the objectives presented in the research protocol (Appendix 9) several methodological restrictions were encountered. These were mainly in respect of the retrospective method.

The advantage of retrospective case-note review is that data for a long period are available. A disadvantage is that data are rarely collected in the format specifically required. In addition this method allows only the consideration of hospital admissions and excludes those who died before admission and those who were treated at home. A further disadvantage is that case note retrieval is frequently difficult.

Where study design requires the subsequent follow-up of patients identified by retrospective case note review the tracing of patients following discharge is frequently difficult and is an important limitation of the retrospective study method.

Prospective study is considered preferable by many researchers (28,93) However, due to constraints on time, cost and the high participant drop-out rate inherent in this approach, the retrospective method is often more practical.

In the present study the first limitation encountered was in respect of obtaining access to hospital records of stroke patients admitted to the study hospital in 1980. Accession cards necessary for record retrieval were unavailable for 1980 and 1981 and it is likely that these records have been destroyed. For 1982 the accession cards were only partially complete. For this reason it was only possible to commence the study with patients admitted during 1983. The high case-fatality rate and consequently the very small number of survivors available for household interview necessitated the addition of 1984 stroke admissions to the study.

As a result of the above only two-year and not five-year survival rates were determined. The recording of hospital discharges at Addington Hospital adheres to the disease indexing system of the International Classification of Diseases (ICD) (WHO, 1977, 9th revision).⁽¹⁰⁹⁾ Once the final diagnosis is entered by the doctor on the discharge sheet, a medical records clerk issues an ICD code. This, and essential patient details, are transcribed onto an accession card and filed. Several problems were experienced in respect of this system, mainly in relation to incorrect coding.

Stroke diagnosis in an appreciable proportion of cases, 76 (26.5%), could not be confirmed. The reasons given by senior medical registry staff are as follows:

- (i) The ICD categories for CVD are broad and confusing. In addition the clerks receive no training in the coding of diseases. Many patients with conditions such as peripheral vascular disease and no evidence of stroke were classified as acute ill-defined CVD (ICD code 436).

The use of abbreviations in the final diagnosis was observed to be potentially misleading and in several cases these were incorrectly interpreted as stroke eg AKA (above knee amputation), GU (gastric ulcer), PVD (peripheral vascular disease).

- (ii) Omission on the part of the doctor to enter the final diagnosis on the discharge sheet resulted in the clerk having to scan the notes and draw a conclusion.

- (iii) The absence of adequate training of records clerks and the medical staff in the use of the ICD codes, and of the former in record keeping practise is held to be largely responsible for the high proportion of misclassified cases.

In addition to the above, case-notes could not be traced in respect of 14% of admissions. The discharge diagnosis had therefore to be confirmed through the hospital accounts department. Details relating to patient management were consequently unavoidable. Missing case-notes are therefore a potential source of weakness of this method.

An important disadvantage of retrospective study is that the nature, completeness and accuracy of recorded details cannot be controlled. In attempting to establish the condition of the patient on admission it was observed that details pertinent to diagnosis and prognosis were frequently not recorded (eg level of consciousness, headache, neck stiffness, vomiting etc.).

Review of the nursing records led to the conclusion that these were of limited value in establishing the quality and extent of care given. Comments were often too brief and the patient's progress especially in relation to regaining limb function was seldom reflected. Difficulty in tracing patients after any length of time is expected, however poor recording of personal details in several cases compounded this.

The size of the household sample ($n = 35$) was regarded as a study limitation in that statistical significance in small samples is difficult to attain. Confident extrapolation of these findings to the general population therefore cannot be made.

In the study a single functional assessment administered after a lengthy period was found to have limited value with respect to establishing patient prognosis over time. As functional assessment is not an integral part of the management of stroke patients at the study hospital, there was unfortunately no baseline for the comparison of results.

Due to the logistic constraints of this study, it was necessary to restrict the geographical boundaries and only to consider white patients living in the magisterial district of Durban which includes the local authorities areas of Durban, Queensburgh, Pinetown, Amanzimtoti and Umhlanga Rocks.

LITERATURE REVIEW

Stroke, first documented as apoplexy has its earliest references in the writing of Hippocrates.⁽⁷⁷⁾ As early as 1880 extracranial vessel disease was thought to be responsible for infarction. It was not until 1951 that Fisher's notion of internal carotid artery disease was accepted as significant.⁽²⁵⁾ Over the last 3 decades major advances have been achieved in improved diagnostic techniques (angiography and brain scanning) and in better medical, pharmacological and surgical treatment.

Stroke is an important condition in respect of the demands it makes on health resources. In relation to cost, stroke consumes more in terms of bed resources than any other medical condition.^(3, 87)

The literature review which follows covers the following issues:

- A. Problems inherent in the analysis of the literature
- B. Pathophysiology
- C. Epidemiology
- D. Survival and disability
- E. The provision of supportive health care following stroke.

A. PROBLEMS INHERENT IN THE ANALYSIS OF THE LITERATURE

Whilst the literature is absorbing, the variety of definitions and methodological approaches employed in stroke study serve to complicate the comparison of studies and their results.

1. Lack of uniformity in the definition of stroke

The definition of stroke recommended by the World Health Organisation (WHO) is as follows:

"Rapidly developing clinical signs of focal (or global) disturbance of cerebral functions lasting for more than 24 hours or leading to earlier death, with no apparent cause other than vascular lesion."

Although most studies employ this definition some use modified versions in keeping with their study objectives.^(96, 106)

Whilst stroke is a major component of cerebrovascular disease it is not synonymous with the term. This is evident from Analysis of the International Classification of Disease (ICD) 9th Revision - (Appendix 1). Rubrics concerned with cerebrovascular disease (430 - 438) include several conditions which are not synonymous with the World Health Organization definition of stroke. eg. ICD rubric 437 which includes generalized cerebral atherosclerotic conditions and ICD rubric 435 consisting of a variety of insufficiency syndromes which result in transient focal neurological signs and symptoms. In addition, identical codes are used for initial and recurrent stroke. This may lead to an overestimation of the number of cases of stroke.

Definitions of stroke in research studies either include all rubrics of the ICD (430 - 438)^(1, 2, 3, 93) or make specific reference to the exclusion of TIA (ICD = 435).^(18, 28, 33, 83, 87, 97) The inclusion of TIA in epidemiological studies has been shown to alter the total incidence of stroke by as much as 10%.⁽³⁾ Lack of uniformity in the definition of stroke complicates the analysis of epidemiologic information so that it is often difficult to obtain an accurate picture.

Stroke is generally considered to be defined by the presence of a focal or global neurological deficit lasting for a minimum period of 24 hours.

For the purpose of this study "stroke" has been defined as "A vascular lesion of the brain of acute onset resulting in disability lasting more than 24 hours, or leading to death." This is to distinguish stroke from TIA.

2. Variations in Methodological Approach and Study Populations

Studies vary widely in relation to methodological approach and in the selection of study samples. In the present review no two studies were observed to be identical in approach.

Choice of methodological approach ie retrospective or prospective is dependent on the objectives of the study as well as constraints such as time and cost. Provided the possible limitations of each method are considered, this does not pose great restrictions for the comparison of results. Differences in populations and the criteria for patient selection pose far greater restrictions in comparative analysis.

The populations in which studies are conducted must be expected to provide different answers to problems. . Examples of the types of study populations reviewed in the literature include

- i) hospitalized patients^(4, 7, 9, 34)
- ii) community based studies to determine incidence and risk factors^(1, 28)
- iii) mortality studies based on information from death registers⁽³⁾
- iv) descriptive studies on stroke survivors in relation to coping ability.^(2, 13, 20, 39, 106)

Few studies have been published concerning patients over 65 years.⁽⁸³⁾ Advancing age serves to compound the difficulties associated with diagnosis and results in seemingly less interest being shown in this group of patients.^(1, 82) The interest in younger patients appears to be due to the economic and social impact of stroke.

Besides age, other criteria for patient selection included the characteristics of stroke as related to outcome eg side of hemiplegia, level of consciousness on admission etc. Most studies were found to include only initial stroke sufferers,^(1, 38) whereas others did not make this distinction.⁽²⁾ Where a functional assessment of disability has been employed in the latter, the results must be considered against the risk of confounding disability due to subsequent stroke with that due to the initial episode. In comparing the results of community based studies, difficulties arise, in that time intervals between stroke onset and functional assessment vary widely and the criteria used to express functional disability are not standard.⁽³⁹⁾

"Uniformity, in methodological approach to stroke study is urgent, in particular, a clearer specification of time intervals between the onset of stroke and functional assessment, and the use of standardized classification schemes where available to express the type and degree of disability."⁽¹⁰⁶⁾

3. Reliability of Stroke Diagnosis

The reliability of stroke diagnosis is considered the greatest

difficulty for researchers of stroke.⁽⁸³⁾ In one study, 5 out of 50 cases initially diagnosed as stroke were found to be tumours.⁽⁷⁷⁾ Factors considered responsible for diagnostic inaccuracies range from the lack of diagnostic facilities available in some hospitals to the small number of patients autopsied in order to verify diagnosis. Interestingly, the National Study of Stroke⁽⁸⁷⁾ revealed that the willingness to provide a diagnosis was proportionate to hospital size. The larger the hospital the greater the number of strokes classified as "ill-defined".

Mayo Clinic studies of Rochester, Minnesota, are recommended for their reliability in that medical practice in respect of stroke, is based on diagnostic verification and a high degree of accuracy in record keeping.⁽³⁵⁾

B. PATHOPHYSIOLOGY

An acute stroke occurs as a result of reduced blood perfusion in an area of the brain. As several factors may be responsible for this stroke should be considered a symptom of underlying disease rather than a diagnosis in itself.⁽⁷⁷⁾ The course of the disease is often difficult to predict^(81, 87) and the clinical presentation is frequently complicated by the identification of multiple disease in the same patient.⁽⁴⁰⁾

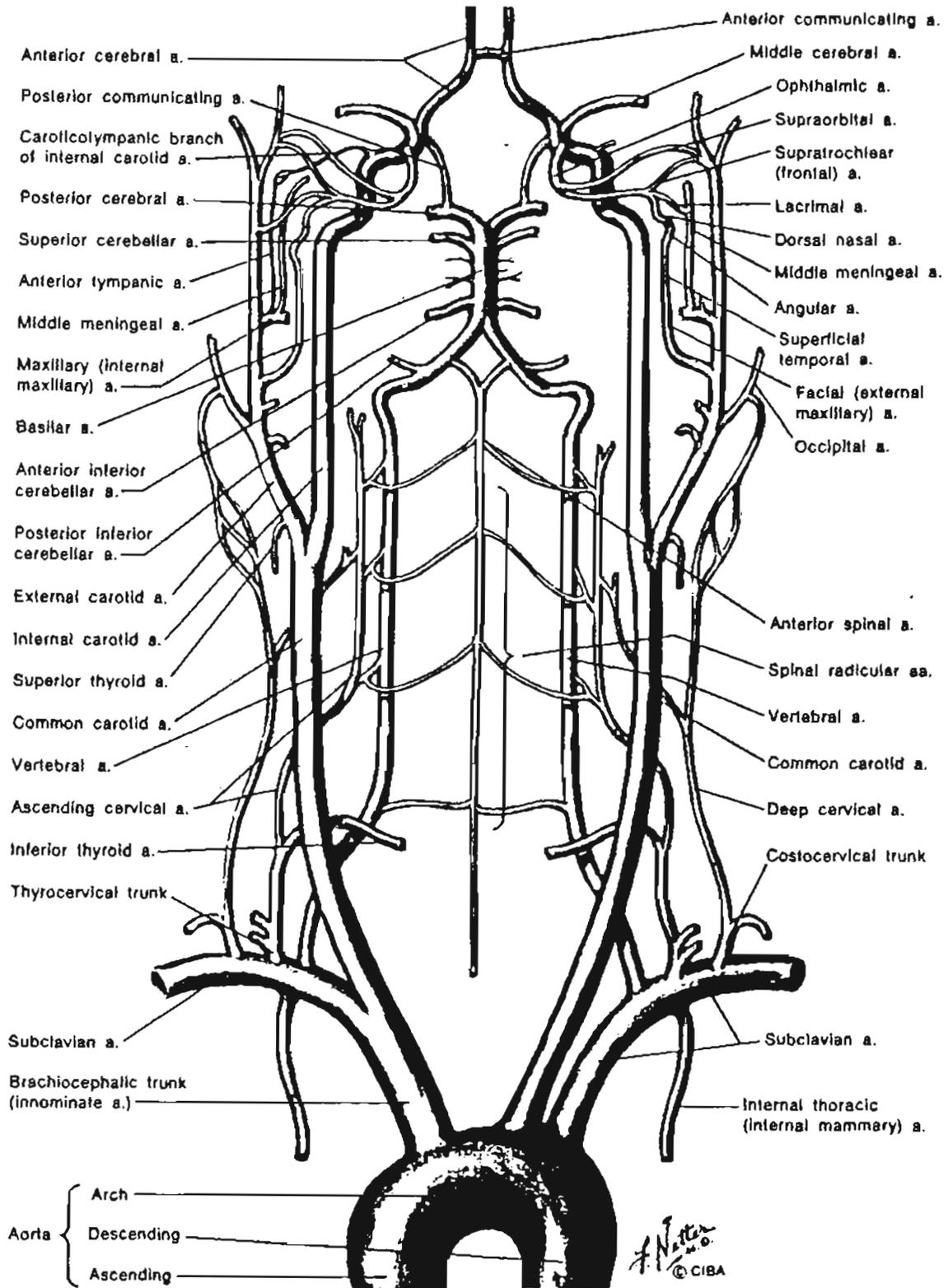
Management involves (i) : determining the cause of the stroke
 (ii) : determining the risk factors involved
 (iii) : developing primary and secondary preventive programmes.

1. Causes and Types

The basic pathology of acute stroke is either ischaemic or haemorrhagic. (A schematic representation of the blood supply to the brain has been included for reference purposes (plate 1 page11))

Plate 1

SCHEMA OF BLOOD SUPPLY TO BRAIN



Reproduced with permission from CIBA-GEIGY Corporation

Source: Fields W S. Aortocranial Occlusive Vascular Disease (Stroke) Clinical Symposia; 26, 4: 7.

USA, 1974

I Atherothrombotic Disease

Ischaemic stroke is frequently associated with atherosclerotic vessel disease and hypertension.⁽⁴⁵⁾

The pathophysiology of the thromboembolic process, whilst beyond the scope of the present study, is well described in the literature.^(14, 63, 86)

The sites where atheromatous vessel disease most commonly occurs⁽²⁵⁾ include:-

- (i) the bifurcation of the internal carotid artery
- (ii) the proximal segment of each vertebral artery
- (iii) the proximal segment of the subclavian artery, particularly on the left side
- (iv) the vessels at the base of the brain.

These are illustrated in plate 2 (page14).

In the posterior circulation, atherosclerosis occurs at the origin of the vertebral artery and also more diffusely along the basilar artery. Strokes resulting from impairment of the posterior circulation are much less common than those in the anterior circulation and tend to have a better prognosis.⁽⁷⁷⁾

Strokes associated with atherosclerotic vessel disease may be produced by several mechanisms:

- (i) local occlusion of an extracranial or intracranial vessel
- (ii) embolisation of a thrombus from an atherosclerotic plaque
- (iii) embolisation of platelet material from an atherosclerotic plaque
- (iv) embolisation of fatty material from an atherosclerotic plaque
- (v) ischaemic infarction associated with reduced cerebral blood flow as a result of a severe stenotic lesion.

Ischaemic strokes may also be associated with congenital lesions affecting the cerebral vessels. Alternatively these are produced by vasospasm occurring following subarachnoid haemorrhage (Prof. Bill - personal communications).

It is appropriate at this point to briefly mention lacunar infarctions. This form of arteriosclerotic disease occurs in the small penetrating vessels of the brain in hypertensive patients. Lipohyaline degeneration results in vessel occlusion or the formation of micro-aneurysms so that the presence of lacunae is strongly correlated with a risk of intracerebral haemorrhage and infarction.⁽⁷⁶⁾ Changes in the brain due to lacunar infarctions manifest in pseudo bulbar palsy. Renewed interest has been shown in this form of cerebral arterial disease because of its close association with hypertension and because they are considered to be more common than is frequently recognized.

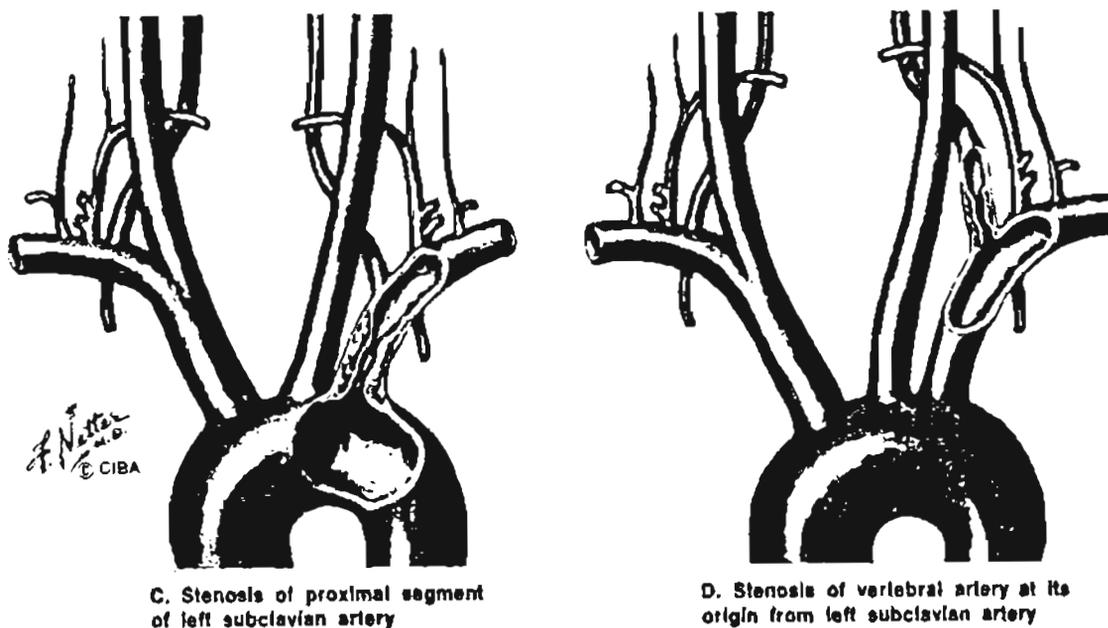
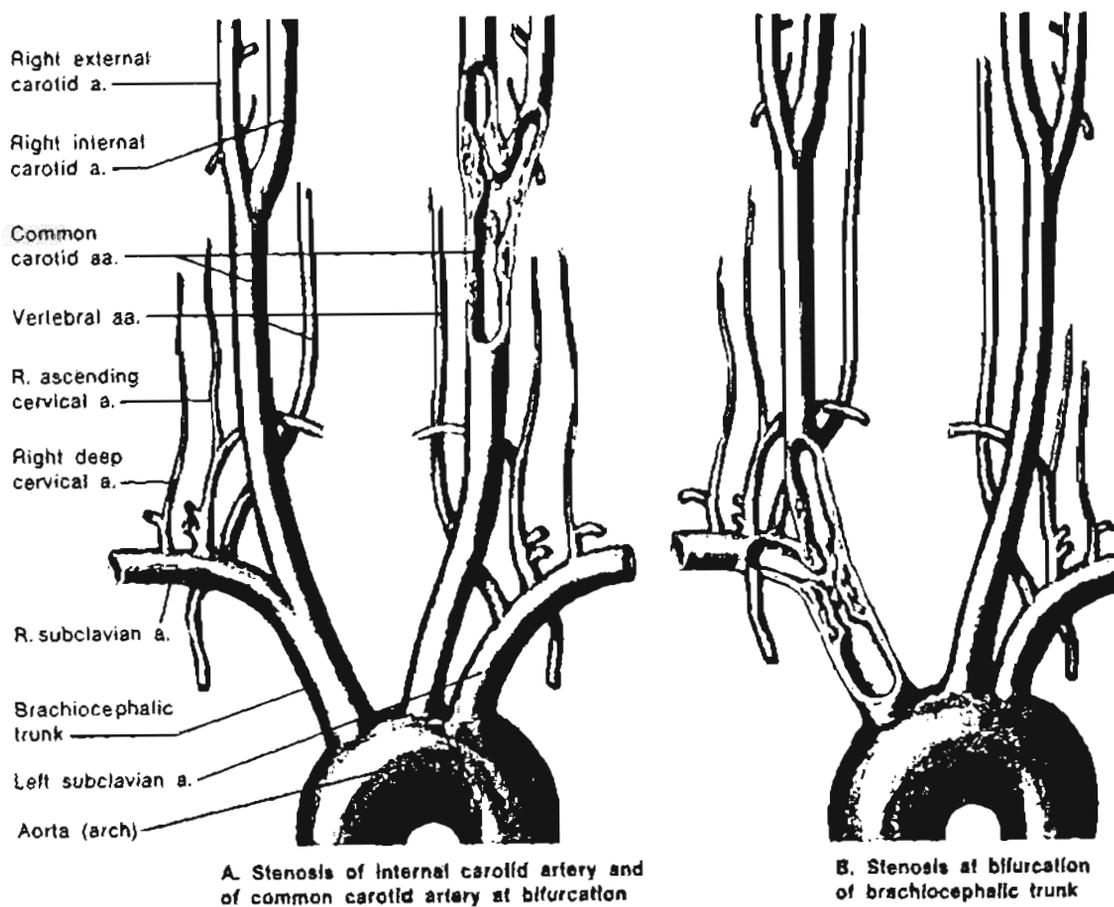
Cerebral thrombosis is the most common form of stroke accounting for 60% of infarctions.^(25, 85) It is also the least lethal.⁽⁸⁶⁾ Aspects of therapy are controversial. Current therapy tends to be based on the knowledge of particular risk factors in each institution and the development of its own diagnostic procedures and therapies.⁽⁶³⁾

Interest in atherothrombotic disease appears related to the fact that first time treatment is preventative.⁽⁶³⁾ Approximately 11% of patients suffering cerebral thrombosis have a history of one or more transient ischaemic episodes.⁽⁶³⁾ These should be regarded as warning signs and the appropriate investigations and treatment commenced. No consensus has been reached concerning the treatment of TIA and it does not necessarily follow that treatment will successfully avoid stroke.⁽¹⁰⁷⁾ This is an area which provides a rich field for further research.

