

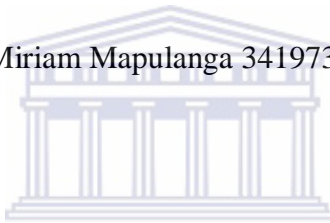
**UNIVERSITY OF THE WESTERN CAPE**

**Faculty of Community and Health Sciences**

**Department of Physiotherapy**

**Exploration and determination of the process of care of stroke in  
Zambia**

Miriam Mapulanga 3419738



A thesis submitted in fulfilment of the requirements for the Degree of Master of Science in the Physiotherapy Department, Faculty of Community and Health Sciences, University of the Western Cape

Submitted: May, 2015

Supervisor: Dr. Nondwe Mlenzana

## **Keywords**

Exploration

Determination

Process

Care

Stroke

Zambia



## **Abstract**

Zambia is undergoing epidemiological changes from communicable diseases to NCDs as a result of demographic transition and hence Stroke is an emerging NCD in the country. The process of care of stroke in Zambia as country is unknown. Exploring the process of care of stroke in Zambia, could help understand the gaps in service delivery thereby helping to create interventions to improve stroke service delivery. The purpose of this study was to determine and explore the process of care of stroke in Zambia. As there is no information regarding stroke care in Zambia, the study aimed to explore and determine the process of care and explore the conditions under which diagnosis and management of stroke is done in Zambia and are the factors influencing stroke diagnosis and management in Zambia.

The study was conducted in Zambia's five general hospitals which were selected conveniently. The study consisted of both quantitative and qualitative methods. The quantitative part consisted of stroke patients' medical records reviews, who were admitted to general hospitals between 1<sup>st</sup> January to 30<sup>th</sup> October 2014. A sample of 80 medical records was selected randomly from each general hospital, making the total of 400 medical records from all the hospitals. Data was collected using a checklist which was specifically design for the study after literature review and contained stroke care processes including diagnosis, medical management, rehabilitation, lifestyle management and community linkage. Analysis of quantitative data was done using Statistical Package for Social Science (SPSS) version 22. The qualitative part consisted of individual in-depth interviews with a purposefully selected sample of three health workers from each hospital making 15 health workers. The in-depth interviews were based on predetermined themes including staffing levels, multidisciplinary team action, treatment guidelines, clinical capacity, planning and budgeting and technical

environment. All the interviews were audio-taped, transcribed verbatim and the predetermined themes were analysed using content analysis. Ethical clearance to conduct the study was obtained from the University of the Western Cape Faculty Board Research and Ethics Committees and Senate Research Committee and ERES Converge in Zambia. Permission to conduct the study in Zambia was obtained from the Ministry of Health, Zambia. Informed consent was obtained from the health workers who took part in the study.

The study found that the stroke process of care in Zambia ranged from diagnosis through to physical rehabilitation and lifestyle management. The stroke process of care was challenged in the area of diagnosis using biochemistry, haematology, CT scan, MRI and Angiography etc. The process of care in rehabilitation was challenged by lack of gadgets and space to use in rehabilitation. Community linkage, speech therapy and social welfares services were not part of the stroke process of care in Zambia as the study as established. Staff shortages, busy schedules, no treatment guidelines, poor clinical capacity, lack of resources and poor technical environment impacted negatively on the stroke process of care according to this study. Diagnosis and management of stroke was made with no treatment guidelines, poor clinical capacity and poor technical environment. The same were the factors which were influencing diagnosis and management namely staff shortages, no multidisciplinary teams due to busy schedules of health workers, lack of treatment guidelines, poor clinical capacity by health workers, lack of resources for stroke and poor technical environment. Using the Chi-square association of variables, the study showed that CT scan was associated with definitive diagnosis with the p-value of 0.000. Equally, Chi-Square test showed that Diagnosis was not associated with medical management (p value=0.058).

**Declaration**

I hereby declare that **Exploration and determination of the process of care of stroke in Zambia** is my own work and that it has not been submitted in whole or in part for any other degree or examination in any other University, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Signature: .....

Miriam Mapulanga

February, 2015

Witness: .....

Dr. N. Mlenzana



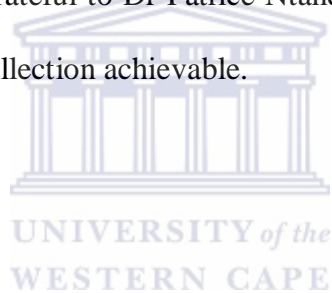
## **Dedication**

To Tumelo, Upeme and Wahila.