Due to their accessibility, the surgical management of extracranial atherosclerotic lesions has received a great deal of interest.^(51, 73, 62, 63) High risk factors for endarterectomy have introduced an element of controversy into this form of management. A safer alternative has been suggested in the use of antithrombotic drugs. Aspirin has been shown to be a particularly useful agent.⁽²⁶⁾ Its action and some of the experimental work being carried out in Canada and America are reviewed by Fields.⁽²⁶⁾ The use of aspirin in TIA and cerebral infarction (slight episodes) requires that the diagnosis for stroke type is accurate the rationale for the use of aspirin in the latter being the prevention of a second more serious stroke.⁽⁶²⁾

Plate 2

COMMON SITES OF EXTRACRANIAL ATHEROSCLEROTIC STENOSIS



Reproduced with permission from CIBA-GEIGY Corporation

Source: Fields W S. Aortocranial Occlusive Vascular Disease (Stroke)
 Clinical Symposia; 26, 4: 12
 USA, 1974.

II Cardiac Disease

Approximately 31%⁽⁵⁹⁾ of all stroke types arise from the embolisation of a thrombus of cardiac origin eg diseased heart valves arising as a complication of myocardial infarction or atrial fibrillation.^(59, 77)

As 80% of the blood circulation from the internal carotid artery flows directly into the middle cerebral artery it follows that this is the most frequent site of embolic ischaemic infarction.⁽⁸¹⁾ Unlike cerebral thrombosis the onset is abrupt and there is little time for the development of a collateral blood supply. The rapid onset of neurological deficit and a history of heart disease are most significant in identifying this type of stroke.

Haemorrhagic Strokes

These are of 2 types:-

(i) Intracerebral haemorrhage

Intracerebral haemorrhage refers to the rupture of an intracerebral artery in a hypertensive patient which may result in a neurological deficit.^(77, 81) In extensive haemorrhage vital centres may be compromised leading to coma and death. The symptoms and focal neurological signs that develop depend upon the site and size of the haematoma. Intracerebral haemorrhages account for \pm 12% of strokes.⁽⁵⁹⁾

(ii) Saccular Aneurysms (Berry Aneurysm)

Saccular aneurysms occur most commonly on the circle of Willis and develop against a background of congenital vessel wall weakness. They tend to occur in a younger age group than that of intracerebral haemorrhages and are frequently associated with hypertension and atheroma.

Rupture may result in haemorrhage into various sites ie.

- (a) into the subarachnoid space
- (b) into the cerebrum
- (c) intraventricularly
- (d) all 3 sites

It may be impossible from the history and clinical examination to differentiate between subarachnoid haemorrhage and intracerebral haemorrhage and the diagnosis may only be confirmed on computerized axial tomographic brain scan and cerebral angiography.

Appendix 2 summarizes the types of strokes and the clinical factors associated with each.

2. Risk Factors

Whilst hypertension is well recognized as important, (45, 59, 63, 77) advancing age is the most important risk factor associated with stroke. (65) In the United States stroke affects 6 elderly to every 1 younger individual. (66)

The risk of stroke attributable to hypertension is approximately 70% (105) as opposed to the 10% risk attributable to TIA. (63, 107)

Contrary to current attitudes, raised systolic blood pressure is as important as raised diastolic pressure in its relationship to stroke. (107) Systolic hypertension should not be regarded as a harmless consequence of old age and a 2 to 4 fold increase in stroke risk has been observed. (59, 63) Effective long-term control of hypertension is reported to decrease the incidence of both ischaemic and haemorrhagic stroke.

Other risk factors with a close association to stroke include hypotension, atherosclerosis and diabetes mellitus. There appears to be considerable evidence for the role of genetic predisposition to stroke. (28, 65)

Heredity is considered strongly positive where both parents are known to have had cardiovascular disease or CVD. (29) The relative roles of the contraceptive pill, high blood cholesterol levels and smoking appear controversial. (59, 65) Kurtzke states that in his opinion these factors

plus obesity, climate and diet do not have any important influence, either singly or together, on the development of acute thrombotic brain infarction. Studies quoted by Kurtzke do not show conclusive evidence of the role of the contraceptive pill in female patients suffering thrombotic or subarachnoid haemorrhage.⁽⁶⁵⁾ Whilst the mechanism is not clearly understood the contraceptive pill does cause increased platelet activity, changes in co-agulation factors and hypertension.⁽⁷⁷⁾ It is advisable that those at risk of stroke (particularly those with hypertension) should not be given exogenous oestrogens⁽⁷⁷⁾ Smoking in itself has only a weak relationship to stroke.⁽¹⁰⁷⁾ However, because smoking elevates the haemoglobin concentration⁽⁷⁷⁾ it would be advisable to warn patients with a high risk of stroke viz, diabetics, heart disease sufferers, hypertensive patients etc to discontinue this habit.

C. EPIDEMIOLOGY

"Stroke is so prevalent, so disabling and results in so great a demand on health services, it is important to have accurate data about incidence and survival for the rational planning of services." (Stevens and Ambler, 1982)

Epidemiology is the study of the distribution of a disease or a physiological condition in human populations, and of the factors which influence this distribution.⁽⁷⁰⁾ The knowledge which results from such studies can be utilized to⁽⁷⁰⁾ (1) identify the aetiological factors of a specific disease and (2) to provide the basis for the development of primary and secondary health preventive measures. After heart disease and cancer, stroke is ranked as the third cause of death in Western countries^(1, 28, 73, 77, 83) and is a major cause of disability in population groups.

1. Mortality and Morbidity

Stroke mortality is at its peak within the first two weeks when approximately 50% of patients die.^(40, 77) Early death is usually directly due to the brain lesion⁽⁴⁾ and following this to the complications of infection and generalized thrombotic conditions.⁽⁷⁷⁾ After the first year mortality from stroke is about 10% per year.⁽⁷⁷⁾

In the United Kingdom (U.K.) stroke constitutes the main cause of

disability within the handicapped population. It is a major reason for admission to hospital and for the consultation of general practitioners.⁽⁹⁷⁾ In the UK it is estimated that there are about 130 000 stroke patients living in the community with significant impairments.⁽⁹⁷⁾ Of these about 75% are severely handicapped.⁽⁷⁷⁾ Despite this, stroke need not be associated with a poor outcome. Two thirds of stroke survivors will regain independence in the activities of daily living and one in ten with no discernible deficit of any kind.⁽⁷⁷⁾ Similar figures were reported by the Framingham study where of 84% of stroke survivors living at home, 69% were fully independent in the activities of daily living after 6 months.⁽³⁹⁾ In this study 119 stroke survivors were matched for age and sex with a stroke free member. The differences in functional assessment results between the two groups were slight which demonstrated that functional limitation was widespread in the older age group of the general population. However, stroke was responsible for impaired quality of life eg. although both groups suffered reduced socialization, this was twice as frequent in stroke survivors.

2. Modifiers of Stroke Mortality

The primary modifiers of stroke mortality are race, age and sex.

Racial Differences: Factors such as diet, lifestyle, and environment rather than that of race are thought to be responsible for the differences seen in population groups.^(59, 111) South African and American Blacks show similar characteristics in their high mortality rates for CVD and hypertensive disease and their lower mortality rates for ischaemic heart disease.^(59, 83, 111) The excess of strokes in Blacks appears consistent with the high prevalence of hypertension.⁽⁵⁹⁾

The greatest stroke mortality in the world is found in Japan where statistics attribute 25% of all deaths to stroke.^(59, 77) The exact reasons for this are unclear although low temperatures in some parts of Japan, associated with inadequate housing and excessive salt intake are suspected to be major factors.⁽⁸²⁾

Age Differences: Advanced age at the time of the stroke has a definite impact on immediate mortality and long-term survival.⁽⁴⁾ Older patients tend to have more severe strokes and pre-existing disease often hinders recovery. Additionally older brains have less ability to recover.⁽¹⁹⁵⁾

Sex Differences: In most Western countries it appears fairly conclusive that a higher incidence of stroke exists for males than for females.^(1, 97) This may be due to the higher incidence of atherosclerosis and cigarette smoking in men than in women.⁽¹⁾

Although there appears to be a significant sex difference in relation to the incidence of fatal stroke, there does not appear to be such a difference in respect of long-term survival.⁽¹⁰³⁾ From the mortality table (Appendix 3), it would seem that the incidence of CVU in SA is higher in females than males in each race group and in almost all age groups.^(102, 112)

3. Declining Stroke Mortality

A marked decline in stroke mortality internationally has been well documented,^(73, 83, 77, 107) although the reasons for this appear controversial. Some studies claim that the decline in case fatality is due to improved medical practice⁽¹³⁵⁾ whilst others give a decrease in the incidence of new cases as the primary reason.^(79, 107)

The reasons given to explain the progressive changes in the occurrence of and outcome following stroke include:-

- (i) Improved diagnostic capabilities particularly with the advent of CT scanning resulting in decreased case fatality.⁽¹⁰⁷⁾
- (ii) Opportunities for improvement in primary stroke prevention, due to the early recognition of risk factors.^(35, 79)
- (iii) Knowledge about the treatment and control of hypertension has been important in reducing stroke incidence.^(79, 107)
- (iv) The early treatment of complications following stroke onset has improved.⁽³⁵⁾
- (v) Levels of functional independence have improved through the widespread use of rehabilitational therapy.^(79, 107)

It is suggested in the literature that the decline of stroke mortality with respect to changes in life expectancy deserves greater attention.⁽⁷²⁾

Whilst mortality rates in South Africa appear to have fallen, these rates remain higher than those of other Western countries.⁽¹⁰⁶⁾ This seems to indicate the need for further improvement in the management of stroke illness.

4. Stroke in South Africa

Whilst the incidence of stroke in SA is not known, that stroke occurs in all population groups is evident from analysis of Department of Statistics mortality listings (Appendix 4).

The stroke mortality rate for white South Africans is 92,4 per 100 000 and is the second most important cause of death in this group.⁽¹⁰²⁾ It would appear from the mortality rates for non-white groups that the incidence of stroke in these groups is higher than that for whites.

From the national studies both published^(11, 12, 53, 84) and unpublished⁽²¹⁾ stroke emerges as an important condition for several reasons.

- (i) In spite of its association primarily with the aged,⁽⁷⁷⁾ stroke is highly prevalent in patients under 65 years (Appendix 3). According to Wyndham 60% of deaths in white South Africans in this age group can be attributed to faulty lifestyle. Of these deaths 1/5 can be attributed to stroke.⁽¹¹¹⁾ Disease related to faulty lifestyle has major implications for the role of preventive medicine and health education.
- (ii) Mortality from stroke has declined in recent years with specific implications. The incidence of non-fatal stroke in Britain is quoted at between 1 and 2 per 1 000.⁽⁹⁶⁾ As ours is an ageing population it is possible that this rate in people over 75 years of age is likely to increase to as high as 20 per 1 000.⁽⁸⁴⁾ Meeting the needs of patients disabled by stroke therefore constitutes a major problem in the planning of supportive health care services.
- (iii) As previously mentioned literature reflecting the epidemiology of stroke in South Africa is limited. Most reference to stroke patients is made within the context of geriatric studies^(11, 12, 21) and/or chronic illness⁽⁸⁴⁾ or in the form of Statistical Analysis.^(102, 112) Additionally many of

these references relate to advancement in the development of health services for patients in the Cape Province. (11, 12, 21, 84, 99, 100, 110)

- (iv) From community geriatric studies (12, 21, 85) stroke emerges as an important condition within the handicapped population.

Immobility related to stroke featured as the most common problem in patients presenting at geriatric clinics at Tygerberg Hospital. (12) Morbidity figures at the same clinic show 54% of clinic visits to be related to CVD. (11) In an unpublished retrospective study (21) on the follow-up of a group of patients discharged from Groote Schuur hospital, stroke patients were amongst those most frequently referred to the hospitals' department of community liaison. These patients were identified as an extremely vulnerable group due to:-

- (i) an average period of hospitalization of only 2 days (84)
- (ii) the fact that they constituted an older age group (21)
- (iii) and that many were chronically ill and lived alone. (21)

In a follow-up study on stroke patients discharged from the same hospital it was shown that only 12% of patients were considered independent in their ability to cope with the activities of daily living one year after stroke. (84) The median length of hospital stay in these patients was 2 days and many were sent home with little or no advice as to how to cope with their disabilities. Additionally 37% were below the official age for retirement. Results indicated that:-

- (i) the education of patients and families on discharge from hospital is essential,
- (ii) the development of supportive community services is essential to improve the quality of life for patients.

D. SURVIVAL AND DISABILITY

A rule of thumb commonly quoted with reference to stroke outcome is that of "thirds". A third die, a third remain chair-bound or bed-bound and a third regain reasonable function.⁽¹⁸⁾ Survival to one year can be expected in between 50 - 53% of cases.⁽⁹⁷⁾ In a Swedish study 45% who survived the first month had died by the 32nd month (2½ years). In a prolonged study, Weddell & Beresford⁽¹⁰⁶⁾ found that 74 of 380 patients (19%) had survived 4 years from stroke onset. Very little is known about what happens to patients who survive strokes⁽⁵²⁾ in relation to their adjustment post stroke and the quality of life experienced.

Community based studies describing long term stroke disability have an advantage over hospital-based studies in that (i) they provide a useful oasis for structuring continuing-care programmes and (ii) they permit more accurate prognosis to be made for individual patients in terms of eventual functional recovery.⁽³⁹⁾

1. The Implications of Stroke

Strokes are not only responsible for a large number of deaths, but survivors may be left with severe functional disability requiring long-term rehabilitation and supportive community services. As such, stroke has implications for the patient, the family and the attending health professionals.

- (i) The Patient: Whether the effects of stroke are long-term or short-term they may have major physical, psycho-social and economic implications. The patient may have to cope with impaired communication skills, a functional disability, reduced independence, lack of self-reliance, physical disfigurement and ultimately a major change in lifestyle. Patients commonly express an over-riding fear of a second stroke. Furthermore, the loss of personal dignity and frustration must contribute to the depression common to stroke sufferers.
- (ii) The Family: To most families a stroke represents an unknown challenge, which causes confusion and stress related to coping. Family resources are frequently not able to cope with the addition of an elderly handicapped person who may require assistance with all activities.

Further, the inadequate preparation of the family to care for an ill member is well documented.⁽⁹⁰⁾ Feelings of guilt are often present on the parts of both family and patient. This is especially so for the family who cannot accept responsibility for an ill and/or disabled member. Chronic illness in the family profoundly effects family life⁽⁹⁰⁾ especially with regard to role changes, added financial burden, restriction of family movements, changes in living arrangements, disturbed sleep, and very often the problems encountered when three generations live under one roof.

- (iii) The Professional Staff: Professional attitudes to stroke are frequently poor. The possible reasons for this may be:
- (i) that most patients present with multiple disease pathology,
 - (ii) stroke occurs most often in an older age group,
 - (iii) many patients suffer a hemiplegia as a result of stroke,
 - (iv) many have a speech difficulty and may be disorientated and
 - (v) they are often incontinent. The personality disorders accompanying the course of many strokes often result in patients being labelled "difficult" and "uncooperative". This compounds the challenge of treating stroke patients and hence the poor attitude towards them. It is not uncommon in medical practice for the expectations and attitudes of the staff to conflict with those of the patient and family. The mutual dissatisfaction which may stem from this supports the need for the staff to consider the long-term implications of illness for the patient and to understand his real needs. This is one reason for undertaking a retrospective, descriptive study of patients surviving an initial episode of stroke.

2. Some of the factors influencing the prognosis for survival following stroke include:-

(i) Level of consciousness

Impaired consciousness at the time of stroke appears to have a more important influence on stroke outcome than factors such as sex and age. (4, 18)

Coma on admission is a sign of serious brain damage. The more severe the impairment of consciousness the higher the probability of death. (4) Almost all patients who are comatose on admission to hospital die, many within 24 hours. The patient who is fully alert is less likely to die from the cerebral lesion. Prognosis in this case depends on the development of extracranial complications. (72)

(ii) Side of brain lesion

The association between the side of the brain lesion and patient survival is too weak to act as a useful prognostic indicator. (103) The side of the brain lesion usually influences the nature of the functional deficits observed in patients after stroke, although the association should not be accepted as conclusive. (103) Patients with left hemisphere lesions usually make better recoveries than those with right-hemisphere lesions. (24)

It is reported that clinicians and families commonly fail to appreciate the effect and extent of brain damage on behaviour. (13) In addition experience suggests that right brain damage is more often associated with serious family problems than left brain damage. In the absence of aphasia the families of right brain damaged patients frequently find themselves with high and unmet expectations of the patients progress and abilities. This, combined with the highly self-centred behaviour common to patients with right sided lesions can be very disruptive to family life. (13)

Non-dominant hemisphere lesions (right brain lesions) may result in perceptual deficits, hemi-inattention and denial of the motor defect. Treatment in these patients often stopped because their behaviour is interpreted as confused, unco-operative and lacking in motivation. (24, 40) Despite the association of perceptual deficits with stroke, the

effective management of depression in stroke patients appears essential to long-term outcome. Depression is a specific neurologic complication in 70% of right-hemisphere strokes.⁽⁴⁰⁾ An even stronger correlation has been shown between depression and left anterior hemisphere lesions.⁽⁸⁸⁾ In a two year longitudinal study of post-stroke mood disorder the severity of depression was associated with the location of the lesion (viz : left anterior), impairment in cognition and the activities of daily living, the quality of available social supports and age.⁽⁸⁹⁾

(iii) Age

Although there appears to be a relationship between age and immediate survival there is no relationship between age and disability apparent at six months,⁽¹⁰⁴⁾ ie there is no support for the belief that older patients are less able to recover.

In a study on the influence of age on stroke outcome⁽¹⁰⁵⁾ age was shown to have little influence on the severity of stroke or the deficits seen. Age did influence the length of hospital stay and was considered an important influence in management decisions. However, it is not clear whether the length of hospital stay was associated with social difficulties related to discharge or to the involvement of paramedical therapists in care. The long-term survival of a stroke victim is accepted as shorter than that of the general population.⁽⁴³⁾

(iv) Coronary heart disease and hypertension

The presence of coronary heart disease, congestive cardiac failure, and hypertension play a significant role in reducing prognosis for survival following stroke.^(72, 93, 107) In the presence of hypertension the 5-year survival rate of stroke sufferers decreases by 15%.⁽⁹³⁾ As hypertension is a primary risk factor in stroke it is possible that controlling the incidence of hypertension will play a major role in the primary prevention of stroke, and in stroke recurrence.

(v) Stroke recurrence

All patients especially the elderly are at risk of stroke recurrence. It is estimated that 75% of patients will suffer a recurrent stroke within 15 years of the original episode,⁽⁷²⁾ the recurrent episode usually being fatal.