## **Acknowledgements**

Dr Nondwe Mlenzana my supervisor for the support given in writing this thesis, and the entire department of Physiotherapy, in the Faculty of Community and Health Sciences, University of the Western cape.

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## ***Abbreviations***

AIDS	Acquired Immuno Deficiency Syndrome
CT scan	Computed Tomography
DALYs	Disability Adjusted Life Years
DWI	Diffusion Weighted Imaging
ECG	Electrocardiogram
EEG	Echocardiogram
EMG	Electromyography
FBC	Full Blood Count
GPP	Good Pharmacy Practice
HDL	High Density Lipoprotein
HIV	Human Immuno Virus
HTN	Hypertension
INR	International Normalised Ratio
MDT	Multidisciplinary Team
MOH	Ministry Of Health
MRA	Magnetic Resonance Angiography
MRI	Magnetic Resonance Imaging
NCDs	Non Communicable Diseases
NGT	Naso-Gastric Tube
RPR	Rapid Plasma Reagin
SPO	Structure Process Outcome
SPSS	Statistical Package for Social Scientists
TIA	Transient Ischaemic Attack
WHO	World Health Organization



## **Definition of terms**

Clinical capacity- Health workers capability to care for patients effectively and adequately

Technical environment- Health service delivery space for stroke

Multidisciplinary teams- Teams with different categories of health workers working together



# Chapter One

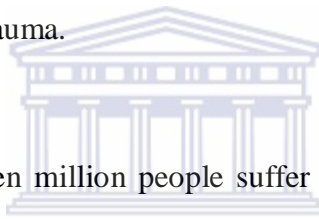
## Background

### 1.1 Introduction

The incidence of stroke is increasing mainly as a consequence of the growing population of elderly people (Rothwell, Coull, Giles, Howard, Silver & Bull, 2004). In affluent countries, improvements in acute stroke care have helped more people to survive the initial event but, while mortality has been reduced, stroke remains a major cause of disability (Brewer, Horgan, Hickey & Williams, 2012). Most of the survivors of the initial stroke event are left with some degree of disability, which can range in effect from moderate to severe. Some of the consequences of stroke while less apparent are nonetheless important; mild cognitive impairment for example can make some of the tasks of daily living difficult, and loss of role and physical function can have profound psychological effects on stroke survivors (Gordon, Gulanick, Costa, Fletcher, Franklin & Roth, 2004).

Stroke was first defined as a “rapidly developing clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin”( Aho , Harmsen , Hatano , Marquardsen , Smirnov & Strasser 1980). With this definition, Transient Ischemic Attack (TIA) which is said to last less than 24 hours; and patients with stroke symptoms caused by subdural haemorrhage, tumours, poisoning or trauma, are not included. But with advances in science, the term stroke has come to include clinical syndromes with causes like central nervous system infarction, cerebral ischaemic, silent central nervous systems infarction, intra-cerebral haemorrhage, silent cerebral

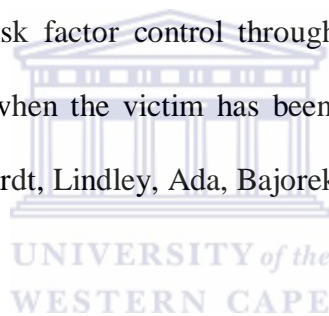
haemorrhage, subarachnoid haemorrhage, central nervous thrombosis and other unspecified causes (Sacco, Kasner, Broderick, Caplan, Connor & Culebras, 2013). Hence the clinical syndrome “stroke” is characterized by an acute loss of focal brain function lasting more than 24 hours or leading to death, which is thought to be due to either inadequate blood supply to a part of the brain due to low blood flow, thrombosis or embolism associated with diseases of the blood vessels, heart or blood (ischemic stroke or cerebral infarction) or spontaneous haemorrhage into or over the brain substance (primary intracerebral haemorrhage, intra-ventricular haemorrhage and subarachnoid haemorrhage respectively) (Warlow, Dennis, van Gijn, Hankey, Sandercock & Bamford 2000). This, by definition does not include cerebral haemorrhage caused by trauma.