The Framingham study⁽⁹³⁾ revealed that over a period of 5 years the risk of stroke recurrence was 42% for men and 24% for women. Whilst the differences were not age-related, there appeared to be a relationship between recurrence rate and prior hypertension, coronary heart disease and/or congestive cardiac failure.

(vi) Factors influencing long-term survival

In a Swedish study of 114 patients under 70 years of age, 40 (35%) were able to return to work or complete independence in the ADL'S.^(28, 29) These patients had few psychiatric symptoms, relative youth and the absence of aphasia. The results of rehabilitation were found to be influenced by factors such as previous occupation, home conditions, attitudes of relatives and the policy of the physicians concerned.⁽²⁹⁾

In addition, factors such as low motivation, confusion, disorientated thinking, withdrawal and apathy, perceptual-intellectual deficit, nystagmus and previous stroke have been recorded as negative predictors of long-term outcome.⁽³⁸⁾

E. SOME ASPECTS OF SUPPORTIVE HEALTH CARE FOLLOWING ACUTE STROKE

A community is judged by the way in which it responds to the most vulnerable members of its society.⁽¹¹⁾ The provision of supportive health care is considered an important subject. Issues related to the short and long term management of stroke comprise an extensive literature review.

In order to remain within the limits of the present study a few pertinent aspects have been chosen for discussion viz:

- (i) the role of CT scanning in the diagnosis of stroke
- (ii) interdisciplinary stroke care
- (iii) some of the principles of stroke rehabilitation - advantages/disadvantages of stroke unit.
- (iv) functional assessment.

I. Computerized Axial Tomography

Computerized axial tomography (CT scanning) has revolutionized neurological medicine. It has major advantages in stroke diagnosis⁽⁵⁰⁾

and plays an important part in improving survival.⁽³⁵⁾ CT scanning requires a radiologist of considerable skill and even so diagnosis from a single scan may be difficult.^(47, 104) In some cases an infarction might not show on scan for several weeks.⁽⁴⁷⁾

The most important contributions of CT scanning in stroke are:

- (i) The exclusion of treatable pathologies^(47, 77) presenting as stroke. This is particularly so in distinguishing stroke from tumour, a clinically difficult task where there is progression.⁽⁸⁾
- (ii) It is reliable in distinguishing cerebral infarction from haemorrhages.⁽⁸⁾ Diagnostic error in relation to stroke type has been quoted as between 10-60% in American studies.⁽⁷⁷⁾
- (iii) It is the best first investigation in suspected subarachnoid haemorrhage.⁽⁸⁾
- (iv) It is essential in assessing the extent of ischaemic cerebral oedema.⁽⁸⁰⁾

Careful selection of patients referred for CT scanning is vital, to prevent abuse of the facility.⁽⁸⁾ However, in the case of stroke, it is felt by leading Durban neurosurgeons that all suspected stroke patients should undergo a brain scan (Dr PAJ le Roux - personal communication).

Mis-diagnosis reflects poorly on the standards of medicine practised and may result in unnecessary loss of life or disability. With the continued use of CT scanning, clinical diagnostic skills have been shown to improve.⁽⁸⁾

II. Interdisciplinary Stroke Care & Rehabilitation

"The Rehabilitation Process uses the knowledge and skills of many professional disciplines working together and it must include the use of community services and resources." (Jesner 1982)

The practical aspects of stroke rehabilitation have been simply presented by Margaret Johnstone.⁽⁵⁵⁾ In discussing the roles of each member of the health team, she points out that the role of the nurse in rehabilitation is frequently overlooked. It often appears as if the process of rehabilitation is considered apart from the total care of the patient. This is unfortunate as the nursing of the patient especially in the acute stages of illness is paramount in relation to long-term outcome.^(10, 55) It is felt that by highlighting the important aspects of stroke rehabilitation the definition of stroke care as an interdisciplinary activity⁽⁶²⁾ will become clear.

Many of the principles of rehabilitating the stroke patient refer to the hemiplegia resulting from brain damage, however as each stroke presents a different pattern of disability, management cannot be generalized⁽⁶⁾ and the case for individualized patient care is strong. To achieve this a comprehensive functional assessment is invaluable in planning the immediate and long-term care of the patient. (The merits of this are discussed in greater detail in the following pages).

Although speech difficulty is an important disorder frequently associated with stroke its management is complex and beyond the scope of the study. It is relevant to state that in many cases spontaneous recovery occurs between 4 and 10 weeks post-stroke.⁽⁶⁸⁾ It is essential that a patient with a communication disorder is evaluated by a speech pathologist who will be able to identify the nature of the impairment and whether this is related to an affected speech area or to generally reduced cognitive function.⁽⁶⁾ In addition it has also been found that speech therapy is useful for those who have swallowing difficulty.⁽⁶⁾

1. When to begin

Writers agree that rehabilitation ought to begin as early as possible in the course of illness^(6, 40, 81) in order to optimize outcome. Early initiation of rehabilitation avoids the gamut of complications possible in stroke sufferers viz the complications of prolonged bed rest especially contractures and depression.⁽⁵⁾ The re-teaching of specific sensory motor skills should only begin once a neurologically stable condition has been established, usually within 48 hours.⁽⁶⁾ The sensory stimulation of the patient by virtue of his environment appears essential in initiating success in stroke rehabilitation.⁽⁵⁷⁾ A central tenet in stroke rehabilitation is the concept that this is a specialized

activity requiring a team of staff able to work together in common understanding of the problems facing the patient.⁽⁵⁵⁾ According to Johnstone a programme of rehabilitation only becomes efficient when:

- (i) the physical handling of the patient is carried out along identical lines by all team members
- (ii) when there is continuity of care and,
- (iii) a common aim in care has been defined.

2. The principles

- (i) Successful mobilization is a gradual process which begins with the correct limb positioning and the passive and active exercising of the limbs. This is considered the most important role of the nurse in re-teaching normal limb function.⁽¹⁰⁾
- (ii) Correct handling and properly controlled movements are essential to inhibiting spasm⁽⁵⁵⁾ which when it occurs may result in a functionally useless limb.
- (iii) The re-teaching of the postural reflex mechanism is essential if severe disability is to be avoided. The pattern of progression in mobilization of the stroke patient is summarized from Johnstone⁽⁵⁵⁾ as follows:
 - (a) correct bed positioning
 - (b) mobility in bed involving rolling, lifting the body (bridging), lying on both sides, stretching across the affected side (cross facilitation)
 - (c) regaining sitting balance
 - (d) learning to transfer from bed to chair and back
 - (e) regaining standing balance
 - (f) learning to walk.
- (iv) Treatment is based on a firm knowledge of the environment to which the patient will be returning.⁽³³⁾
- (v) Planning a programme of rehabilitation should be based on a thorough objective assessment rather than subjective impression.⁽⁷⁵⁾ This assessment must include an assessment of the learning needs of both family and patient.⁽¹⁰⁾

(vi) Involvement of the family is essential as this is considered the most important resource available to the patient. (10, 19, 33, 40, 51, 90)

3. Achieving success in rehabilitation

Attempts at estimating prognosis for survival to functional independence are considered to be mostly inaccurate⁽⁴⁾ and should be treated conservatively. It does appear that the longer the period before spontaneous movement of the affected limbs is seen, the poorer the prognosis for recovery of motor activity (and speech, if this is affected).⁽⁸¹⁾

A British study investigating the possibility of predicting the long term outcome of stroke on the basis of a simple assessment in the early stages of illness, concluded that the patients attitude towards and ability to co-operate with treatment is as important as the amount of treatment provided.⁽⁴⁷⁾

Authors appear to agree that early counselling and treatment (where applicable) is as important as the physical aspects of care in assisting the patients return to prestroke function. In order to be clinically effective in the management of stroke patients it is necessary to consider the implications of stroke disability in the personal life of the patient and not only to focus on the focal neurological sequelae.⁽⁴⁰⁾ The psychological concerns of the patient following stroke are documented in detail by Richard Goodstein. It would appear that it is necessary to incorporate such skills as 'how to provide reassurance' into the teaching of stroke care for all disciplines.⁽⁴⁹⁾

4. The role of the nurse

As the role of the nurse is central to successful stroke management^(10, 55) a short note has been included on some important aspects of her role. Besides meeting the physical care needs of the patient, the nurse plays an important role in co-ordinating all aspects of patient care.⁽¹⁰⁾ This role is very well demonstrated in the Creative Nursing Care Model of Skeet and Thompson⁽⁹⁶⁾ (Appendix 5). The model has particular success in its application to vulnerable patients namely the elderly, patients living alone, the chronically ill or disabled and

especially stroke sufferers. A major advantage of this model lies in its improvements over the Nursing Process. In contrast to the latter this approach allows for the contributions of all members of the team and illustrates the constructive involvement of the nurse in the team.⁽⁹⁶⁾ It clearly highlights her important role as a co-ordinator of care and makes provision for the continuity of care between the community and the hospital. Interestingly, it reflects Strykers' definition of Rehabilitation exceedingly well. viz

"Rehabilitation is a creative process that begins with immediate preventive care in the first stages of illness or accident ... (and is) continued through the restorative phase of care (that) involves adaptation of the whole being to a new way of life" (Stryker)⁽⁸¹⁾

A detailed explanation of the model can be found in the reference.⁽⁹⁶⁾ A simple example of how this approach to stroke care can be taught to nurses is given in Appendix 6. This example is in relation to a single activity for daily living that demonstrates the application of the students' physiological background to the physical care of the patient as well as involvement in the multidisciplinary team and the family. As the ultimate aim of stroke rehabilitation is to return patients to their own homes, the nurse has an important teaching function with respect to both patient and family. Two principles emerge as important in teaching:

- (i) Teaching must be appropriate for the social circumstances in which the patient lives and appropriated to the severity of the stroke.⁽¹⁰⁾
- (ii) Establishing the patients needs for learning should be based on an objective assessment rather than a subjective impression.⁽⁷⁷⁾ This must include an assessment of the learning needs of both family and patient.⁽¹⁰⁾

III. Where to Rehabilitate

Hospital care versus home-based care

Whilst the relative merits of hospital versus community care appear not to have been studied, the factors influencing the admission of some patients and not others have been reported in the British literature. Besides stroke severity and diagnostic difficulty, reasons for admission include patients living alone and those needing nursing care.⁽⁴⁹⁾

The advantages of home-based rehabilitation^(56, 104) include:-

- (i) more appropriate rehabilitation
- (ii) less anxiety and depression in patients and families experienced through the process of hospitalization
- (iii) more efficient use of limited resources
- (iv) cost effective care.

Although there is argument as to whether domiciliary care is less expensive⁽⁵¹⁾ it appears to be a desirable and acceptable alternative to hospital management for some stroke patients.^(56, 104, 9)

Further research into the factors that should determine admission to hospital or treatment at home is suggested by researchers.⁽¹⁰⁴⁾

Whether stroke management is hospital or domiciliary based, the informed participation of the family significantly influences successful rehabilitation.^(34, 56)

The proposal of a stroke service which enables patients to remain in their own homes requires the development of rapid outpatient and domiciliary diagnostic facilities as well as domiciliary based nursing teams.⁽⁹⁾ To reduce the number of hospital admissions without adversely affecting the quality of patient care it would appear important to provide domiciliary physio and occupational therapies as well.

The acute stroke unit versus the medical ward

A stroke unit comprises a team of staff specialized in the management of disability and whose function is essentially therapeutic.⁽³³⁾ In comparison with the specialized unit, the medical ward has the

disadvantages of (1) being ill-equipped in terms of staff and facilities to deal with the complex issues inherent in stroke rehabilitation

and (2) they tend to operate on the basis of diagnosis and cure of acute cases with little understanding of the psychological approach required to deal with stroke disability. The major advantage of the stroke unit is its potential for improving stroke outcome especially in the acute phase.⁽³³⁾ Reduction in mortality rates is controversial, however agreement seems to exist in relation to improved neurological outcome.⁽³⁾ The stroke unit provides for improved standards in the treatment of strokes, co-ordination of resources, a focus for staff training and for the instruction of carers. Additionally it provides opportunities for study and research.⁽⁹⁸⁾

In a study of the advantages of stroke units in Edinburgh⁽³⁴⁾ 62% of patients treated in a stroke unit experimental group were assessed as independent on discharge as opposed to 45% treated in a medical ward control group. Follow-up one year later revealed both a decrease in the levels of independence of the experimental group and a dramatic increase in the independence levels of the control group. This study indicates that: (1) the full rehabilitation potential of control group had been realized

and (2) support of the stroke patient and family continues after hospital discharge. In spite of family involvement in the rehabilitation of the experimental group (stroke-unit patients) the over-protectiveness of families was thought to influence the decline in independence in this group.

In a similar study in Dover⁽⁹⁸⁾ the greatest benefits of the stroke unit were that a larger proportion than the control group were discharged alive and a greater number were still alive after 1 year. (The marginal difference in functional status was considered too small to be significant.)

Selectivity in patients admitted to a stroke unit is proposed.⁽³³⁾ It is suggested that the selection be made on the basis of (1) consciousness at the time of admission as this carries a good prognosis for survival and, (2) inclusion of those with established or developing hemiplegia who are unlikely to recover their independence in a spontaneous way.

Bernard Isaacs suggests that the most valuable aspects of stroke unit care are intangible, and include the improvement of staff attitudes to stroke and an awareness of the complexity of patient needs.⁽⁵¹⁾

IV The Value of Standardized Functional Assessment in Stroke Care

Functional assessment has been defined as "A method for describing disabilities and limitations experienced following stroke in order to measure the individuals use of the variety of skills involved in performing the activities of daily living."⁽³⁷⁾

Functional assessment involves the measurement of disability at various levels of function, mental, motor, social etc in order to indicate the ability of the patient to live independently. Functional assessment is difficult⁽¹⁶⁾ and essentially requires the skills of the multidisciplinary team.⁽⁶²⁾ A variety of assessment tools have been developed each with varied objectives.

1. Assessment tools available

Despite the development of a wide variety of assessment tools, no single format appears entirely satisfactory in all circumstances.⁽¹⁶⁾ In research and clinical practice a combination of indices and modifications of instruments is often resorted to.^(22, 62) The most popular tools are the Katz Index, Barthel Index and the Kenney self-care evaluation.⁽⁶²⁾ These are all assessments of the individuals ability to perform the ADL's. Other tools include:- (i) ESCROW^(27, 62) - an assessment of social and economic independence.

and (ii) PULSES^(37, 38) -

which covers a wide range of skills (viz P = physical condition, U = self-care evaluation, L = mobility, S = sensory components, E = excretory function, Ss = intellectual & emotional adaptability). Combinations of tools have resulted in the development of various formats eg (i) Long Range Evaluation Summaries (LRES)⁽³⁸⁾
(ii) Functional Life Scales (FLS).⁽⁹⁴⁾

The relative merits of these tools is a complex study in itself and unfortunately beyond the scope of the present study. In respect of the wide clinical applications of a standardized functional assessment, the use of an appropriate tool in stroke care cannot be too heavily emphasized.

2. Clinical Application

The advantages of including a functional approach in the care of stroke patients are that:-

- (i) individualized patient care is promoted at all stages of the rehabilitation process⁽⁴⁴⁾ and participation of the multi-disciplinary team is essential.⁽¹⁶⁾
- (ii) an objective assessment is a more accurate indication of patient needs in relation to the provision of community based services than a decision based on diagnosis alone.⁽²⁷⁾ The type and amount of assistance required to maintain the patient in the community will be indicated by a suitably comprehensive assessment.⁽⁶⁰⁾
- (iii) The prognostic importance of assessment in relation to long-term survival is invaluable.^(38, 43, 60) It provides essential information about practical problems such as "Who is likely to show improvement?", "Who would benefit from specific preventive and therapeutic measures?" etc. This assists in providing a service which is cost effective.
- (iv) This approach is invaluable in clinical research⁽⁴⁴⁾ and as an aid to teaching the rehabilitation process.⁽³⁸⁾
- (v) The essential value of functional assessment in rehabilitation is that it adds a dimension of quality to care and enables ongoing evaluation of the patient's management.⁽³⁷⁾

STUDY OBJECTIVES

1. To determine the number of white patients admitted to Addington Hospital in 1983 and 1984 in respect of whom a discharge diagnosis of acute stroke was recorded.
2. To determine the proportion of all stroke discharges from the study hospital attributable to initial acute stroke.
3. To determine the survival rates of persons identified in 2 above.
4. To assess the levels of functional disability of current survivors.
5. To identify in respect of survivors, level of need for and utilization of supportive health services.
6. To assess from 1, 3, 4 and 5 above the need for community and health-facility based supportive health services.
7. To make recommendations in respect of the provision of supportive health care services for persons who have suffered an acute stroke.

DEFINITIONS

For the purpose of this study the following definitions are applied:

(i) Acute Stroke

A vascular lesion of the brain of acute onset resulting in disability lasting more than 24 hours, [or leading to death].

(ii) Initial Stroke

An initial stroke is considered to be a stroke as defined above where the sufferer has not previously suffered any cerebrovascular episode which resulted in impairment of function lasting more than 24 hours.

(iii) Disability

Any restriction or loss of ability to perform any activity in the manner or within the range considered normal for a human being.

(iv) Transient Ischaemic Attack (TIA)

A focal reduction in cerebral blood supply resulting in a short period of loss of function which recovers rapidly without residual disability. (90)

METHOD

1. STUDY DESIGN

The study is composed of a Hospital based and a Household based component.

Hospital-based Component: This is directed to ascertaining the frequency of admission to Addington Hospital attributable to acute stroke and the outcome of such hospital admissions. This study component was based upon retrospective case-note review.

Household-based Component: This was directed to ascertaining survival and level of functional disability following discharge from hospital. This study component was based upon household interview.

2. CRITERIA FOR INCLUSION IN THE STUDY

(i) Hospital-based

Patients were admitted to the study if the following criteria were met:

- (a) The admission occurred between 1 January 1983 and 31 December 1984.
- (b) The International Classification of Diseases (ICD) rubric which had been accorded in respect of the final diagnosis was 430, 431, 432, 433, 434 or 436.
- (c) The patient was a member of the white population group.

(ii) Household-based

Patients were included in this component of the study only if:

- (a) The above criteria for inclusion in the study were met

- (b) The patient was discharged from hospital
- (c) The place of residence of the patient was within the magisterial district of Durban.

3. PROCEDURE

- (i) Authority to undertake the study was obtained from the Ethics Committee of the University.
- (ii) The medical Superintendent of Addington Hospital was approached and consent was given for access to the case-notes of identified patients.
- (iii) Patients were identified by name and in-patient number from the hospital indexing system of all admissions. (The index is organised according to diagnostic (ICD) code. Age on admission, race, sex and hospital fatalities are recorded on the index cards, in addition to name and in-patient number.)
- (iv) Case notes for all patients within the ICD of 430 - 434 and 436 were reviewed in order to exclude those who did not meet the criteria for initial inclusion above.
- (v) Case note review enabled confirmation of the discharge diagnosis recorded in the diagnostic index (and whether this was an initial or subsequent episode). It also enabled the establishment of any record of subsequent death. Patient's last recorded residential address and telephone number and that of the next of kin were established.
- (vi) Information was extracted about the stroke episode, in order to provide baseline descriptive data (eg age, sex, hemiplegic side, length of hospital stay, level of consciousness on admission) and evidence of transfer to Wentworth Hospital.

- (vii) The whereabouts of patients who met the criteria for inclusion in the study were determined from hospital records. Where an initial telephone call to a recorded number was not successful in tracing the patient the whereabouts of the patient was established by one of the following methods:
- (a) consulting hospital Accounts Department records
 - (b) contacting the Medical Aid Society recorded on the patient's admission sheet
 - (c) consulting the Department of Social Welfare and Pensions. (Although an address could not be furnished they could state whether the patient was alive and receiving a pension).
 - (d) visiting the last known home address where a telephone number was not available.
- (viii) Permission to interview was requested from the patient or responsible carer and in each case consent was given.
- (ix) A structured questionnaire relevant to the study objectives was drawn up and administered (Appendix 8). Where telephone numbers were not recorded or available the last known home address of the patient was visited.

4. SAMPLE SELECTION

(i) Hospital-based Study Component

All patients discharged from Addington Hospital in 1983 and 1984 who met the criteria for inclusion in this component of the study were included in the sample.

(ii) Household-based Study Component

All patients who were admitted to the hospital-based study component and who:

- (a) had not died subsequent to hospital discharge
- (b) were resident in the Durban Magisterial District
- (c) could be traced to their current place of residence were included in the sample.

(iii) Control Group

For the purpose of this descriptive study no control group was drawn, however comparisons between sample sub-groups were made.