Globally, more than fifteen million people suffer stroke each year with devastating effects; one third of these individuals die and another one third remain permanently disabled leaving only one third to recover fully (Wilkinson, Wolfe & Warburton, 1997). As a result, throughout the world, stroke is among the top five diseases with the greatest disease burden, based on disability-adjusted life years of 47,943,000 Disability Adjusted Life Years [DALYs](Truelsen, Beggs & Mathers, 2006). This makes stroke the leading cause of acquired adult disability in individuals (Strong, Mathers & Bonita, 2007). The risk factors of stroke have been on the increase worldwide due to changes in lifestyle patterns from more active to sedentary lifestyles and demographic health transition especially for resource constrained countries (WHO, 2013; Connor, Walker, Modi & Warlow, 2007).

The clinical syndrome of stroke is characterized by sudden weakness, paralysis (an inability to move) or numbness of the face, arms, or legs, especially on one side of the

body, confusion, trouble speaking or understanding speech, trouble seeing in one or both eyes, problems breathing, dizziness, trouble walking, loss of balance or coordination, and unexplained falls, loss of consciousness, sudden and severe headache (American Stroke Association, 2012). Quality stroke care from diagnosis to community rehabilitation after stroke improves the quality of life for stroke survivors in many nations (Luengo-Fernandez, Gray, Bull, Welch, Cuthbertson & Rothwell 2013). The diagnosis of stroke is made in a patient with stroke risk factors presenting with signs and symptoms that match an arterial vascular territory based on aetiological factors and is confirmed with definitive diagnostic tools (Ferro, Massaro & Mas, 2010). Management follows a continuum of treatment by thrombolytic agents or anti coagulants and risk factor control through to comprehensive rehabilitation which is only complete when the victim has been effectively linked to community care (Wright, Hill, Bernhardt, Lindley, Ada, Bajorek, et.al., 2012).



Effective stroke rehabilitation depends on the thorough assessment arising from diagnosis. Research has shown that better process of care is associated with improved functional outcomes in stroke rehabilitation, the process of care involving adequate diagnosis; and that optimizing outcomes from stroke rehabilitation should be promoted the most, by improving process of care (Hoenig, Horner, Duncan, Clipp & Hamilton, 1999). The initial stage of stroke process of care starts with diagnosis followed by medical treatment through to rehabilitation. Rehabilitation is an integral part of stroke process of management. The home care afterwards involves medical as well as rehabilitation and social welfare.

In Zambia, management protocol for stroke on diagnosis and management has not been established yet, and patients are managed following clinical manifestations that they are presenting with (Ministry of Health, 2013a). There is no data on stroke care in Zambia. The purpose of this study was to explore and determine the processes followed to diagnose and manage stroke in Zambia.

## 1.2 Problem statement

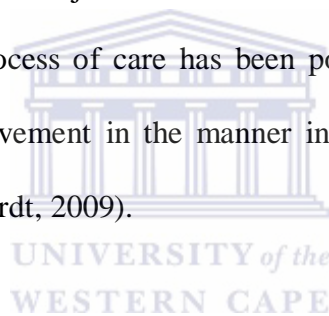
Stroke is an emerging Non-Communicable Disease (NCD) in Zambia (Atadzhanov, Mukomena, Lakhi, Ross & Meschia, 2012). Zambia, like any other country in Sub Saharan Africa is undergoing epidemiological changes from Communicable Diseases to NCDs as a result of demographic transition (Connor, Walker, Modi & Warlow, 2007). The shift towards NCDs has increased the risk of stroke in Zambia as the risk factors of stroke are simply other NCDs (Siziya, Rudatsikira, Babaniyi, Songolo, Mulenga et.al. 2012).

The process of care of stroke in Zambia as country is unknown (Ministry of Health, 2013a). In 2009, the country pledged to embark on NCDs treatment guidelines and protocol development in second level hospitals to help improve the healthcare services in the country (Ministry of Health, 2013b). This was to enhance better diagnosis and management of NCDs in the country.

Exploring the process of care of stroke in Zambia, could help understand the gaps in service delivery thereby helping to create interventions to improve stroke service delivery. This could also help in guideline formulation which standardise process of care. Lack of guidelines results in inadequate diagnosis, leading to inadequate medical and rehabilitation management and increases the patients' chance of having another stroke (Di Legge, Koch, Diomedi, Stanzione & Stallusti, 2012). This leads further to

disability and eventually high mortality due to stroke. Particularly in Zambia, this was revealed by a recent study which revealed high in-hospital mortality due to stroke at 40% of the total admissions (Atadzhanov et.al., 2012).

In Zambia, Stroke as a medical condition has not been given much attention owing to the competitiveness of the infectious diseases like HIV/AIDS, Malaria, tuberculosis and diarrhoea (WHO, 2010). In as much as the quality of health services have not been the best in Zambia, stroke health care services have not been considered at all. This has been on all the continuum of care from diagnosis to management. Exploring the process of stroke care is a prerequisite for effective stroke management (Langhorne & Pollock in conjunction with the stroke unit trialists collaboration, 2002). Exploring the process of care has been possible in some African countries revealing need for improvement in the manner in which stroke has been managed (Rhoda, Mpofu & DeWeerd, 2009).



### **1.3 Purpose**

The purpose of this study was to determine and explore the process of care of stroke, as there is no information regarding stroke care in Zambia. The study was necessary because stroke care involves both diagnosis and management including medical and rehabilitation aspects. The researcher sought out to determine and explore stroke care by carrying out the study in five general hospitals of the country.

#### **1.4 Research questions**

- What is the process of care of stroke in Zambia?
- What are the conditions under which diagnosis and management of stroke is done in Zambia and what are the factors influencing stroke diagnosis and management in Zambia?

#### **1.5 Aim of the study**

The study aimed to explore and determine the process of care and explore the conditions under which diagnosis and management of stroke is done in Zambia and what are the factors influencing stroke diagnosis and management in Zambia.

#### **1.6 Objectives**

- To determine the process of care stroke in Zambia.
- To explore the conditions under which diagnosis and management of stroke is done in Zambia.
- To explore factors influencing process of diagnosis and management of stroke in Zambia.

#### **1.7 Significance**

Africa is experiencing epidemiological transition from communicable to non-communicable diseases due to changing lifestyles which is resulting in the increasing incidence of stroke (Africa Health Monitor, 2008). This has been evidenced by increase in stroke admissions to hospitals in Sub-Saharan Africa (Connor et.al., 2007). As a result of this, Zambia pledged to embark on NCDs treatment guidelines and protocol development in second level hospitals to help improve the healthcare



services in the country (Ministry of Health, 2013b). This was to enhance better diagnosis and management of NCDs in the country. With the constrained resources, service delivery for stroke and other NCDs been constrained leading to high mortality rates due to NCDs at 1035/100 000 (WHO, 2011).

The results from this study will be used as a baseline study to understand what exists in the healthcare pertaining to stroke care. The study will be used to identify the gaps in stroke service delivery and thereby work at improving service delivery. By enhancing the structure and process to enable better outcomes for stroke, the study will help strengthen the health system for better stroke outcomes.

## **1.8 Chapter Summary**

Chapter one presented the introduction of the study. This chapter highlighted the background of the research and brought out the statement of the problem which was highlighted as stroke being an emerging Non Communicable Disease in the developing countries including Zambia. The chapter highlighted that although stroke is emerging due to epidemiological transition and population aging; there is no information on the process of care of stroke in the country. The chapter highlighted that the purpose of the study was to determine and explore the process of care of stroke, as there is no information regarding stroke care in Zambia. The study aimed to explore and determine the process of care and explore the conditions under which diagnosis and management of stroke is done in Zambia and what are the factors influencing stroke diagnosis and management in Zambia.

## 1.9 Outline of other Chapters

This report consists of six chapters. Chapter one is the introductory chapter which has just been highlighted.

Chapter two presents the literature reviewed in the study. The chapter looked at the literature related to the topic of interest. The literature review covered the process of care of stroke. The chapter began with the Stroke epidemiology; looking at the prevalence, incidence and consequences of stroke. The chapter looked at Stroke Aetiology considering the risk factors both modifiable and un-modifiable risk factors. Literature review on stroke diagnosis was also done. This brought out the different diagnosis techniques and tools. The definitive diagnostic tools and supporting diagnostic test were reviewed globally, regionally and in relation to Zambia the country of study. The stroke management was reviewed at global level and regional level. There was no data stroke care in Zambia. Lastly literature was reviewed on stroke rehabilitation at various levels and still there was no literature at national level. Literature on the Donabedian model which is the framework for this study has also been presented.