5. REDUCTION OF BIAS

Bias was reduced by

- (i) adherence to defined criteria
- (ii) the use of a standard questionnaire
- (iii) the conducting of the interview by a single interviewer
- (iv) the conducting of all cases who met the inclusion criteria .

RESULTS

1. Number of patients and means of case ascertainment (OBJECTIVES 1 & 2)

A total of 286 admissions for stroke were identified through the hospitals' medical records retrieval system. Of these, 76 patients (26.5%), in whom a diagnosis of acute stroke could not be confirmed, were excluded (Table 1). Of the remaining study population of 210 cases, 113 (54%) had died in hospital and 16 (7.6%) surviving patients were excluded due to recurrent stroke episodes. The initial sample consisted of a homogeneous group of 81 initial acute stroke patients discharged from hospital (Tables 1 and 2). Follow-up of these cases revealed that 24 (29.6%) had died, 16 (20%) were living beyond the geographical limits of the study and 6 (7.4%) could not be traced (Table 10) (Fig V).

Due to the unexpected small number of remaining cases 35 (16.6%) random sampling could not be carried out on this group in order to identify a household sample. Fortunately all 35 patients agreed to participate.

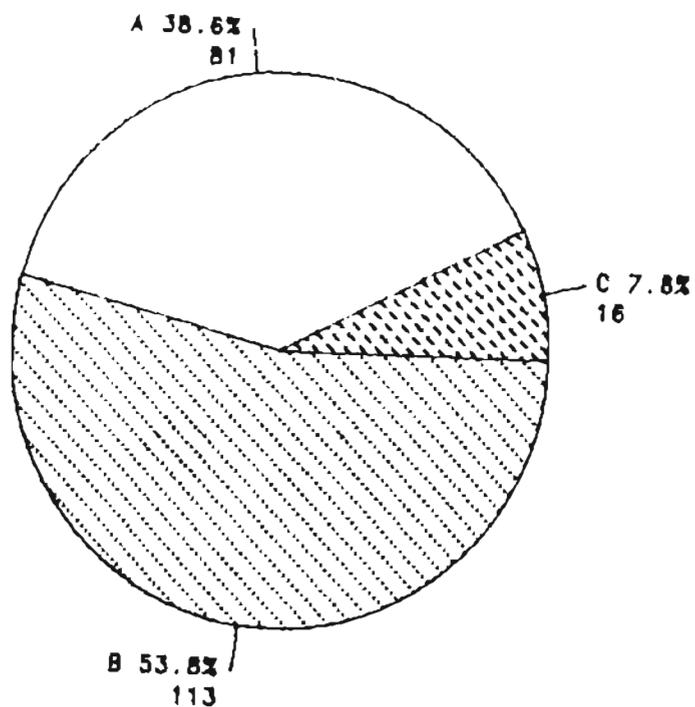


Fig I. Population distribution for 210 White acute stroke sufferers treated at Addington Hospital in 1983 and 1984.

Key

- A. Initial Acute Stroke discharged.
- B. Deaths in Hospital (initial and recurrent)
- C. Recurrent acute strokes discharged.

2. Characteristics of Study Population of Acute Stroke Patients

(i) Age and Sex

The sex distribution (Table 3) appeared almost equal; males accounting for 106 (50.5%) and females accounting for 104 (49.5%). Only in the undefined category (ICD code 436) was a higher number of females recorded.

Mean age at the onset of acute stroke was 66 years (Table 4). The age range being between 28 years and 97 years. Ninety-six (46%) of patients were over the age of 74 years and the remaining 43 (20%) were below the age of 65 years (Fig II).

Mean age according to sex and type of stroke is recorded in Table 4. It can be seen that females (mean age 70 years) were significantly older than males (mean age 62.9) (Pair-wise t-test: $p = 0.0002$ DF = 208). Except in the case of subarachnoid haemorrhage (ICD code 430) females were older in each rubric.

(ii) Types of Strokes

Of 210 patients with a confirmed diagnosis of acute stroke 70% were classified as acute and ill-defined (Table 5). An equal number of haemorrhagic and occlusive strokes were treated during the two year period.

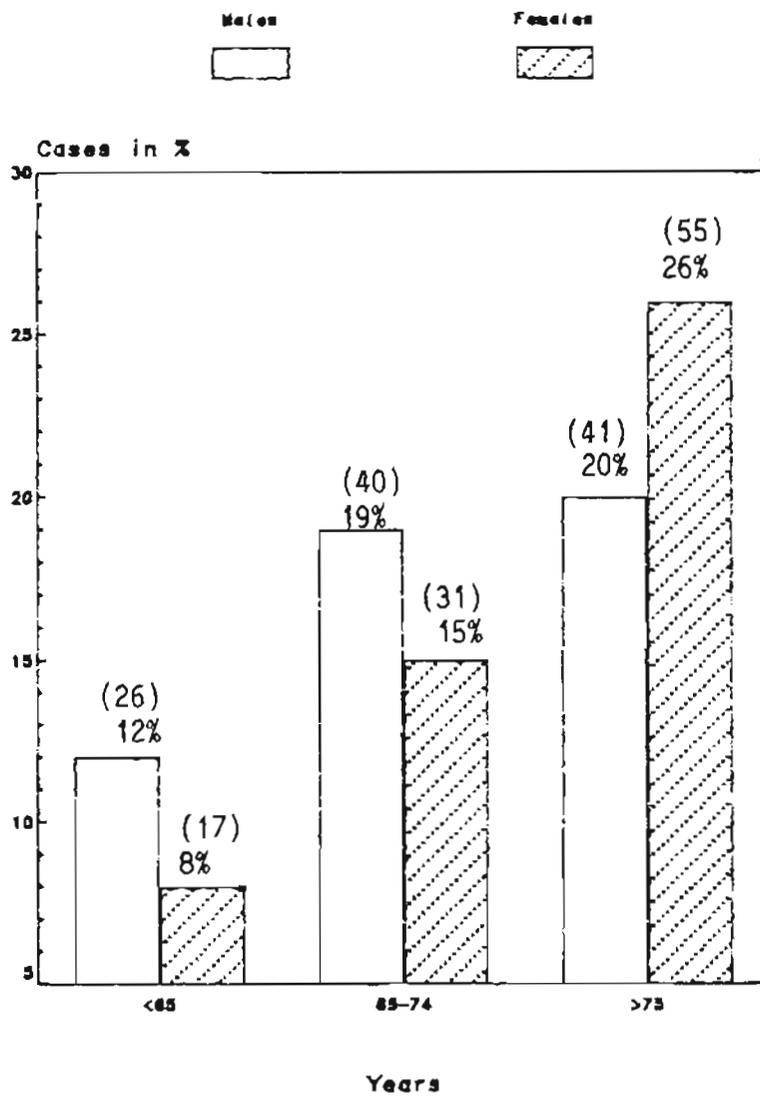


Fig II Age and sex distribution for all white stroke patients admitted to the study hospital in 1983 and 1984

(iii) Case Fatality and Survival (OBJECTIVE 3)

Of the acute stroke sufferers included in the study 113 (54%) died in hospital (Table 5). Seventy-four deaths occurred in the "unspecified" group, 27 in the haemorrhagic group and 12 in the occlusive group. The hospital fatality rates (HFR) for these major diagnostic categories were 50%, 87% and 42% respectively.

Of all hospital deaths following acute stroke 80 (71%) occurred within the first week of admission (Table 6). Following this critical period the number of deaths decreased markedly.

In Table 8 it is shown that 80 (38.5%) of the population of 210 patients died in the first week. At the end of the first month 109 (52%) had died. The cumulative mortality rate at the end of one year was 58.6%.

Whilst 113 (54%) died in hospital, a further 24 (11%) were found to have died on follow-up (Table 8).

The length of hospital stay according to outcome (discharge or death) is shown in Fig III.

The survival curve from stroke onset and up to 2 years (720 days) is illustrated in Fig IV. This illustrates the high case fatality recorded for the initial weeks following admission.

An observable association appeared between the level of consciousness and the outcome of stroke (Table 9).

Of the patients who were comatose on admission 42 (93%) died and 3 (7%) survived. Of those recorded as fully alert on admission 18 (41%) did not survive, 12 (27%) survived to interview and 14 (32%) were untraced.

A record of the level of consciousness on admission was not available for 24 (11%) cases.

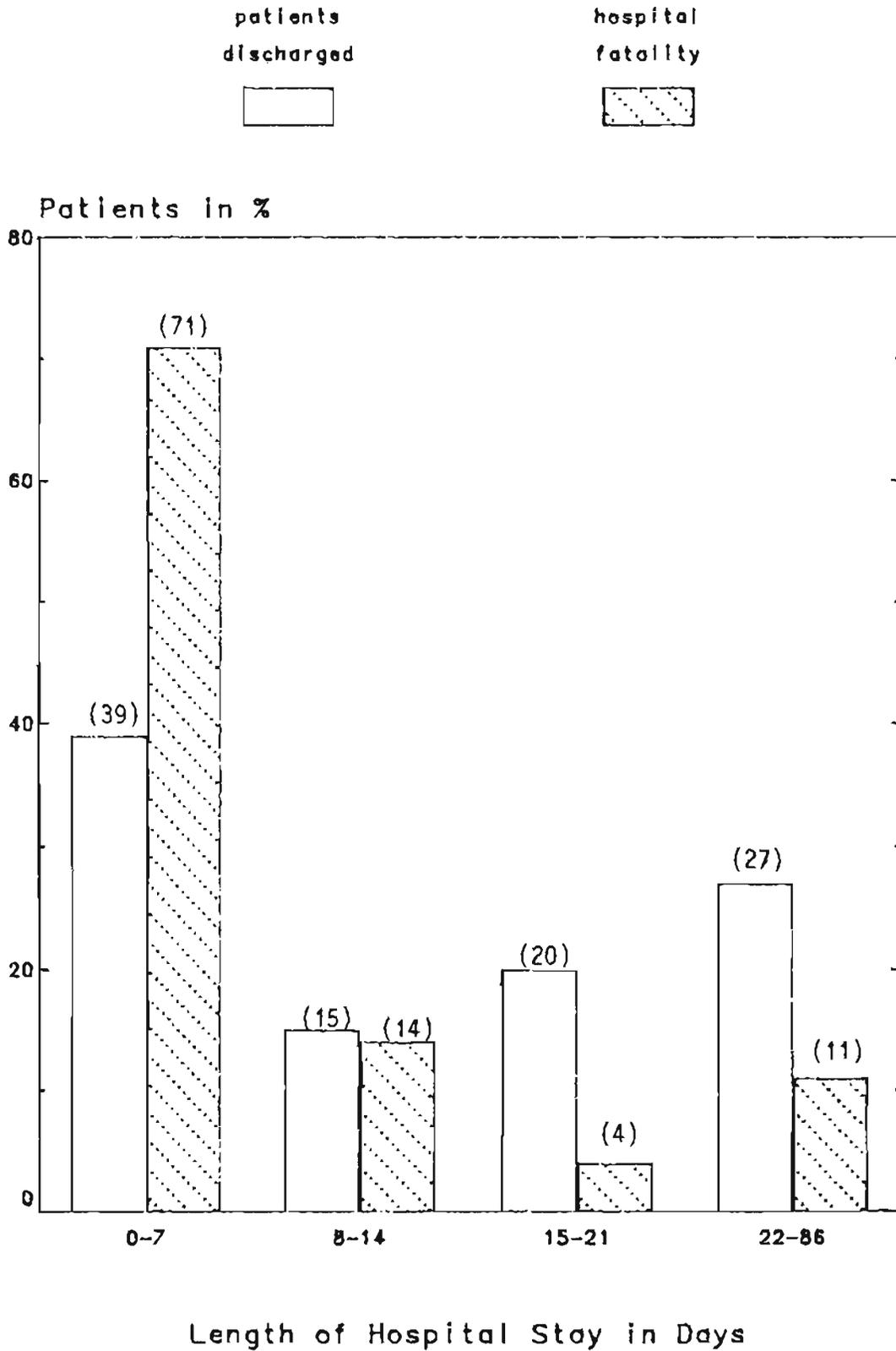


Fig III Length of hospital stay for 210 patients illustrating hospital fatality rate and percent of patients discharged for each time period

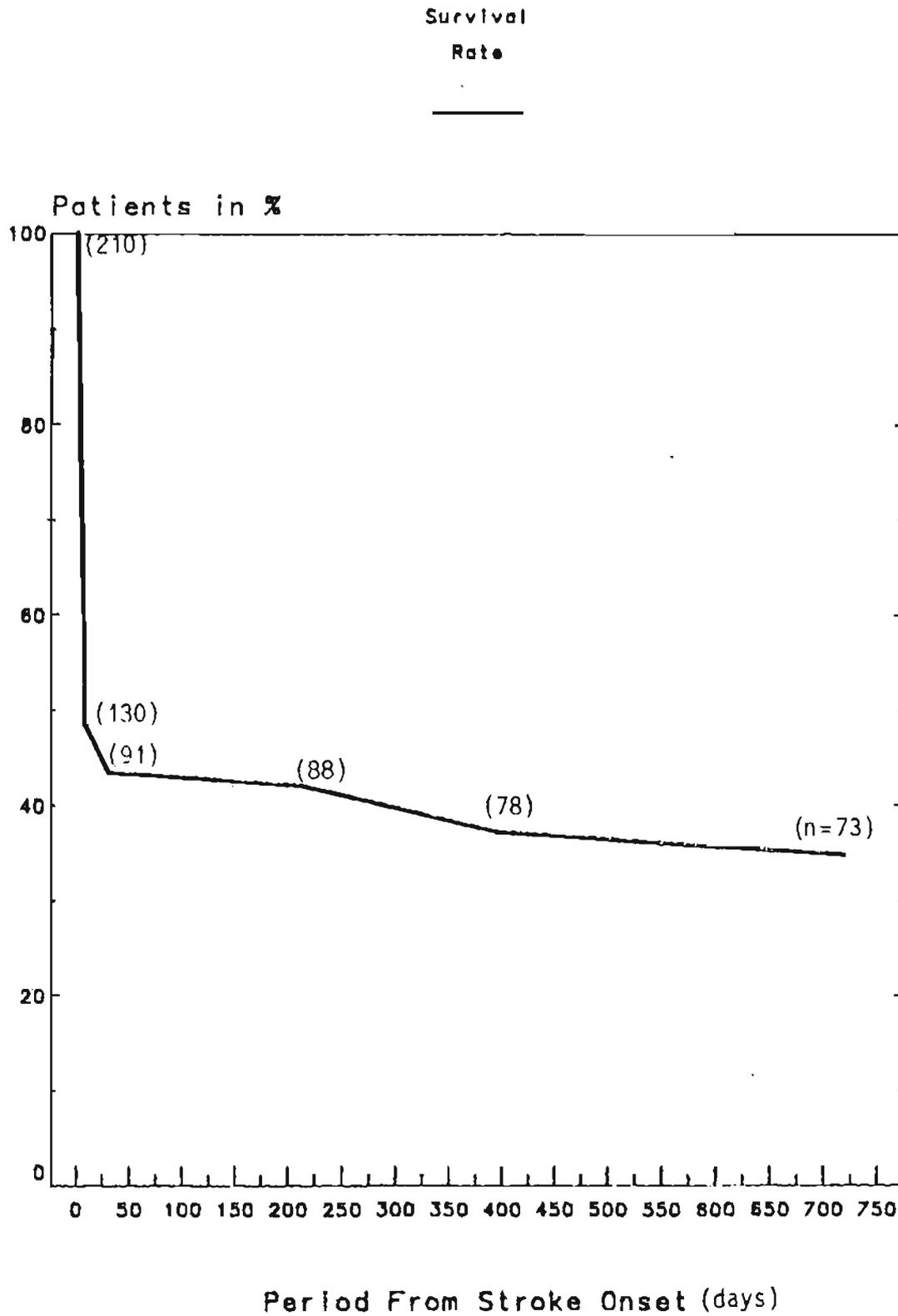


Fig IV Survival curve for 210 patients admitted to Addington Hospital in 1983 and 1984

3. Description of Hospital-based Study Sample

Follow-up of 81 acute stroke patients discharged from the study hospital revealed that only 35 (43%) were available and accessible for household interview (Table 10).

Twenty-four (11%) of patients had died and 16 (19.8%) could not be traced. A further 6 (7.4%) lived beyond the geographical limits of the study and therefore did not meet the criteria for inclusion to this component of the study (Fig V).

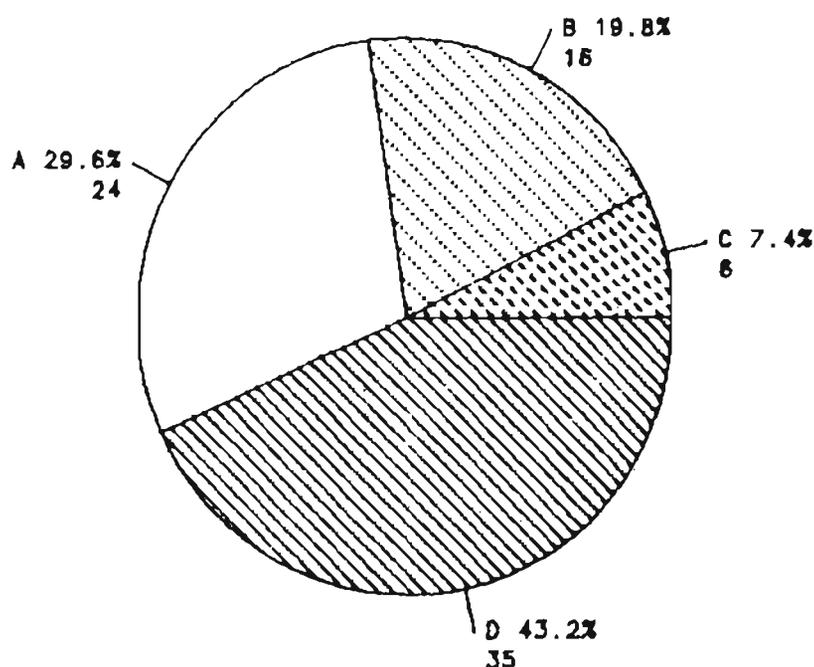


Fig V Composition of Hospital-based study sample: indicating reasons for inclusion in or exclusion from the Household-based study component: Number and percent (%)

Key

- A. Death after discharge
- B. Residence outside household-based study area
- C. Untraceable
- D. Household sample

4. Characteristics of Household Sample (n = 35)

(i) Age and Sex

Of the 35 patients interviewed 15 (43%) were males and 20 (57%) were females. The majority of patients were over 65 years with 8 (23%) below retiring age (Table 11a). There was an observable difference between age and sex in this group with a female tendency to older age. The mean age for the group was 73.5 years (Table 11b).

(ii) Side of Weakness and Age

Hemiplegia was left-sided in 22 (43%) cases, right-sided in 11 (31%) and 2 (6%) no experience of weakness of the limbs was reported (Table 12). Side of weakness was equally distributed in patients under 65 years 18 (51%) had suffered left-sided weakness and in 7 (20%) weakness was on the right side (Table 13). No significant association was observed between side of weakness and age ($p > 2.71$).

(iii) Length of Hospital Stay

Length of hospital stay was not significantly associated with age (Table 14). In the household sample, 14 (40%) were discharged within 1 week. Of 10 (28%) hospitalized for more than 22 days, 5 (50%) were over 74 years. The maximum period of hospitalization was 59 days. No significant association between length of hospital stay and sex was identified ($p = 0.4$) (Table 14). The median length of hospital stay was 19 days.

The length of hospital stay in relation to the nature of therapy received is reported below.

Functional Assessment of Survivors (OBJECTIVE 4)

Functional assessment consisted of an assessment of the ability to perform daily activities (ADL), higher mental skills (HMS) and the degree of social contact maintained (SC) (see questionnaire, Appendix 8). Table 15 summarizes the mean assessment scores according to the year of stroke occurrence. Very little difference in scores appears. Patients with more recent stroke achieved marginally better results despite an older average age (Table 11b). The distribution of total scores is shown in Table 16 where 19 (89%) achieved a score < 83% and 7 (44%) achieved low scores ie below 60%. Very little difference was noted in respect of functional scores and side of weakness. Patients in whom no paralysis was experienced scored the lowest in both tests, however a significant relationship ($p < 0.02$) was observed between ADL scores and HMS scores (Table 17).

Analysis of the levels of independence in ADL function (Table 18) reveals 3 patients dependent in all activities. Bathing and climbing stairs were activities with which the most assistance 16 (45.7%) and 18 (51.4%) respectively, was required. Assistance with toileting was required by 8 (23%) patients.

In relation to the difficulties experienced with higher mental skills (Table 19) short term memory was reported as problematic for 21 (60%). Difficulty in the area of self motivation was experienced by 22 (62.8%) patients.

Social contact scores were generally low (Table 15). The average score for all patients was 62.5%. Following variable analysis 22 (67%) patients received visitors irregularly and seldom, and 12 (34%) patients never left their homes. Five patients (15.2%) were still able to drive but 23 (66%) were totally reliant on family for transportation. Eleven (31%) patients were unable to use the telephone due to physical inability or limited access.

6. Changes in Lifestyle as a Result of Stroke (OBJECTIVES 5 & 6)

(i) Housing (Table 20)

The onset of stroke resulted in changes in living circumstances for 12 (34%) patients. There was no change in the life style of the remaining 23 (46%) (Table 20). At the time of the household interview just over half were living in their homes either alone in the cases of 8 (23%) patients or with a spouse in 11 (31%) cases (Fig VI).

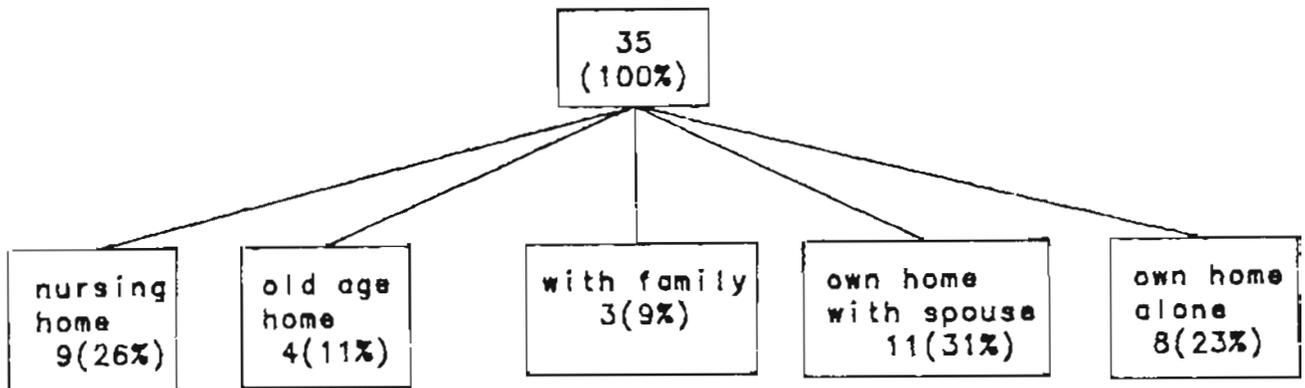


Fig VI Distribution of living circumstances in patients interviewed.

(ii) Employment (Table 21)

Of persons included in the household sample (average age 73.5 years) 26 (74%) had retired before suffering a stroke. Post-stroke the number retired increased to 33 (94%) as, of the 7 patients employed pre-stroke, 5 had to retire subsequently. Only one was able to remain in his usual full-time employment and one patient (aged 39) who had been medically boarded prior to the stroke, was able to obtain full time employment as a lift operator after suffering the stroke.

In this study all female patients who were running households and who were over retirement age were classified as "retired", hence, only 1 patient aged 49 was classified as a housewife. As she was

unable to continue this activity post stroke she was classified as retired. Post stroke a total of 33 (94%) were to be retired although stroke was responsible for retirement in only 5 (15%) cases. Those employed post-stroke numbered 2 (6%).

(iii) Quality of Life

The quality of life was assessed subjectively by the patient and reflected on a graph of life satisfaction (Appendix 8). An assessment was carried out in 29 (82.8%) patients. Six (17%) patients were omitted due to their inability to complete the task. Table 22 reflects the attitudes recorded and the major reasons for these given by the patients.

The majority of patients 22 (72%) reported reduced life satisfaction and 5 (17 %) reported no change in their level of life satisfaction following stroke. Three (10%) patients reported improved life satisfaction following stroke.

(iv) Health and Psychosocial Problems

In more than 50% of patients, depression, confusion and sensory loss (sight and hearing) were reported (Table 23). Seven (20%) patients were incontinent and a small number 4 (11.4%) reported general ill health. Of the psychosocial problems, loss of independence and confinement to the home were reported in 15 (44%) of cases (Table 23). Correlation between health problems and mean ADL scores is shown in Table 24. The most significant correlations were observed between mean ADL scores and depression, mean ADL scores and the presence of incontinence. In both cases low ADL scores were found to correlate with these disabilities. Weak correlations were observed between low ADL scores and the presence of poor eye-sight or confusional states.

7. Supportive Health Services Used

It appears from Table 25 that length of hospital stay was influenced to some degree by whether patients were receiving treatment from the paramedical departments of the hospital. Only 11 (32%) of patients received occupational therapy. This however, shared a strong relationship to length of hospital stay (χ^2 ; $DF = 1$, level of significance = 0.0391). Twenty-two (62.8%) patients reported speech difficulty on admission to hospital. Of these 6 (17%) were treated by the speech therapist in hospital, 2 (5.7%) continued with treatment on an outpatient basis.

Minimal use has been made of services outside the hospital. Tafta services had been most frequently used, but by only 7 (20%) of patients (Table 26). Community health nurses appeared to have visited the homes of 9 (25.7%) patients only on one occasion following discharge.

DISCUSSION

A. HOSPITAL BASED STUDY POPULATION

1. CASE ASCERTAINMENT

This is a retrospective, descriptive study on the outcome of acute stroke in white patients admitted to Addington Hospital between 1 January 1983 and 31 December 1984.

Of 286 patients admitted to hospital and given a diagnosis of stroke, this diagnosis could not be confirmed in 76 (26.5%) cases. From the remaining 210 cases a household sample was established according to the criteria for inclusion in the study defined above. Relevant epidemiological details were established from the hospital records for all cases, but an interview in the home was only conducted in respect of 35 surviving patients. All visits were made in June 1986. The time of the household visits ranged from 19 to 42 months after the occurrence of the stroke (mean = 30,4 months).

2. DEMOGRAPHY OF THE STUDY POPULATION

The number of males and females included in the study (106 and 104 respectively) were approximately equal. However, the age of females was significantly ($p < 0.002$) higher than that of males. The mean age of females was greater than that of males for each ICD rubric except in the case of subarachnoid haemorrhage (Table 3)

As stroke is more frequent with increasing age and a large proportion of patients who attend the study hospital are elderly the average age of 62.9 years for males was surprisingly low (Table 4). The longer period of survival in women over men noted in this study is consistent with that reported in other studies⁽⁹³⁾. This may be due to greater severity of atherosclerotic vessel disease in men or to a higher incidence of heavy smoking as has been proposed in other studies.⁽¹⁾

3. TYPES OF STROKES

(i) Occlusive strokes (ICD Codes 433 and 434)

Due to the very high proportion of "ill-defined" strokes (70%) the number of occlusive strokes (15%) was lower than that quoted in other studies. (refer Appendix 2)

Occlusive stroke in males treated at Addington Hospital appears to be important for 2 reasons:-

- a) The average age (62.2 years) is much lower than that for women (72.25 years) and is below the usual age for retirement (Table 4). Amongst the 7 women in whom death from occlusive stroke was recorded 2 were below the age of 45 years and 1 was aged 60. (The age range for the remainder was 69 - 93 years.)
- b) Whilst the hospital fatality rate for males in this category was 16% and 23% for females, the former is noteworthy considering the age group in question.

There is therefore need for the development of a programme of stroke risk determination and stroke prevention.

(ii) Haemorrhagic strokes (ICD Codes 430, 431 and 432)

Of the major diagnostic categories patients with haemorrhagic stroke suffered the highest case fatality rate (Table 5) (HFR = 87%). In addition this constituted the youngest group of patients (mean age = 63.7 years) (Table 4). The high HFR for patients with subarachnoid haemorrhage is particularly important due to their relative youth (mean age = 53.4 years).

In respect of patients with subarachnoid haemorrhage only 8 patients were identified and only one patient survived. In 2 cases patients survived 7 and 32 days respectively. Both these patients were conscious but disorientated on admission. In the remaining case the occurrence of subarachnoid haemorrhage was

questioned. The surviving patient who was aged 79 years had been admitted with unimpaired level of consciousness. On follow up this patient was found to be in very good health. A brain scan had not confirmed either subarachnoid or cerebral haemorrhage however the former remained recorded as the discharge diagnosis.

(iii) Undefined strokes

It is noteworthy that 70% of strokes were classified as "acute and undefined" (code 436) (Table 5). This is markedly higher than the expected figure of 11% quoted in other studies⁽⁵⁹⁾ and may indicate both the difficulty of accurate stroke diagnosis on the basis of clinical examination and the need for improved diagnostic techniques. Factors which may be associated with these findings are:-

- (a) Lack of resident brain scanning facilities: It was not until 1985 that brain scanning facilities were available at the study hospital. Prior to this, patients were transported to a specialist hospital some 25km away for scanning. It is possible that due to logistic difficulties many patients were not scanned.
- (b) Age group seen: Although the overall average age was 66.4 years, patients in the "ill-defined group" were older, averaging 73.3 years (Table 4). Diagnosis is more difficult in older patients and particularly without the aid of readily available brain scanning facilities.
- (c) Verification by autopsy: The verification of diagnosis by autopsy is not routine practice in the hospital and very few were observed to have had an autopsy confirmed diagnosis.
- (d) Hospital size: Hospital size has been postulated to influence the willingness of doctors to make an accurate diagnosis⁽⁸³⁾. Pressure of work may have played a part in the high number of "ill-defined" cases and the brevity of history taking in some instances.

4. SURVIVAL AND OUTCOME

The short and long term case-fatality rates in the present study appeared similar to those of international studies. Between 25 - 50% of stroke admissions can be expected to die in the initial weeks^(4,40) and 66% within the first year.⁽³⁰⁾ In the present study 52% died within the first month of stroke and 59% of survivors had died within the first year (Table 7). Of the deaths occurring in hospital 71% occurred within the first week. The rate of death after the first week dropped dramatically (Table 7). Consistent with the findings of other studies,^(4,18) level of consciousness proved to be an important determinant of outcome. Patients with impaired consciousness had a considerably worse case-fatality to those who were fully alert on admission (Table 9). With regard to side of weakness and age no significant association with was noted between the variables. ($\chi^2 = 0,1473$) (Table 13).

Survival to functional independence in self care and mobility outside the home is expected in 1/3 of cases (18). In the present study this was achieved in 13 (37%) of cases.

B. HOUSEHOLD SAMPLE

1. GENERAL CHARACTERISTICS

For the 35 patients in respect of whom a household intravenous conducted the mean age was 73.5 years. Males accounted for 15 (43%) and females for 20 (57%) cases. The age of females was significantly higher than that of males (Table 11a). Thirteen (37%) patients were 75 years or older (Table 11a). Eight of these 10 (79%) were female (28%) patients were less than 65 years of age. Of these only 2 (25%) were female. The higher proportion of female survivors is consistent with the findings of other studies.

The median length of hospital stay for the household sample was 19 days (Table 14) as opposed to 2 in a similar Cape Town based study.⁽⁸⁴⁾ The association between age and length of hospital stay was not significant ($p < 0.05$).

2. DISABILITY AND THE RESULTS OF FUNCTIONAL ASSESSMENT

It is expected that between 30 and 50% of stroke patients of all ages will make a functionally complete recovery from stroke. It has been reported that the older the patient the less likely is complete functional recovery and only one in five over the age of 60 will achieve a full recovery.⁽⁸³⁾

The present study indicates that the outcome of stroke for this small group is better than expected. In spite of high average age (73.5 years) 19 patients (89%) scored over 82% on the overall assessment (Table 16). Thirteen patients (37%) were fully independent in the activities for daily living (ADL's). The results of the functional assessment showed that 50% were independent in completing their own shopping (Table 18). Shopping is considered to be the most complex skill in the ADL list (Table 18) and it followed that patients independent in this activity were independent in the others. However, this did not mean in all cases that they were able to live entirely independently.

The skills which created the greatest difficulty for independent living were climbing steps and bathing. In most cases this appeared to be due to physical weakness, poor balance, loss of power and a fear of falling.

It is interesting to note that a distinct pattern emerged in relation to the loss of functional skills. Skills appeared to diminish in reverse order to that in which they are acquired in the courses of normal human development. Feeding skills, the first to develop, were the last to be lost (Table 18). This would seem to support the principle of retraining functional skills following the pattern of normal motor development in infancy.(55)

In analyzing the results of the functional assessment it was not always clear whether poor functional ability was due to stroke alone. In several instances it was felt that the ageing process was partly responsible for poor scores and that the onset of stroke had contributed to this.

Besides age, other factors played a role in reduced mobility and low ADL scores post-stroke, eg

- (i) Falls were reported by several patients and were experienced as major set-backs.
- (ii) Leg amputation in 2 cases resulted in patients being wheelchair bound. Unfortunately in both these cases physiotherapy at the time of stroke had not been successful due to lack of co-operation from the patients. Both had suffered right hemisphere lesions and had refused physiotherapy at the time.

This emphasizes the importance of patient attitude in therapy and the fact that stopping therapy too early or without sufficient thought needs to be avoided. It was considered that where patients are emotionally uncooperative they should be reviewed at intervals to establish whether further recovery could be augmented by additional physiotherapy. In both cases who had

suffered leg amputation (men aged 62 and 70 at the time of stroke) a great deal of frustration and regret was expressed at the minimal rehabilitational therapy which they had received.

It is important to appreciate that conducting a functional assessment in the patients' home had the possible drawback of reflecting what the patient is allowed to do rather than what he or she is capable of achieving.

3. FACTORS THOUGHT TO INFLUENCE ASSESSMENT SCORES

The results of the functional assessment were thought to be influenced by a number of factors:-

- (i) Hospital discharge to home assessment interval : Very little variation in assessment scores occurred when the subgroups by year were compared (Table 15). This was irrespective of the mean age difference of years between those patients admitted to hospital in 1983 and 1984 respectively (Table 11b). As patients were interviewed at least 19 months following the stroke, It is considered reasonable assumption that most recovery had already occurred and that differences in time, from onset to assessment, would not significantly affect the findings of this study.
- (ii) Side of weakness: The majority of patients (63%) suffered left-hemiplegia and may have been expected to achieve less well than those with right hemiplegia. A significant association between ADL scores and side of weakness was not found ($p = 0.2921$) (Table 17). Those with right-sided weakness did achieve slightly higher scores on the total assessment. Very poor scores were recorded for the 2 cases who had not experienced hemiparesis. One of these patients was senile and low scores were recorded in all areas of her assessment. The other patient, whilst independent in the ADL's scored poorly on the HMS test.

- (iii) Higher mental skills (HMS) scores: The association between HMS and ADL scores was significant ($p = 0.02$) (Table 17). Those who scored low HMS scores, had correspondingly low ADL and social contact assessment scores. This is considered likely to have implications for the future care of these patients and the type of services needed.
- (iv) Current health status (Table 24): Although general ill health was reported in 11% of the sample, this did not appear to influence ADL scores. Depression reported in 57% of cases appeared to influence functional ability significantly ($p = 0.0097$). The presence of incontinence in 20% of cases correlated strongly with poor ADL scores ($p = 0.0002$). The patients' perceptions of what constituted "general ill-health" seemed to vary widely. Despite the presence of conditions such as rheumatism, angina, diabetes, and the need to take medication daily, many regarded their health as generally good. Whilst stroke frequently occurs in patients with multiple disease pathology this is not always the case. In spite of a relatively severe handicap, health may still be regarded as good and an optimistic attitude held. An example of this is given in a short personal account of stroke (Appendix 7).
- (v) Length of hospital stay and involvement of paramedical staff: The length of hospital stay was positively associated with to the degree of involvement of the paramedical staff, particularly the occupational therapist ($p = 0.0391$) (Table 25). The association between length of hospital stay and physiotherapy was noteworthy. Of the household sample 25 (71%) had received at least 1 session with the physiotherapist. Outpatient physio- and occupational therapy was considered by the patients to have been of great benefit. Continued functional assessment following hospital discharge would have provided a useful index in evaluation of the effectiveness of these services. (60) Of the 11 patients receiving occupational therapy, 7 were hospitalized for

more than 2 weeks. Occupation therapy referral considered was to influence the results of functional assessment but insufficient information on the functional capacity of the patient on admission made it impossible to confirm this impression.

4. COPING WITH THE LONG TERM EFFECTS OF STROKE

In spite of the interval lapse following stroke onset, the emotional nature of many of the household interviews revealed both the enormity of the impact of stroke on people's lives, and long term need for psychological support.

Reduced levels of independence and having to move home were experienced as especially stressful. Age and the severity of stroke were noted to be important factors influencing a change in living circumstances.

The variety of living circumstances in which patients were found reflected a range of different needs according to each lifestyle and a different set of problems related to coping. Each of these is briefly discussed.

- (i) Patients remaining in their own homes post stroke: Those patients remaining in their own homes had not necessarily suffered less severe strokes. They were mostly younger and in 11 cases had fit able-bodied spouses. Except for 3 patients who were unaffected, the remainder (8) suffered residual disabilities of varying degrees of severity.

The major problems for the patient included:

- (a) anxiety and fear related to stroke recurrence
- (b) a sense of loss of importance and reduced selfworth.
This was thought to play a large role in the depression and frustration frequently reported
- (c) forgetfulness and confusion
- (d) reduced independence and boredom
- (e) outbursts of temper.

In many cases the spouse tended to be very protective. Spouses often appeared to deny memory loss and confusion in the "patient" although the latter felt this to be a problem. The responsibility of a severely disabled spouse is physically and emotionally extremely stressful. There is frequently little opportunity for respite and financial hardship often complicates the picture. Sexual impotence was voluntarily referred to by one patient who felt this should have been discussed with him and his wife prior to his leaving hospital.

(ii) Patients living alone: Patients living alone were functionally independent in most ADL's. Due to physical weakness in several cases and in one case very poor eyesight, assistance was needed using steps, getting in and out of the bath and doing the shopping. Assistance in all cases was provided by a domestic maid once or twice a week. All patients living alone complained of social isolation and loneliness. Despite this, their success in living independent lives was explained by strong faith and determination not to give up.

(iii) Patients living with family: This was only relevant in three cases but several common problems were observed, viz:-

- (a) problems related to privacy and 3 generations living together
- (b) marital strain
- (c) constant concern if the "patient" has to be left alone
- (d) when assistance is required with activities especially dressing and bathing, these tasks are physically demanding for a carer
- (e) enjoying a family holiday was impossible as there was no one to care for the patient
- (f) emotional stress was very much in evidence for both patients and families.

It did appear easier for spouses and families to cope with the patient who was completely dependent than those who insisted on struggling to do things independently, were slow and as a result demanding on the carer's patience.

- (iv) Institutionalized patients: Of the 13 institutionalized patients living in old age homes and nursing homes, 8 (61.5%) were over the age of 75 years. Eight (61.5%) were wheelchair or bedbound, of which 6 (75%) were in the age group over 75 years. Stroke in each case had dramatically reduced mobility and except in 4 cases patients were dependent in all the ADL's and scores in the area of HMS tended to be correspondingly low. Although total nursing care or nursing assistance was readily available to these patients, rehabilitation programmes were not available at any of the institutions visited.
- (v) Quality of Life: Although 89% of patients achieved high scores (~ 83%) on the functional assessment, 72% reported reduced life satisfaction following the stroke. It is possible that the negative attitudes expressed in relation to quality of life were not due to stroke alone but exacerbated by it (Table 22). The social isolation, loneliness and boredom which results from reduced mobility are problems common to many elderly whether they have had a stroke or not.

Irrespective of the interval between onset of stroke and the interview many patients and their families became emotional when discussing the long term effects of the stroke. Even where the physical after effects were not considered problematic, activities were curtailed by the

inability to concentrate, loss of stamina and physical weakness. In younger patients the forced retirement, reduced activity and anxiety were perceived as important in reducing their life satisfaction. In conversation with the patients it became clear that in the rehabilitation of professional people suffering stroke it is important to cater for their inevitable sense of loss of importance. This was not expressed as a problem by non-professional patients. Where patients are capable of employment on a part-time consultancy basis, or in a similar line of business, this should be suggested. Encouraging patients to take up some form of employment is seen as an important aspect of the follow-up of stroke patients. This observation appeared to support Griffiths comment that "the higher the patients' IQ and responsibilities prior to the stroke the harder the fall" (40). For those patients expressing positive changes on the life satisfaction graph a degree of life acceptance was revealed although these patients were not without residual disability.

Personality factors do appear to play an important part in adaptation following stroke. It was thought that patients with well-developed coping skills in general, had coped better with the crisis of stroke.