Chapter three has presented the methods used in detail. The study employed both quantitative and qualitative methods. The chapter has highlighted the design of the study and the setting. The sampling criteria for the quantitative and qualitative parts have been presented in this chapter. The chapter has equally presented the data collection tools for the quantitative and qualitative parts of this study. The procedures followed to conduct this research have been highlighted. Data analysis has been described fully and the ethical procedures followed in this study have been highlighted.

Chapter four of this report presents the study result for both quantitative and qualitative data. The results presentation begins with quantitative information which is presented in figures and tables. The quantitative data from the checklists was used to collect information. Information has also been presented in graphs. The association of variables using chi-square have been presented using tables. Qualitative data which is from the individual in-depth interviews with the health workers has been presented in texts.

The fifth chapter presents the Discussion of the research findings. These are the findings from the quantitative data and qualitative data. The discussion tries to answer the research questions and objectives. This chapter also tries to compare the findings of this study to the existing literature. The chapter discusses the process of care of stroke in Zambia, with conditions under which diagnosis and management of stroke is done in Zambia and the factors influencing diagnosis and management. The chapter also discusses how structures affect the process of care. The chapter also analyses the structures and process of care of stroke in Zambia as was established from the study.

The last chapter, chapter six presents the conclusion and recommendations. The chapter concludes the findings of the study into specific objectives. In this chapter, the study limitations have been highlighted. The recommendations made in this chapter are in relation to the structures and process according to the model used in the study. Therefore recommendations have been made at various levels for all stakeholders.

# **Chapter Two**

## **Literature review**

### **2.1 Introduction**

This chapter aimed at giving an overview of literature pertaining to the process of care of stroke. This literature reviewed covered global, regional and local perspectives on the process of care of stroke.

Literature review was done using the databases available through the University of the Western Cape which are electronics and this includes PubMed via Medline, Google scholar and EBSCOhost. Other sources of data including books and journal articles were included. For the literature search, the key words used were explore, determine, process of care, stroke and Zambia with Sub Saharan Africa as the alternative word search. The literature search was done from February 2014 to April 2015.

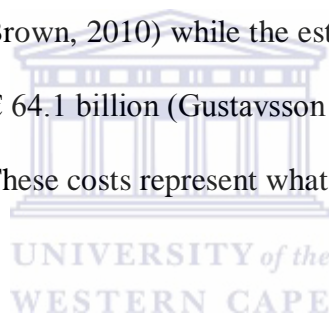
### **2.2 Stroke epidemiology**

This section reviews literature on stroke epidemiology. The section discusses literature reviewed on the stroke prevalence, incidence and outcomes of stroke. Special emphasis is given to literature in the same region as Zambia for easier comparison.

#### **2.2.1 Stroke burden**

Although stroke incidence has declined by over 40% in the past four decades in high-income countries, the incidence has doubled in low- and middle-income countries over the same period (Ferri, Schoenborn & Kalra, 2011). Given that age is one of

most substantiated risk factors for stroke, the ageing of the world population implies a growing number of people at risk (Di Carlo, 2009). Therefore, according to literature, estimated numbers of stroke events in European Union countries, Iceland, Norway, and Switzerland are likely to increase from 1.1 million per year in 2000 to more than 1.5 million per year in 2025 solely because of the demographic changes (Truelsen, Piechowski-Jozwiak & Bonita 2006). Meanwhile, the World Health Organization (WHO) predicted that disability-adjusted life years (DALYs) to be lost due to stroke (a measure of the burden of disease) will rise from 38 million in 1990 to 61 million in 2020 due to the increased burden (WHO, 2004). As a chronic condition, the estimated direct and indirect cost of stroke in the United States for 2010 was \$ 73.7 billion (Lloyd-Jones, Adams & Brown, 2010) while the estimated cost of stroke in Europe in 2010 was approximately € 64.1 billion (Gustavsson, Svensson, Jacobi, Allgullander, Alonso & Beghi, 2011). These costs represent what was lost by both the stroke victim and health providers.