5. HOSPITAL BASED SUPPORTIVE HEALTH CARE SERVICES: UTILIZATION AND NEED

Stroke patients in Addington Hospital are mostly treated in the general medical wards. The length of hospital stay was not significantly associated with age (Table 14). However, the length of hospital stay was associated with the involvement of the occupational therapist in treatment (Table 25). Occupational therapy and speech therapy referrals were considered to be few. Only 2 of the 6 patients assessed by the speech therapist

received long term therapy. In most cases speech had returned spontaneously, as is documented in the literature ⁽⁶⁹⁾. Nine 26% patients did not receive paramedical treatment, of these 2 were hospitalized for more than 3 weeks.

Quality of care

The nursing records were reviewed as these were considered to reflect to some degree the quality of daily care given and to influence the outcome of stroke. Several observations were made:-

- (i) there was lack of evidence of the role of the nurse as a co-ordinator of care. In many cases care plans were based on the Nursing Process which whilst this has certain advantages, poses several disadvantages for co-ordinated care, namely:
 - (a) limited reference was made to the involvement of the paramedical team. When referred to this usually took the form of a statement merely recording the patient's visit to the gymnasium
 - (b) there was little evidence of the reinforcement of skills taught in the gymnasium and apparently little knowledge of the therapeutic goals for patient treatment
 - (c) the involvement of patient and family in rehabilitation especially in relation to the positioning and exercising of limbs was not recorded
 - (d) check-list were used in some cases but tended to result in care which appeared mechanical. In the case of patients requiring long term rehabilitation check-lists do not reflect an individualized and creative approach to care, one of the aims of the nursing process.
- (ii) limited knowledge on the role of the nurse in the rehabilitation of the stroke patient was indicated by the following:

- (a) no particular reference was made to the patients' needs for frequent exercising of limbs and the positioning of paralyzed limbs especially hands. This is one of the most important nursing activities in relation to stroke care.^(10, 55) In general, little reference to the paralyzed side was made in the notes
- (b) history taking on admission of the patient frequently revealed that the significance of certain aspects of the history in relation to the implications of stroke had not been realized e.g. the physical circumstances in which the patient is living, and who is available to provide care and assistance etc. On admission of the patient a base-line description of the patients' condition should be recorded. It is meaningless to simply state that the patient is in a "satisfactory condition" and not to mention, for example, the side and extent of paralysis. During the course of hospitalization the identification and recording of information significant to the patient's ultimate transfer home and the degree of assistance required is essential. In many cases neither of these aspects of patient care were clearly recorded.
- (c) An attitude frequently reported was the association of stroke with the requirement of "heavy" nursing care. In the literature it is suggested that if patient mobility in bed is taught at the outset, unless the patient has impaired consciousness the nursing care need not be regarded as "heavy".⁵⁵ The challenge of assisting the retraining of mobility appeared not to be realized. Correct mechanical lifting and teaching the patient to move correctly in bed, not only retrains the postural reflex mechanism, but maximizes self-help and eases the task of nursing.

(iii) The management of depression

Depression was frequently reported in the nursing notes. The patients' needs for reassurance and emotional support were frequently reflected in the records but how these needs were met unclear. An example quoted from the records illustrates this:-

"Patient went to physiotherapy department again. She was very tired on returning to the ward and also very tearful. She says she did much less today. She feels people are getting impatient with her because she is so slow. Patient was reassured, but remains distressed."
(student nurse)

As many people value themselves through their activities, loss of mobility and physical vigor are frequent causes of depression.¹³ As much as is known about the causes of depression and anxiety in stroke patients need to be understood by the professional staff in order that these complications may be anticipated and correctly managed. It appears that a certain degree of depression is to be expected in association with decreased mobility, loss of dignity as well as the reality of slow and frequently incomplete recovery, hence, it is recommended that techniques in communicating reassurance to patients be incorporated in the teaching of all professional staff.

(iv) Preparation for discharge

The discharging of patients from hospital frequently appeared abrupt with little evidence of planning for this. Unless there was a placement problem, mention of the venue to which the patient was discharged, was not made. Questions do need to be asked regarding transport home and accessibility to flats (especially where there is no lift).

During the household interviews the patients were questioned about the advice they were given in hospital (Table 27). Only 4 (11%) remembered being given an explanation for the cause of the stroke. Many patients considered the onset of stroke to be related to an emotionally stressful event, coupled with fatigue in some cases.

The advice most frequently remembered was when to return to the out-patient clinic. Advice on diet, the availability of community services and where to obtain aids such as walking-sticks, commodes, bath aids etc appeared to be given in very few cases. Many patients were found to require dietary advice particularly those living alone and the frail elderly being cared for by the family.

(v) Lack of continuity of care

The lack of continuity of care between home and hospital was very much in evidence. Patients were being discharged after long periods of hospitalization or very short stays with no co-ordinated back-up service outside the hospital. The community health nurses who are essential in bridging the home-hospital gap had made a single visit to only 9 of the non-institutionalized patients. Whereas one visit is all that might be necessary in most cases, the visit is essential with regard to isolating patients with problems.

6. NON-HOSPITAL BASED SERVICES: UTILIZATION AND NEED

Whilst domiciliary services provided in Durban are limited, the utilization of services following hospital discharge were minimal. Tafta services were the best known but had been used by only 7 (20%) of the patients. Stroke clubs had been used by only 3 patients. All patients who required assistance with bathing and household duties (eg shopping,) had employed domestic assistance on a part or full time basis. Of the 13 patients requiring full time nursing care 10 were institutionalized and 3 were living with families. In the case of the latter, the cost

of nursing services was high and these were found to be frequently unreliable especially at night. Depending on the nature and degree of disability there appeared to be a need for services which could provide:-

- (i) assistance with physical problems eg incontinence, constipation, chest infections etc as well as opportunities for the emotional expression of the carers.
- (ii) day care centres to relieve carers and to provide social contact for these otherwise very isolated patients.
- (iii) holiday-relief which is essential for families caring for an elderly, chronically dependent member. Strained family relationships were evident in all cases where families were caring for a stroke-handicapped relative. Although the situation did not appear as urgent, relief for the spouses of moderately handicapped patients was felt to be important, if only on a day-care basis.

The poor use of stroke clubs was due mainly to ignorance of their availability and value. One of the younger patients felt that the club he had attended did not provide stroke sufferers with sufficient constructive advice. "It was geared to the senile elderly and no scope was provided for individual problems." Transport was also reported as a major problem.

Many patients consulted a local general practitioner who was prepared to make house calls and prescribe repeats of medication without necessarily seeing the patient. Difficulty getting to the Addington out-patient department was related to transport difficulties especially in the cases of wheelchair-bound patients. Many of these patients were social pensioners not on medical aid so that cost was a major factor.

This study has highlighted the need for the development of a co-ordinated health service which would:

- (i) have the advantage of reducing hospital stays to a minimum period and
- (ii) provide short-term "aggressive" therapy appropriate to the patients' usual routine and lifestyle.

In conclusion, the following quotation is cited because of its relevance to those professionals involved in stroke care.

"Situations often occur when it is felt that little or nothing can be achieved ... In actual fact, this is the greatest challenge of all to the clinician. Improving the quality of life of an ailing elderly patient - adding life to years rather than years to life - has often been the hallmark of the great geriatrician.

He often obtains his greatest achievements by listening to the fears and anxieties of patients and their relatives, always being ready to sympathize, reassure and explain" (Tibbit, 1979).

CONCLUSIONS

The small sample of patients who were interviewed precludes the confident generation of the findings to the population in general. The findings of the study and the conclusions are nevertheless relevant and provide some important information concerning the nature of the problems experienced by patients who have survived a stroke following their discharge from hospital.

Stroke in South Africa

Review of the literature revealed that despite a decline in stroke mortality in recent years, rates in South Africa remain higher than most western countries. The apparent limit of published literature reveals the need for further work in the field, particularly in the development of health promotion and disease prevention programmes. The decline in stroke mortality has important implications for the development of appropriate supportive health services which at the present time appear few. It is surprising and of a great concern that where curative services are so well developed, preventive and supportive services are minimal.

Study method

Several study limitations were experienced as a result of the retrospective method. These were mainly in relation to flaws in the hospital record-keeping system eg the high proportion of episodes (26.5%) incorrectly recorded as stroke. There are strong indications of the need to revise the system of medical record-keeping, storage and retrieval.

Survival and disability

Considering the high average age of patients (73.5 years) and the limited nature of services specialized in stroke care, the functional ability of patients was found to be better than expected. Complete functional independence was noted in 13 (37%) cases.

It is noteworthy that complete functional independence does not necessarily obviate the need for supportive care. It was felt in some cases that social isolation, general ill health and old age were more significant problems in the lives of patients than the stroke itself. The advent of stroke in some cases merely exaggerated these problems.

The lack of supportive services was particularly noted in relation to families coping at home with dependent elderly stroke patients. The greatest problems in coping appeared in relation to depression, personality changes and incontinence as well as the tedium of providing constant care for the chronically ill or disabled patient. With respect to adjustment after stroke it was felt that personality factors play an important role.

While this study does not attempt to determine incidence of stroke the occurrence of this condition in younger patients is noteworthy and requires further epidemiologic investigation. In the present study 71% of deaths occurring in hospital occurred in the first week. In order to establish the reasons for this, accurate analysis of the recorded clinical signs and symptoms on admission is required. To achieve this, consistency in medical reporting is essential. Although the analysis of the medical records was not an objective of this study, a lack of consistency in the details recorded on patient admission was observed. It is possible that the recent acquisition of a resident brain scanner has the potential to improve diagnostic accuracy and survival. The policy on the referral of suspected stroke patients for brain scanning must be clear. Advanced age should not be a criteria for denying the patient an accurate diagnosis made on the basis of a scan.

The provision of supportive health care

(i) Involvement of the transprofessional team

There is evidence that the quality of life after stroke and the successful reintegration of the handicapped individual into society depends on the quality and nature of available health

care services. The application of the skills of the transprofessional team is most appropriate in stroke care.

In the present study it was felt that patients being nursed in a general medical ward did not benefit from a therapeutic team approach. Referrals to occupational therapy were few and the value of isolated exposures to both physiotherapy and occupational therapy in many cases was questioned. The impression gained from review of the case notes and the subsequent progress of the patient was that the potential for improvement in those surviving the initial weeks is often underestimated. The value of an objective instrument for measuring disability and directing the course of treatment became increasingly clear during the study.

(ii) The approach to rehabilitation

On the basis that:-

- (a) The provision of a graduated programme of rehabilitation was not in evidence in the case notes.
- (b) Nursing skills in the progressive retaining of the postural reflex mechanism under the close guidance of the physiotherapist was not reflected in the records.
- (c) In only 1 set of records was there evidence that the nursing staff were aware of the occupational therapy aims for the patient and that these were being reinforced by the nurses.

The following conclusions were drawn:-

- (a) The satisfaction of meeting the challenge of stroke rehabilitation cannot be achieved without communication and co-operation between the team members.
- (b) Planned and co-ordinated care of the stroke patient requires a team specially trained in the management of hemiplegia and the process of rehabilitation.
- (c) Stroke care affords an ideal opportunity for individualized patient care as each stroke manifests as a unique composite of neurological deficits.

(iii) Limitations in care due to the absence of a standardized functional assessment

Considering the advantages of functional assessment in the standard of care afforded, a major limitation in care was felt to be the absence of periodic functional assessment.

The results of the functional assessment conducted in the present study had no value in reflecting patient progress over time as there was no similar objective assessment against which it could be measured. It was useful in reflecting current status regarding independence and hence the nature of existing needs.

(iv) The psycho-social aspects of care

That stroke frequently means isolation and considerable psycho-social consequences for the patient was revealed in several interviews. Considering the time lapse from stroke to interview, many of the psychological problems observed may be regarded as long term eg depression, anxiety, fear of recurrent stroke, lack of self confidence, personality changes, etc.

Making allowances for these in a programme of rehabilitation which involves the family must enhance the quality of life after stroke and the successful re-integration of the handicapped individual into society. Stroke clubs could play a major supportive role for patients and families post stroke, but this requires informed and creative leadership.

(v) Place of stroke care

Due to the specific demands of the stroke patient and the special interest this requires from the staff it does not seem appropriate to admit stroke patients to a general medical ward. Although many stroke patients in the UK are not hospitalized, until supportive health care services in Durban have been sufficiently developed it is concluded that all acute stroke patients should be hospitalized in the initial stages. A stroke unit comprising staff with specialized knowledge in stroke

rehabilitation may alter present views on stroke management and elevate the medical status of the condition.

It would appear that all the advantages of a geriatric assessment unit outlined by Tibbit^(99, 100) can be used to motivate the establishment of a stroke unit. As a large proportion of stroke patients are under the age of 65 years it would appear advantageous not to treat these patients in geriatric units. The rationale being the avoidance of the association of stroke with the elderly and the consequent stigma attached to this.

In respect of the provision of community based supportive services the needs of stroke patients are considered to be similar to the needs of the chronically ill or disabled. As a result there is a strong evidence to support the co-ordination of the presently fragmented services to facilitate more efficient operation and to provide service to a greater number of people.

(vi) Stroke Prevention

The identification of risk and the primary prevention of stroke is essential.

"Major reductions in disability and death from stroke will come from prevention rather than more efficient medical and surgical treatment."(59)

The need for preventative and promotive health care has been well recognised, however these programmes require planning, developing and initiating.

"No single medical measure could make such a contribution to the quality of life in old age as the prevention of strokes" (WHO, 1971)(33)

RECOMMENDATIONS

In respect of improving the care of stroke patients and subsequent outcome it is recommended that:-

1. A multidisciplinary stroke team which includes medical, nursing, physiotherapy, occupational therapy, speech therapy, clinical psychology and social worker health professionals, be established.
2. A standard policy for co-ordinated stroke management be formulated by the multidisciplinary stroke team, approved by appropriate hospital and health service authorities and subsequently implemented.
3. The stroke care programme referred to in 2 above includes the following:-
 - (i) adequate education of patients and their families concerning the implications of stroke
 - (ii) reassurance regarding supportive care after discharge
 - (iii) the development of an appropriate standardized method of functional assessment which could be administered on admission, during the course of treatment and on discharge of the patient
 - (iv) the development of community liaison facilities to identify vulnerable patients, assess their needs following hospital discharge and to encourage utilization of appropriate community services. This is suggested in an attempt to improve continuity of care following discharge.
 - (v) planned discharge of patients with written reinforcement in the form of leaflets and booklets, of explanations and advice given.
 - (vi) the ultimate aim of stroke rehabilitation is to return patients to their own homes. Where complete independence is not restored, holiday relief facilities are an urgent requirement for carers.

- (vii) holiday relief facilities for short term admission of stroke patients be provided where complete independence is not restored, so as to assist the carers.
 - (viii) the development of a stroke counselling service is recommended to assist families and patients coping with disability and social reintegration following stroke.
4. A specialized stroke unit structured initially to meet the requirement of the Addington Hospital patients and eventually to meet the demands of the urban centre as a whole. Impediments caused by the in present fragmentation of health services would need to be overcome.
 5. Improvements in nursing education related to stroke care be made especially in respect of the role of the nurse in the rehabilitation team and in the practical aspects of stroke management such as:
 - (i) implementation of a graduated programme of mobilization
 - (ii) the management of perceptual deficits
 - (iii) avoiding the physical complications following stroke.
 6. A working knowledge of the techniques and goals of the paramedical staff is needed by nursing and medical staff particularly in relation to the advantages of occupational therapy in stroke rehabilitation.
 7. The development of stroke clubs needs to be encouraged. These should be established as dynamic groups with the aims of providing emotional support to stroke sufferers, social contact with others in a similar position and practical advice related to coping.
 8. Further research needs to be conducted concerning the needs of younger stroke patients at Addington Hospital.

TABLES

TABLE 1

WHITE PATIENTS IDENTIFIED BY THE MEDICAL INDEX OF ADDINGTON HOSPITAL
FOR INCLUSION IN THE STUDY AND, WHERE EXCLUDED, REASONS FOR EXCLUSIONS:

Number and Percent (%)

REASON FOR EXCLUSION (IF EXCLUDED)	NUMBER (%)
*CVD, but not stroke	16 (5.6)
not CVD	30 (10.5)
medical records not found	30 (10.5)
remaining study population	210 (73.4)
TOTAL	286 (100)

*Note CVD = cerebrovascular disease

TABLE 2

WHITE PATIENTS WITH ACUTE STROKE INITIALLY RETAINED IN THE STUDY AND
THOSE SUBSEQUENTLY EXCLUDED ACCORDING TO REASON FOR EXCLUSION:

ADDINGTON HOSPITAL 1983 AND 1984

Numbers and Percent (%)

REASONS FOR EXCLUSION (IF EXCLUDED)	NUMBER (%)
Acute but not initial stroke	16 (7.6)
Death in hospital	113 (53.8)
Retained in study	81 (38.6)
TOTAL	210 (100)

TABLE 3

ACUTE STROKE ACCORDING TO TYPE OF STROKE AND SEX:
WHITE PATIENTS ADMITTED TO ADDINGTON HOSPITAL IN 1983 AND 1984:
Number and Percent (%)

ICD CODE	TYPE OF STROKE	MALES	FEMALES	TOTAL(%)
430	Subarachnoid haemorrhage	6	2	8 (4)
431	Cerebral haemorrhage	10	9	19 (9)
432	Unspecified intracranial haemorrhage	3	1	4 (2)
433	Occlusion of pre-cerebral arteries	2	1	3 (1)
434	Cerebral thrombosis and embolism	14	14	28 (14)
436	Acute, ill-defined	71	77	148 (70)
	TOTAL	106 (51)	104 (49)	210 (100)

TABLE 4

SEX AND MEAN AGE OF OCCURRENCE (YEARS)
ACCORDING TO TYPE OF STROKE : WHITE PATIENTS ADMITTED TO ADDINGTON
HOSPITAL IN 1983 AND 1984:
Number and Percent (%)

ICD CODE	TYPE OF STROKE	MALES	FEMALES	MEAN AGE (YEARS)
430	Subarachnoid haemorrhage	54.8	52.0	53.4
431	Cerebral haemorrhage	65.6	73.8	69.7
432	Unspecified intracranial haemorrhage	61.0	75.0	68.0
433	Occlusion of pre-cerebral arteries	55.5	75.0	65.3
434	Cerebral thrombosis and embolism	69.0	69.5	69.2
436	Acute, ill-defined	71.5	75.1	73.3
	MEAN AGE	62.9	70.0	66.4

Pairwise t-test: $p = 0.0002$ DF = 208 (significant)

TABLE 5

PATIENTS, DEATHS AND HOSPITAL FATALITY RATE (HFR) IN RESPECT OF
INITIAL ACUTE STROKE ACCORDING TO MAJOR DIAGNOSTIC CATEGORY:
WHITE PATIENTS ADMITTED TO ADDINGTON HOSPITAL IN 1983 AND 1984
Numbers, Percent (%) and HFR

CATEGORY	PATIENTS (%)	DEATHS	HFR
Haemorrhagic	31 (15)	27	87
Occlusive	31 (15)	12	39
Unspecified	148 (70)	74	50
TOTAL	210 (100)	113	54

- Note: 1. Haemorrhagic include ICD rubrics 430 to 432 inclusive.
 2. Occlusive includes ICD rubrics 433 and 434.
 3. Unspecified includes ICD rubric 436 only.