Meanwhile in Sub Saharan Africa, due to the demographic health transition, the burden of NCDs such as stroke and other vascular diseases is also on the increase, adding to the high burden of Communicable Diseases and the poverty related disease burden, putting further strain of the limited health care resources (Connor et.al. 2007). This was also shown by the WHO health report of 2004, which used updated techniques based on those developed for global burden of disease studies to estimate cause of death in WHO member countries in 2002, found that there were about 359000 deaths due to stroke (3% of all deaths) in Africa as compared to almost 1.5 million (16% of all deaths) in Europe, but a different analysis showed that stroke caused an estimated 52% of vascular death (deaths caused by either stroke or ischemic heart disease) in Africa compared with 38% of the very deaths in high

income Europe, showing higher ratio of stroke to coronary deaths in Africa countries (WHO, 2002).

Equally, a recent study in Zambia revealed high in-hospital mortality due to stroke at 40% of the total admissions (Atadzhanov. et. al, 2012). This study was conducted at the country's biggest hospital which has the best medical equipment for stroke health care in Zambia, suggesting that the results could be very disturbing nationwide.

### **2.2.2 Stroke prevalence**

Stroke prevalence is the frequency of existing stroke cases in a defined population at a given point in time (Bonita, Beaglehole & Kjellström, 2009). Accurate world stroke prevalence is not known as some countries around the world have no information. In developed countries with good information systems, stroke prevalence estimates have been made. For example in the United States of America, The Centre for Disease Control and prevention [CDC] (2012) recorded stroke prevalence to be at 2.6% in 2010 for people aged  $\geq 65$  years. Among the racial or ethnic groups, age-adjusted prevalence was highest among the American Indians or Alaska Natives and lowest among Asians. But with Age-adjusted prevalence, CDC found the prevalence to be higher among adults with a lower level of education compared with those with a higher level of education. No statistically significant difference in stroke prevalence was observed among men or women, or among any particular age group, race or ethnicity, or level of education.

Regarding stroke, Asia has not been left out. For example, stroke prevalence in China ranges between 1.8% in rural areas, and 9.4% in urban areas (Sousa, Ferri & Acosta, 2009). Kim & Johnston (2011), reports stroke mortality in China to be 19.9% of all deaths, and hence China has the highest stroke mortality worldwide.

Africa as a region has had its own share of stroke prevalence and has alarmed the research fraternity. In the Republic of South Africa in Southern Africa, the crude prevalence was 300/100 000 with prevalence higher in females than males (Bradshaw, Groenewald, Laubscher, Nannan, Nojilana, Norman D et.al. 2003), while Nigeria, a West African country estimated its prevalence of stroke to be 1.14 per 1000 (Wahab, 2008). Although the stroke prevalence in Zambia has not been captured, the major risk factors of stroke are showing an increasing trend in the country (Siziya. et. al, 2010).

### **2.2.3 Stroke incidence**

The incidence of disease represents the rate of occurrence of new cases arising in a given period in a specified population. For stroke worldwide, 15 million new cases appear each year, of which one-third die, one-third are left permanently disabled leaving only one-third to recover fully (WHO 2004). In the United States of America, 795,000 new or recurrent strokes occur per year, accounting for approximately 1 in 18 deaths (Roger, 2011). In Europe, the incidence of stroke varies from 101.1 to 239.3 per 100,000 in men and 63.0 to 158.7 per 100,000 in women. Roger (2011) adds that within 5 years of a stroke, over half of patients aged  $\geq 45$  years will die: 52% of men and 56% of women.

Concerning racial disparities, studies in the USA and UK found stroke incidence in blacks with an approximate two fold increased risk compared to white groups regardless of the country of origin or ethnicity (O'Donnell, Xavier, Liu, Zhang, Chin, Rao-Melacini. et. al, 2010; Charles & David, 2006). This disparity is a challenge to Africa because its majority population is Negroes (CSO, 2012). Hence the incidence of stroke in the black population is a public health concern in Africa. The Africa

health Monitor (2008), reported that due to changing lifestyles, the incidence of stroke has been increasing, and thus, more than 28 million people are estimated to die in 10 years time, just in Africa, due to Non Communicable Diseases, largely stroke. This is evidenced by the increase in stroke admissions to hospitals in Sub-Saharan Africa, which could suggest an increasing stroke incidence due to the ageing of the population (Connor et.al., 2007). But in 1998, the overall stroke incidence rates in low to middle income countries had, for the first time, exceeded the level of stroke incidence seen in high-income countries, by 20% (Warlow, 1998).