TABLE 6

ADMISSION TO DEATH INTERVAL OF WHITE PATIENTS WITH AN ACUTE STROKE
WHO DID NOT SURVIVE HOSPITAL ADMISSION: ADDINGTON HOSPITAL 1983 AND 1984

Numbers and Percent (%)

ADMISSION TO DEATH INTERVAL (DAYS)	DEATHS (%)
0 -	80 (71)
8 -	16 (14)
15 -	4 (4)
22 - 86	13 (11)
TOTAL	113 (100.0)

TABLE 7

MORTALITY FOLLOWING AN ACUTE STROKE ACCORDING TO PERIOD FROM ONSET:
WHITE PATIENTS ADMITTED TO ADDINGTON HOSPITAL IN 1983 AND 1984:
Numbers and Percent (%)

PERIOD FROM ONSET	SURVIVORS	DEATHS*	TOTAL	PERIOD** MORTALITY (%)	CUMULATIVE MORTALITY (%)
0 days -	130	80	210	38.0	38.0
8 days -	102	28	130	21.5	51.4
31 days -	91	11	102	10.8	57.1
7 months -	81	3	91	3.3	58.0
13 months -	78	9	87	10.3	61.9
2 years +	73	6	80	7.6	64.7

Note: * (i) The total number of deaths = 137 (see table 9)

**(ii) Period mortality is mortality specific to each time period

(iii) Median survival time from stroke onset to death = 32 days

TABLE 8

MORTALITY AND SURVIVAL OF WHITE PATIENTS WITH AN ACUTE STROKE
ADMITTED TO ADDINGTON HOSPITAL IN 1983 AND 1984:

Numbers and Percent (%)

MORTALITY AND SURVIVAL	PATIENTS
Death in AH*	113 (54)
Death after discharge	24 (11)
Recurrent strokes (excluded)	16 (7.6)
Untraced	6 (2.8)
Survivors	51 (24.2)
TOTAL	210 (100.0)

* Note: AH = Addington Hospital

TABLE 9

LEVEL OF CONSCIOUSNESS ON ADMISSION AND SURVIVAL OF WHITE
PATIENTS WITH AN ACUTE STROKE ADMITTED TO ADDINGTON HOSPITAL
IN 1983 AND 1984
Number and Percent (%)

LEVEL OF CONSCIOUSNESS ON ADMISSION	SURVIVAL			TOTAL (%)
	DEAD	ALIVE	NOT ESTABLISHED	
Fully alert	18 (41)	12 (27)	14 (32)	44 (100)
Impaired	60 (62)	22 (23)	15 (15)	97 (100)
Coma	42 (93)	3 (7)	0 (0)	45 (100)
Not known	17 (71)	2 (8)	5 (21)	24 (100)
TOTAL	137 (65)	39 (19)*	34 (16)**	210 (100)

Note: * Only 35 of these were included in the household sample as 4 were resident outside the study area

** these patients were excluded from the study as 6 were untraced, 16 were recurrent strokes and 12 were residents outside the study area

TABLE 10

COMPOSITION OF SAMPLE OF PATIENTS INTERVIEWED AT HOME:
REASONS FOR SELECTION OR EXCLUSION: WHITE PATIENTS WITH AN INITIAL
ACUTE STROKE ADMITTED TO ADDINGTON HOSPITAL IN 1983 AND 1984:

Numbers and Percent (%)

REASONS FOR SELECTION/EXCLUSION	NUMBER (%)
Deaths following discharge	24 (29.6)
Resident outside study area	16 (20)
Untraced	6 (7.4)
Remainder for household interview	35 (43)
TOTAL	81* (100)

*Note: Number discharged from Addington Hospital (see Table 2)

TABLE 11

HOUSEHOLD INTERVIEW OF SURVIVORS IN AN INITIAL ACUTE STROKE:
WHITES ADMITTED TO ADDINGTON HOSPITAL IN 1983 AND 1984

(a) Age and Sex of Interviewed Patients: Number and Percent (%)

AGE (YEARS)	MALE	FEMALE	TOTAL (%)
< 65	6	2	8 (23)
65-74	6	8	14 (40)
75 +	3	10	13 (37)
TOTAL	15 (43)	20 (57)	35 (100)

(b) Mean Age According to Year of Admission: Number and Percent (%)

YEAR	NUMBER	MEAN AGE (YEARS)
1983	17	71
1984	18	76
TOTAL	35	73,5

Note: Median survival time from stroke onset to assessment = 31 months

TABLE 12

SIDE OF WEAKNESS ACCORDING TO SEX OF 35 PATIENTS INTERVIEWED:
Number and Percent (%)

SIDE OF WEAKNESS	MALES	FEMALES	TOTAL (%)
left	7	15	22 (63)
right	8	3	11 (31)
neither	0	2	2 (6)
TOTAL	15 (43)	20 (57)	35 (100)

TABLE 13

RELATIONSHIP BETWEEN SIDE OF WEAKNESS ACCORDING TO AGE (YEARS) OF
PATIENTS INTERVIEWED:
Number and Percent (%)

SIDE OF WEAKNESS	< 65 yrs	65 - 74 yrs	75 + yrs	Total (%)
left	4	9	9	22 (63)
right	4	4	3	11 (31)
neither	0	2	0	2 (6)
TOTAL	8 (23)	15 (43)	12 (34)	35 (100)

Note: Chi squared test combining 65 years and 65-74 years and excluding cases without hemiplegia
 $\chi^2 = 0,1473$ DF = 1 (not significant)

TABLE 14

LENGTH OF HOSPITAL STAY (DAYS) ACCORDING TO AGE GROUP OF
PATIENTS INTERVIEWED:
Number and Percent (%)

LENGTH OF STAY (DAYS)	AGE GROUP (YEARS)			TOTAL (%)
	< 65	65-74	75 +	
0	5	6	3	14 (40)
8	1	1	1	3 (9)
15	0	4	4	8 (23)
22	2	3	5	10 (28)
TOTAL	8 (23)	14 (40)	13 (37)	35 (100)

median length of hospital stay = 19 days

Note: (i) age categories aggregated (< 75 years and 75 years and over)

(ii) length of stay aggregated (< 14 days and 14 days and over)

$\chi^2 = 0,0008$ DF = 1 (not significant)

TABLE 15

MEAN FUNCTIONAL ASSESSMENT SCORES AND PERCENT (%) OF MAXIMUM
ACHIEVABLE STROKE ACCORDING TO YEAR OF STROKE OCCURRENCE

YEAR	ADL SCORE	HMS SCORE	SC SCORE	TOTAL SCORE
1983	19	6	7	32 (71)
1984	19	7	8	34 (76)

Note

ADL = activities for daily living (maximum score = 24)

HMS = higher mental skills (maximum score = 9)

SC = social contact (maximum score = 12)

Total = the sum of ADL, HMS and SC scores (maximum score = 45)

TABLE 16

DISTRIBUTION OF TOTAL FUNCTIONAL ASSESSMENT SCORES EXPRESSED AS A
PERCENT OF MAXIMUM ACHIEVABLE SCORE:

Number and Percent (%)

SCORE TOTAL	NUMBER %
≥ 83 (high)	19 (89)
60 - 82 (med)	9 (69)
< 60 (low)	7 (44)
TOTAL	35 (100)

TABLE 17

MEAN FUNCTIONAL ASSESSMENT SCORES ACCORDING TO SIDE OF WEAKNESS:
Number and Percent (%) of maximum achievable score

SIDE OF WEAKNESS	ADL SCORE	HMS SCORE	TOTAL
left	18 (75)	6 (78)	25 (81)
right	20 (83)	7 (78)	27 (87)
neither	15 (63)	5 (56)	20 (65)

Note:

Comparing ADL scores with side of weakness.

Pair wise T-test DF = 2 p = 0.2921 (not significant)

Comparing ADL scores with HMS scores.

Spearman rank correlation p < 0.02 (significant)

Comparing ADL scores with sex

Spearman rank correlation: DF = 33 p = 0.4131 (not significant)

Comparing ADL scores with age

t-test: DF = 32 p = 0.058 (not significant)

TABLE 18

LEVEL OF INDEPENDENCE IN ACTIVITIES FOR DAILY LIVING:
ACCORDING TO ACTIVITY:
Number and Percent (%)

DAILY ACTIVITY	DEPENDENCE			TOTAL
	INDEPENDENT	PARTIAL	DEPENDENT	
Shopping	17 (48.5)	1 (3)	17 (48.5)	35 (100)
Climbing steps	17 (48.5)	3 (8.5)	15 (43)	35 (100)
Bathing	19 (54)	4 (12)	12 (34)	35 (100)
Dressing	25 (71)	2 (6)	8 (23)	35 (100)
Mobility on level	26 (74)	2 (6)	7 (20)	35 (100)
Toileting	27 (77)	2 (6)	6 (17)	35 (100)
Getting in & out bed	28 (80)	1 (3)	6 (17)	35 (100)
Feeding	31 (88.5)	1 (3)	3 (8.5)	35 (100)

TABLE 19

DIFFICULTY EXPERIENCED IN RELATION TO HIGHER MENTAL SKILL:
Number and Percent (%)

MENTAL SKILL	LEVEL OF DIFFICULTY		TOTAL
	NONE	SOME	
Self motivation	22 (63)	13 (37)	35 (100)
Verbal communication	23 (66)	12 (34)	35 (100)
Short term memory	14 (40)	21 (60)	35 (100)

TABLE 20

LIVING CONDITIONS BEFORE AND AFTER AN INITIAL ACUTE STROKE:
Number and Percent (%)

TIME RE STROKE	OWN HOME (ALONE)	OWN HOME (SPOUSE)	WITH FAMILY	OLD AGE HOME	NURSING HOME	TOTAL
before stroke	12 (37)	15 (43)	3 (9)	4 (11)	0 (0)	35 (100)
after stroke	8 (23)	11 (31)	3 (9)	4 (11)	9 (26)	35 (100)

Note: All of the above changes were recorded in respect of 12 patients

TABLE 21

OCCUPATIONAL STATUS BEFORE AND AFTER INITIAL ACUTE STROKE:
Numbers and Percent (%)

TIME RE STROKE	EMPLOYED	RETIRED	HOUSEWIFE	OTHER	TOTAL
before stroke	7 (20)	26 (74)	1 (3)	1 (3)	35 (100)
after stroke	2 (6)	33 (94)	0 (0)	0 (0)	35 (100)

Note: All of the above changes were recorded in respect of 8 patients

TABLE 22

ATTITUDES REFLECTED IN RELATION TO A SUBJECTIVE ASSESSMENT OF
LIFE SATISFACTION POST STROKE AND THE MAJOR REASONS GIVEN FOR THIS
Number and Percent (%)

ATTITUDE	PATIENTS	MAIN REASONS GIVEN FOR ATTITUDE
Positive	3 (9)	1) Improvement in life circumstances
Negative	21 (60)	1) Coping with unresolved loss viz: of own home, forced retirement, reduced activity and social contact, death of spouse, memory poor. 2) Psychological problems viz: confusion, bouts of anxiety, loss of confidence, sense of helplessness. 3) Health problems eg: general ill health, poor eye sight.
No change	5 (14)	1) Poor health prior to stroke. 2) Acceptance of life situation, did not expect complete health in old age.
Unable to answer	6 (17)	-
TOTAL	35 (100)	

TABLE 23

HEALTH AND PSYCHOSOCIAL PROBLEMS EXPERIENCED BY PATIENTS
AT THE TIME OF THE INTERVIEW:
Number and Percent (%)

NATURE OF PROBLEM	NUMBER (%)
Depression	20 (57)
Confusion	18 (51)
Confinement to home*	15 (44)
Loss of independence*	15 (44)
Sight	15 (43)
Boredom*	12 (35)
Hearing	9 (26)
Financial difficulty	8 (23)
Incontinence	7 (20)
General ill health	4 (11)

*Note: In these cases 34 patients were interviewed out of a possible 35

TABLE 24

MEAN ADL SCORES IN RELATION TO THE PRESENCE OR ABSENCE OF
COMMONLY EXPERIENCED DISABILITIES:
Number and Percent (%)

DISABILITY	MEAN ADL SCORES		
	PROBLEM PRESENT (%)	PROBLEM ABSENT	p*
Depression	17.8 (57)	21	0.0097
Ill health	15.16 (11)	19	0.9787 (n/s)
Sight	17.18 (43)	20	0.2110 (n/s)
Hearing	18.19 (26)	19	0.6980 (n/s)
Confusion	17.17 (51)	21	0.1146 (n/s)
Incontinence	11.11 (20)	21	0.0002

*Note: Chi squared test with 1 degree of freedom
(N/S) = not significant

TABLE 25

TYPE OF THERAPY RECEIVED DURING HOSPITALIZATION ACCORDING TO
LENGTH OF HOSPITAL STAY (LOS):
Numbers and Percent (%)

LOS (DAYS)	PHYSIO- THERAPY	OCCUPATIONAL THERAPY	SPEECH THERAPY	NIL GIVEN
0	9	3	4	5
8	2	1	0	1
15	6	3	2	1
22+	8	4	0	2
TOTAL	25 (71)	11 (32)	6 (17)	9 (26)

Association with length of stay:

Physiotherapy: Test = t-test : DF = 24.6 : p = 0.2065 (n/s)

Occupational therapy: Test = χ^2 : DF = 1 : p = 0.0391

Speech therapy: Test = χ^2 : DF = 1 : p = 0.6636 (n/s)

TABLE 26

COMMUNITY SERVICES USED BY THE PATIENTS FOLLOWING HOSPITAL DISCHARGE:
Number and Percent (%)

SERVICE	NUMBER (%)
<u>Addington</u>	
Addington outpatients	18 (51)
Physiotherapy	12 (34)
Outpatient therapy	5 (17)
Speech	2 (6)
<u>Outside the Hospital</u>	
Private physiotherapy	2 (6)
State geriatric clinic	4 (11)
Tafta services	7 (20)
Stroke clubs	4 (11)
Home nursing services	3 (9)
St Giles	2 (6)
Red Cross	1 (3)
*Other	3 (9)

*Note: other includes mobile library, ladies hospital society transport and activities groups

TABLE 27

ADVICE GIVEN TO PATIENTS PRIOR TO DISCHARGE FOLLOWING INITIAL ACUTE
STROKE. NATURE OF ADVICE GIVEN:
Number and Percent (%)

NATURE OF ADVICE	ADVISED	NOT ADVISED*	UNSURE	TOTAL
Explanations about stroke	4 (11)	25 (71)	6 (17)	35 (100)
Exercising weak limbs	10 (29)	20 (57)	5 (14)	35 (100)
Taking medication	5 (14)	20 (57)	10 (29)	35 (100)
When to return to OPD clinic	21 (60)	5 (15)	9 (26)	35 (100)
About community services	3 (9)	21 (60)	11 (31)	35 (100)
Dietary advice	1 (3)	29 (83)	5 (14)	35 (100)
Obtaining of aids	1 (3)	23 (66)	11 (31)	35 (100)

*Note: Advice is considered in this content not to have been given if the patient could not state this positively

APPENDICES

APPENDIX 1 CONDITIONS CLASSIFIED AS CEREBROVASCULAR DISEASE ACCORDING TO
 THE INTERNATIONAL CLASSIFICATION OF DISEASES (NINTH
 REVISION)

- 430 Subarachnoid haemorrhage
 - 431 Intracranial haemorrhage
 - 432 Other and unspecified intracranial haemorrhage
 - 433 Occlusion and stenosis of pre-cerebral arteries
 - 434 Occlusion of cerebral arteries
 - 435 Transient cerebral ischaemia
 - 436 Acute but ill-defined cerebrovascular disease
 - 437 Other and ill-defined cerebrovascular disease
 - 438 Late effects of cerebrovascular disease
-

Source: International Classification of Diseases 1975; Revision 9, Vol 1:
271-273.

APPENDIX 2: TYPES OF STROKE AND THE CLINICAL PATTERNS ASSOCIATED WITH EACH

TYPE OF STROKE	PROPORTION OF ALL STROKES (59, 86)	AGE AT PEAK INCIDENCE	PREDISPOSING FACTORS	FAVOURED LOCATIONS	CLINICAL ASPECTS	PROGNOSIS	30 DAY SURVIVAL (59)
ATHERO- THROMBOTIC INFARCTION	60% (44-75%)	Increasing with age	atherosclerosis of an extra or Intra cranial vessel often associated with hypertension & diabetes (81)	1. carotid artery bifurcation, 2. at carotid sinus, 3. basilar artery bifurcation	- unilateral signs: hemiplegia, hemianop- sis, aphasia, agnos- ia (81) - bilateral signs along with cranial nerve disturbance. Onset is gradual & common during sleep. CSF normal, headache (infrequent). History of TIA (frequent) (81, 86)	Difficult to predict. The longer the period before spontaneous movement of the affected limbs is seen, the poorer the prognosis for recovery of motor activity & speech (81)	83%
EMBOLIC INFARCTION	8-31%	Increasing with age	associated with stenosis of a brain supply artery or cardiac disease such as rhythm disturbances, myocardial infarction, valvular disease endocarditis etc	middle cere- bral artery	onset very sudden usual during activity, no warning signs, confusion coma unusual, local- ized neurological defects, CSF usually normal, headache (infrequent) (86)	Difficult to predict. Rapid onset usually means there is little opportunity for est- ablishing collateral blood supply. Massive brain stem infarction is usually total. Long term prognosis depends on the sever- ity of the underlying disease producing the embolism. (81)	66%
INTRA- CEREBRAL HAEMORRHAGE	12% (7-17%)	Increasing with age peaking around 65 years	hypertension	cerebrum (80%) pons or medulla (10%) cerebellum (10%)	onset sudden, usu- ally during activity. Clinical signs in- clude headache, vomiting, hyperten- sion, paralysis, slurred speech or aphasia, loss of consciousness. CSF normal or bloody, raised pressures. Meningeal irrita- tion. Usually only 1 episode occurs without recurrence (81)	Prognosis usually grim. Pontine and cerebellar haemorrhage are usua- lly large & result in death. Once the blood has been absorbed following a small bleed, prognosis for complete recovery is usually good. (81)	17%
RUPTURED SACCULAR ANEURYSM	9% (5-13%)	Bimodal ages 40 yrs and 70 yrs	Formation of Berry Aneurysm due to congenital anatomic weak- ness of the vessel wall. Often accom- panied by hypertension	Saccular aneu- rysm of the anterior circle of willis	sudden severe head- ache which may be associated with loss of consciousness, CSF grossly bloody, hypertension, extreme pressures, severe focal neurological deficit, meningeal irritation, neck stiffness.	A major haemorrhage is fatal in 50% of patients. Prognosis is grave if rebleeding occurs shortly after the first attack. Aneurysm surgery has greatly improved outcome & recovery can be complete.	35%

APPENDIX 3 MORTALITY RATES PER (100 000) AND PERCENTAGES OF ALL DEATHS DISEASES OF THE CIRCULATORY SYSTEM FOR 'CEREBROVASCULAR DISEASES' (ICD 430-438), BY RACE, SEX AND AGE

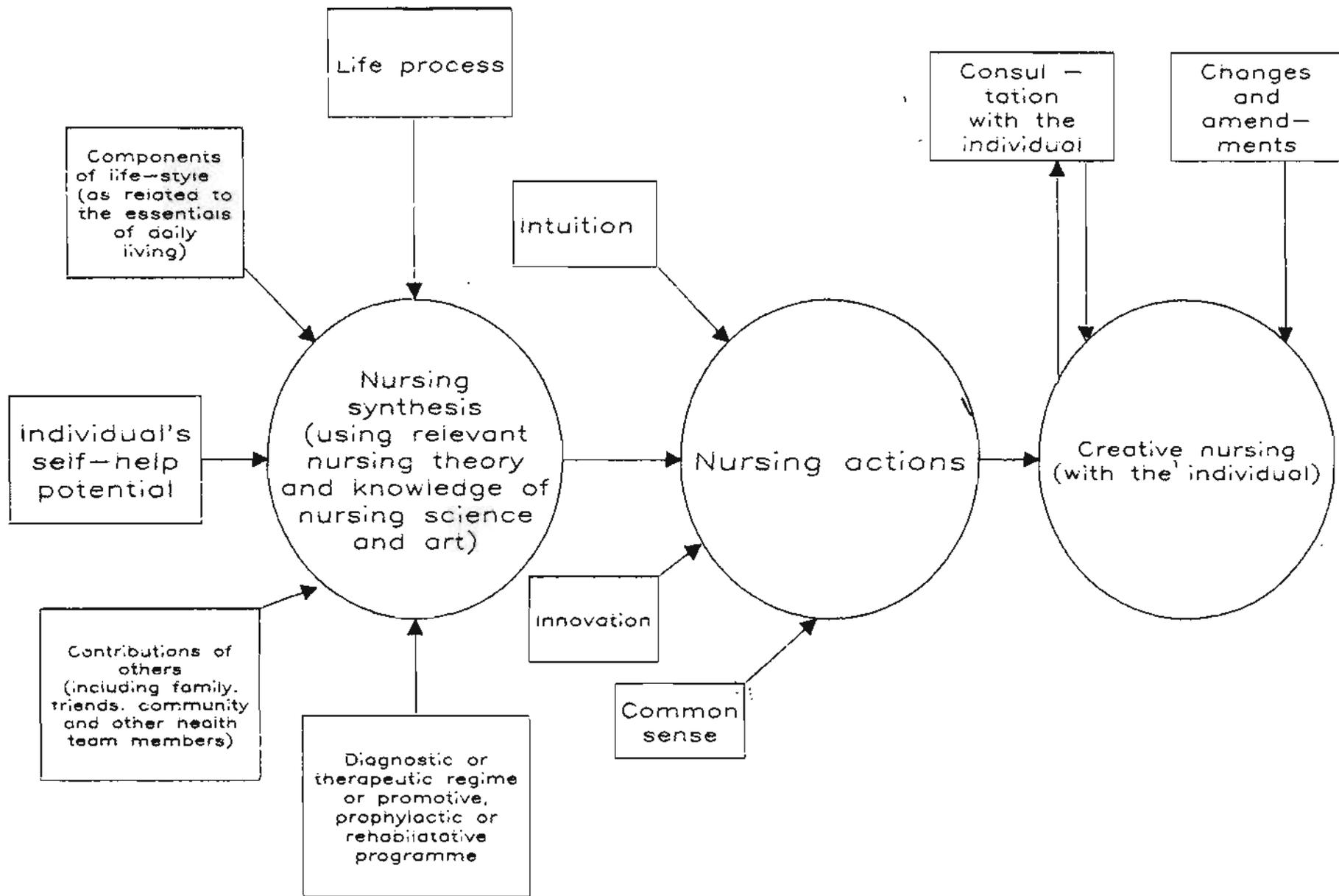
Race and Sex	MRs and percentages in age groups				
	15-24	25-34	35-44	45-54	55-64
Males					
Whites	1,5 (14%)	4,0 (11%)	18,0 (9%)	65,3 (11%)	200,9 (13%)
Asians	3,0 (22%)	6,5 (14%)	44,5 (16%)	195,3 (20%)	581,2 (27%)
Coloureds	6,8 (30%)	19,5 (26%)	68,3 (29%)	208,3 (31%)	429,1 (29%)
Blacks	0,0 (0%)	13,4 (34%)	40,9 (30%)	111,6 (32%)	276,0 (35%)
Females					
Whites	1,8 (32%)	6,7 (29%)	22,0 (29%)	73,6 (30%)	178,5 (26%)
Asians	2,8 (18%)	6,3 (18%)	32,1 (23%)	193,1 (37%)	683,3 (40%)
Coloureds	6,4 (25%)	21,3 (31%)	76,9 (38%)	202,7 (38%)	548,6 (42%)
Blacks	0,0 (0%)	21,0 (30%)	67,2 (38%)	158,5 (40%)	351,9 (41%)

Source: Whyndam CH. Mortality from CVD in the Various Population Groups in the RSA, *SAMJ* 1979; 56, 24: 1026.

APPENDIX 4 THE FIVE MOST IMPORTANT CAUSES OF DEATH (TOTAL NUMBERS OF DEATHS AND RATES PER 100 000) IN WHITES, ASIANS, COLOUREDS AND BLACKS IN SOUTH AFRICA, 1976

ORDER OF IMPORTANCE	WHITES			ASIANS			COLOUREDS			BLACKS			ORDER OF IMPORTANCE	
	TOTAL	MALES	FEMALES	TOTAL	MALES	FEMALES	TOTAL	MALES	FEMALES	TOTAL	MALES	FEMALES		
1	Ischaemic heart diseases			Ischaemic heart diseases			Enteritis and other diarrhoeal diseases			Pneumonia (excluding vital pneumonia)			1	
	9 393 (217,4)	6 165 (285,7)	3 228 (149,3)	853 (114,2)	607 (164,1)	245 (65,2)	4 196 (175,9)	2 220 (189,1)	1 976 (163,2)	3 979 (100,0)	2 377 (-)	1 602 (-)		
2	Cerebrovascular diseases			Cerebrovascular diseases			Pneumonia (excluding viral pneumonia)			Enteritis and other diarrhoeal diseases			2	
	3 992 (92,4)	1 667 (77,3)	2 325 (107,5)	535 (71,7)	276 (74,6)	259 (68,9)	3 836 (160,8)	2 042 (173,9)	1 794 (148,1)	3 443 (86,0)	1 822 (-)	1 621 (-)		
3	Pneumonia (excluding viral pneumonia)			Pneumonia (excluding viral pneumonia)			Cerebrovascular diseases			Homocide and wilful injury by others			3	
	2 695 (62,4)	1 347 (62,4)	1 348 (62,4)	336 (45,0)	192 (51,9)	144 (38,3)	2 308 (96,8)	1 020 (86,9)	1 288 (106,4)	3 014 (75,0)	2 690 (-)	324 (-)		
4	Motor vehicle accidents			Hypertension		Ischaemic heart disease		Cerebrovascular diseases						4
	1 486 (34,4)	1 128 (52,3)	358 (16,6)	237 (31,8)	111 (30,0)	126 (33,5)	1 628 (68,3)	957 (81,5)	671 (55,4)	2 015 (50,0)	1 099 (-)	916 (-)		
5	Bronchitis, emphysema and asthma			Motor vehicle accidents			Homicide and wilful injury by others			Tuberculosis of the respiratory system			5	
	1 211 (28,0)	838 (38,8)	373 (17,3)	198 (26,5)	160 (43,2)	38 (10,1)	1 238 (51,9)	1 000 (85,2)	238 (19,7)	1 974 (49,0)	1 389 (-)	585 (-)		

Source: Van Rensburg HCJ and Mans A. Profile of Disease and Health Care in SA. Academica: 1982: 78-79.



APPENDIX 5:
 Conceptual Model for Creative Nursing (96)

APPENDIX 6 A SUGGESTED APPROACH TO TEACHING ONE ASPECT OF THE NURSING CARE OF THE STROKE PATIENT.

ACTIVITY FOR DAILY LIVING: FEEDING

PROBLEMS ASSOCIATED WITH FEEDING	CAUSES AND EFFECTS	SUGGESTED SOLUTIONS	RATIONALE
1. <u>DYSPHAGIA</u>	<ul style="list-style-type: none"> - facial paralysis (62, 81) - cranial nerve dysfunction (62) (V, VII, IX, X, XII) - combination of perceptual, motor or sensory impairments resulting in apraxia 	<ul style="list-style-type: none"> - recognition of the problem is essential (signs = a weak cough, gurgling respirations) - food consistency: apple sauce, cereal, ice-cream - involvement of dietician in nutritional planning - practical solutions - sit the patient up, head slightly extended - feeding tube may be necessary 	<ul style="list-style-type: none"> - DYSPHAGIA if unidentified may result in aspiration, one of the severest complications of stroke. Suction apparatus must always be at hand. (15) - stimulates the swallowing reflex better than clear fluids which often lead to choking (81) - prevention of dehydration and malnutrition - Use a feeding tube only in severely functional impaired patients (62)
2. <u>FACIAL PARALYSIS</u>	<ul style="list-style-type: none"> - VII NERVE DAMAGE resulting in (81) <ul style="list-style-type: none"> a) numbness and weakness on affected side of face b) diminished lip and tongue control 	<ul style="list-style-type: none"> - feed through unaffected side of patient - if patient is side lying, paralyzed side should be uppermost - mouth care is essential before and after meals 	<ul style="list-style-type: none"> - prevents drooling and aspiration (81) - prevents food lodging in side of mouth
3. <u>LOSS OF GAG REFLEX AND FACIAL MUSCLE WEAKNESS</u>	<ul style="list-style-type: none"> - associated with brain stem lesions results in:- limited palate, tongue and lip movement 	<ul style="list-style-type: none"> - avoid oral feeding 	<ul style="list-style-type: none"> - danger of aspiration

PROBLEMS ASSOCIATED WITH FEEDING	CAUSES AND EFFECTS	SUGGESTED SOLUTIONS	RATIONALE
4. <u>HEMIANOPSIS</u>		- ensure that the patient has seen all the food on his plate	
5. <u>MOTOR AND SENSORY DIFFICULTIES</u>	<ul style="list-style-type: none"> - clumsy hand-mouth co-ordination - spilling - difficulty reaching - inability to perform finer movements eg buttering, cutting, manipulation of cutlery 	<ul style="list-style-type: none"> - involvement of occupational therapist - avoid foods which are difficult to eat, prepare food appropriately 	<ul style="list-style-type: none"> - re-education of independent feeding patterns - suggestion of functional aids - minimizes embarrassment and frustration
6. <u>POOR COMMUNICATION</u>	<ul style="list-style-type: none"> - inability to communicate food preferences may result in poor caloric intake and dehydration 	<ul style="list-style-type: none"> - involvement of family (invite them to bring favourite foods to the patient) - an accurate record of fluid balance is important 	<ul style="list-style-type: none"> - personalizes care

AIMS IN THE REHABILITATION OF FEEDING INFLUENCE:-

- correct patient positioning
- the wearing of dentures
- attempt to make meal times pleasurable, in which case the atmosphere needs to be unhurried and calm
- attractive and appetizing servings
- being fed is humiliating and the patient must be encouraged to regain his independence quickly

APPENDIX 7

A PERSONAL EXPERIENCE

A personal experience of stroke written by a patient who had his stroke 2 years ago. He was 58 years old at the time.

My stroke on 23.6.84 was initially emotionally traumatic. Having coped with this the physical and mental readjustment was enormous. The first two weeks were the most critical in that I wondered if I was ever going to be independent again. This feeling was soon dispelled with intensive physiotherapy from "The Girls" at Addington Hospital. My wife and I will be everlastingly grateful to all the physiotherapy staff and staff of occupational therapy department who supplied all the aids and gadgets which are now "permanent" fixtures in our home and part of my normal living. Within a week of physiotherapy at Addington I no longer needed a wheelchair and had learned to walk up and down stairs unaided within a month. I was then on the road to independence. My physical recovery has not been total, which has disappointed me, considering that I made such great strides to begin with. However, I am very grateful that I can walk about and apart from not being able to use my right arm or hand I can do most things for myself. As I have found writing with my left hand a most awkward task my daughter has given me her typewriter which is a tremendous aid. Even though I'm still just doing "one finger" typing, it is much neater than my attempts at handwriting. I try not to dwell on the "dark side" of my disability but try to keep myself occupied, exercising constantly and getting out and about as much as possible. I think the one thing I miss most is not being able to drive. But apart from not having the full use of my right side, I enjoy perfect health and never feel ill. I still look forward to a full and happy life. I'll beat the stroke - it won't beat me!

APPENDIX 8.

ASSESSMENT OF FUNCTIONAL ABILITY
AND SUPPORTIVE HEALTH CARE NEEDS

Questionnaire No. 1
3
Card No. 4

FROM MEDICAL RECORDS

Surname: Initials:
Address: Telephone:

AGE (at time of stroke) yrs 2

SEX:

M	F
<input type="text"/>	<input type="text"/>

DATE OF STROKE ADMISSION: (day, month, year) 4-6

DATE OF DISCHARGE: 7-9

DATE OF DEATH: (If applicable)

PRESENT STATE:

DEAD 1	ALIVE AND WELL 2	LOST TO FOLLOW UP 3	NOT SUITABLE 4
-----------	---------------------	------------------------	-------------------

10

FIRST RECORDED BLOOD PRESSURE: SBP 11

DBP 12

LEVEL OF CONSCIOUSNESS ON ADMISSION:

FULLY ALERT 1	CONSCIOUS BUT DISORIENTATED 2	STUPOR 3	COMATOSE 4	UNSURE 5
------------------	----------------------------------	-------------	---------------	-------------

13

DATE OF ASSESSMENT: 14
16

PATIENT DETAILS

OCCUPATIONAL QUALIFICATION:

1. PRESENT OCCUPATION

- working full time
- working part time
- housewife
- retired (age)
- retired (health)
- unemployed
- other ...

Pre Stroke	Post Stroke
1	2
1	2
1	2
1	2
1	2
1	2
1	2

	17
	18
	19
	20
	21
	22
	23

2. HOUSING

How has the stroke affected the patient's housing?

	OWN HOME 1	WITH FAMILY 2	OLD-AGE HOME 3	HOTEL/ BOARDING HOUSE 4	OTHER (STATE) 5
Prestroke					
Interim (post-stroke)					
Post-stroke (now)					

	24
	25
	26

3. AT TIME OF YOUR STROKE DID YOU SUFFER

	YES	NO
loss of power of right side of body	1	2
loss of power of left side of body	1	2
facial drooping	1	2
speech difficulty	1	2

	27
	28
	29
	30

4. DURING YOUR HOSPITAL STAY WERE YOU TREATED BY

	YES	NO	UNSURE
physiotherapist	1	2	3
occupational therapist	1	2	3
speech therapist	1	2	3

	31
	32
	33

5. WERE YOU SEEN BY THE SOCIAL WORKER PRIOR TO DISCHARGE

YES	NO
1	2

	34
--	----

6. HAVE YOU BEEN READMITTED TO HOSPITAL SINCE YOUR STROKE?

YES	NO
1	2

	35
--	----

If yes, why?

UTILIZATION OF HEALTH CARE SERVICES

1. WERE YOU ASKED HOW YOU WOULD MANAGE AT HOME ONCE YOU LEFT THE HOSPITAL?

YES	NO
1	2

	36
--	----

2. IF YES, WHO ASKED YOU?

DOCTOR	NURSE	SISTER	SOCIAL WORKER	OTHER
1	2	3	4	5

	37
--	----

3. DO YOU ATTEND AN ADDINGTON OUTPATIENT CLINIC?

YES	NO
1	2

	38
--	----

REGULARITY:-

MORE THAN ONCE A MONTH	ONCE A MONTH	OCCASIONAL
1	2	3

	39
--	----

4. SINCE YOU LEFT HOSPITAL HAVE YOU HAD:-

- (a) physiotherapy
- (b) occupational therapy
- (c) speech therapy

YES	NO
1	2
1	2
1	2

	40
	41
	42

5. BEFORE LEAVING THE HOSPITAL WERE YOU GIVEN INFORMATION ON:-

- (a) your stroke
- (b) exercising your weak limbs
- (c) taking your medication
- (d) when to return to outpatient clinic
- (e) where to go for helpful services
- (f) your diet
- (g) where to obtain aids e.g. walker

YES	NO	UNSURE
1	2	3
1	2	3
1	2	3
1	2	3
1	2	3
1	2	3

	43
	44
	45
	46
	47
	48
	49

6. HAVE YOU BEEN VISITED BY THE COMMUNITY HEALTH NURSE SINCE YOUR STROKE?

YES	NO
1	2

	50
--	----

12. HAVE MODIFICATIONS TO THE HOME BEEN NECESSARY TO ASSIST THE PATIENT/CARERS?

YES	NO
1	2

72

IF YES, EXPLAIN

13. IF FUNCTIONAL AIDS ARE USED BY THE PATIENT WHICH ARE THEY AND WHERE WERE THEY OBTAINED?

YES	NO
1	2

feeding aids

73

toilet aids

74

bath aids

75

wheelchair

76

stick, tripod, frame

77

hearing aids

78

IF YES, SOURCE

14. HOW DO YOU SPEND YOUR FREE TIME?

15. IF THE PATIENT IS RESIDENT IN AN INSTITUTION FOR THE ELDERLY, ARE THE FACILITIES AVAILABLE TO ASSIST REHABILITATION AFTER LONG ILLNESS?

YES	NO
1	2

79

IF YES, PLEASE EXPLAIN

16. IF ASSISTANCE IS NEEDED WITH DAILY ACTIVITIES WHO PROVIDES THIS?

17. MONTHLY INCOME:

80

18. MAJOR SOURCE OF INCOME:

FUNCTIONAL ASSESSMENT

1. ADL Function

Is the patient independent (3), partially dependent (2) or dependent (1) in fulfillment each of the following activities for daily living?

- feeding
- using toilet
- mobility on level
- using steps
- dressing
- bathing
- getting into and out of bed
- shopping

	81
	82
	83
	84
	85
	86
	87
	88

2. Assessment of Higher Mental Skills

Does the patient demonstrate difficulty with the following higher mental skills.

- (3) = no difficulty
- (2) = has difficulty at times
- (1) = has difficulty most of the time

- self motivation
- verbal communication
- short term memory

	89
	90
	91

SOCIAL CONTACT

3. Do you have social contact via a work situation?

YES	NO
1	2

	92
--	----

QUESTIONS 4-6 ARE APPLICABLE IF THE ANSWER TO 3 IS NO

4. How many times do you go out to meet friends or family in an average week?

>3 TIMES	ONCE OR TWICE	SELDOM	NEVER
3	2	1	0

	93
--	----

5. Do you receive visitors

OFTEN	IRREGULARLY	VERY SELDOM
3	2	1

94

6. Who are your most frequent visitors?

.....

7. Transportation: Which option is most applicable?

Drives own car confidently and often

3

Uses public transport independently

2

Reliant on family or friends for transport

1

95

8. Use of Telephone: Which option is most applicable?

Uses the 'phone frequently

3

Is physically unable to use 'phone

2

Has not convenient access to a 'phone

1

96

9. Life Satisfaction

On the left hand graph please mark your assessment of your quality of life before the stroke. On the right, your quality of life now

BEFORE STROKE

Least possible

Best possible



NOW



Appendix 9DEPARTMENT OF COMMUNITY HEALTHM.SC. (MED SCI) : S DEWARPROPOSED RESEARCH PROTOCOLSURVIVAL, DISABILITY AND SUPPORTIVE HEALTH CARE NEED
AND UTILIZATION FOLLOWING AN INITIAL ACUTE STROKEPURPOSE

To establish, in respect of Whites who have suffered an initial acute stroke, the 5 year survival rate and profiles of functional disability and need for supportive health care.

OBJECTIVES

1. To determine the number of White people admitted to Addington Hospital in 1980 in respect of whom a discharge diagnosis of acute stroke was recorded.
2. To determine the proportion of all discharges from the study hospital in 1980 which were attributed to initial acute stroke.
3. To determine the 5 year survival rate of persons identified in 1 above.
4. To assess the functional disability of current survivors.
5. To identify in respect of survivors, level of need for and utilization of supportive health services.
6. To assess from 1, 3, 4 and 5 above the need for community and health-facility based supportive health services.
7. To make recommendations in respect of the provision of supportive health services for persons who have suffered an acute stroke.

DEFINITIONS

1. Stroke: For the purpose of this study an acute stroke is considered to be a vascular lesion of the brain of acute onset resulting in disability lasting more than 24 hours.
2. Initial Stroke: An initial stroke is considered to be a stroke as defined above where the sufferer has not previously suffered any cerebrovascular episode which resulted in impairment of function lasting more than 24 hours.
3. Disability: Any restriction or loss of ability to perform any activity in the manner or within the range considered normal for a human being.

METHOD

1. Authority to undertake this study will be obtained from the Ethics Committee of the University and the relevant Health Authority and, in respect of household interviewing, each patient or responsible carer.
2. Patients with a discharge diagnosis of Acute Stroke will be identified from the diagnostic index of Addington Hospital.
3. Mortality listings will be obtained from the Department of Statistics and the survival status of identified persons will be established.
4. The inpatient and outpatient case-notes of all patients identified in 2 above will be consulted in order to:
 - (i) Confirm that the discharge diagnosis is that recorded in the diagnostic index
 - (ii) ascertain whether or not there is any record of that person's subsequent death
 - (iii) ascertain the last recorded residential address and telephone number of the patient and next of kin
 - (iv) to ascertain whether or not the patient was transferred to Wentworth Hospital.
 - (v) to ascertain whether or not this was an initial or subsequent stroke.
5. In the case of survivors who meet the criteria for inclusion in the study and who are included in the random sample (see below) contact will be attempted, using the last recorded telephone number. Permission to interview the patient and carer will be requested. Where contact is not established the next of kin will be contacted by telephone and the whereabouts of the patient established.
6. Where no telephone numbers are recorded or where contacts attempted in 5 above have failed, letters requesting permission to interview will be directed to the last known home address of patients and next of kin.
7. Patients who qualify for inclusion in the study and in respect of whom permission to interview has been given will be visited and interviewed. Where either patient or carer are reluctant to participate in the study an interview will not be conducted.
8. At the interview a structured questionnaire and checklist relevant to the objectives will be administered and, by observation, the patient's function disability will be determined.

SELECTION OF SAMPLE AND CONTROL GROUPS

(i) Initial Sample:

All white persons who were admitted to Addington Hospital during 1980 having suffered an initial acute stroke will be included in the initial study sample.

(ii) Household Sample:

In respect of the household interview, the following categories will be excluded from the above sample:

- (a) persons who have not survived 5 years
 - (b) persons who are not resident in the Greater Durban area.
- From the list of persons not excluded above a random sample of 60 will be drawn.

(iii) Control Group:

For the purposes of this descriptive study no control group will be drawn, however comparisons between sample sub-groups will be made.

REDUCTION OF BIAS

Bias will be reduced by

- (i) adherence to defined criteria
- (ii) the use of a standard questionnaire and checklist
- (iii) the interview by a single interviewer of all persons finally admitted to the study.

BARRIER DATES

Completion of Protocol	12.02.86
Obtaining of Authorities	28.02.86
Selection of Sample Group	31.03.86
Completion of Literature Survey	30.06.86
Completion of Household Visiting	31.07.86
Collation of Data	31.07.86
Analysis of Data	31.08.86
Completion of Research Report	30.09.86

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