Stroke incidence in Sub Saharan Africa has been further complicated by the HIV/AIDS pandemic. Research has linked HIV immuno-suppression to stroke as a result of tuberculous meningitis, toxoplasmosis gondii and cardiac disease (Hoffmann, 2000). Although HIV infection was found to cause an intracranial small vessel vasculopathy (Connor, Lammie & Bell, 2000; Mochan, Modi & Modi, 2003), and an extra-cranial large artery vasculitis (Nair, Robbs & Chetty, 2000; Chetty, 2001), one study in South Africa fairly convincingly found HIV to be an independent risk for stroke (Cole, Pinto & Hebel, 2004). Meanwhile the Durban Stroke Register found 20% of young black stroke patients to be HIV positive and have HIV associated stroke, but in the older rural SASPI stroke prevalence study only 2% of stroke patients were found to be HIV positive. These figures probably reflect the HIV prevalence in the general population as one was an urban study and the other a rural study with different HIV infection patterns. A Zambian study, at the University Teaching Hospital (UTH), found high levels of HIV infection with CD4 count below 200 cells/ $\mu$ l among young stroke patients (Lambwe, 2005), but the study did not ascertain the cause-effect relationship between stroke and HIV infection.



#### **2.2.4 Stroke outcomes**

The stroke outcome varies from disability, impairment and Mortality. Globally, of a total number of 57 million deaths that occurred during 2008; 36 million (63%) were due to NCDs, principally cardiovascular diseases that resulted in stroke, diabetes, cancer and chronic respiratory diseases and nearly 80% of these NCD deaths (29 million) occurred in low- and middle-income countries where Zambia belongs (Alwan, MacLean Riley, d'Espaignet, Mathers, Stevens.et. al., 2010).

Zambia has not been spared hence reporting high mortality rates due to stroke and other NCDs at 1035/100 000 (WHO, 2011). Stroke has not been researched thoroughly in Zambia, although the country and the region are experiencing an increase in hypertension which is the principal risk factor for stroke and was found to be at almost 40% of the population prevalence (Goma, Nzala, Babaniyi , Songolo , Zyaambo & Rudatsikira, 2011).

#### **2.3 Stroke aetiology**

Stroke is an NCD and as such, it is not transmitted from one individual to another (WHO, 2015). This World Health Organization fact sheet reports that like other NCDs, stroke affects all age groups and all regions of the World. It is like other NCDs, often associated with older age groups, but evidence shows that 16 million of all deaths attributed to NCDs occur before the age of 70 years. Of these "premature" deaths, 82% occurred in low- and middle-income countries where Zambia belongs. Children, adults and the elderly are all vulnerable to the risk factors that contribute to NCDs, whether from unhealthy diets, physical inactivity, exposure to tobacco smoke or the effects of the harmful use of alcohol.

NCDs are driven by forces that include ageing, rapid unplanned urbanization, and the globalization of unhealthy lifestyles. For example, globalization of unhealthy lifestyles like unhealthy diets may show up in individuals as raised blood pressure, increased blood glucose, elevated blood lipids, and obesity. These are called 'intermediate risk factors' which can lead to cardiovascular disease, a NCD (WHO, 2015). Warlow (2008) describes stroke risk factors into two categories i.e. modifiable risk factors and non modifiable ones as shown in table 2.1.

**Table 2.1 Risk factors for stroke (Warlow, 2008)**

<b>Modifiable Risk factors</b>	<b>Non Modifiable Risk factors</b>
Hypertension	Age
Atrial fibrillation	Sex
Hypercholesterolemia	Race/ Ethnicity
Diabetes mellitus	Family history of strokes
Atherosclerosis	History of previous stroke
Circulation problems	
Smoking/passive smoking	
Heavy alcohol consumption	
Physical inactivity	
Obesity	
Diet (Low fruit and vegetable consumption)	

### **2.3.1 Modifiable risk factors**

These are risk factors which are a result of lifestyles, and changing the undesired lifestyles can be controlled or modified in order to prevent a stroke.

Epidemiological studies have demonstrated that modifiable risk factors are wide and varied.

Hypertension is a major risk factor for strokes because most haemorrhages in the brain parenchyma arising in the region of the small arteries that serve the basal ganglia, thalamus, and brain stem and are caused by an arteriopathy of chronic hypertension (Martin, Denis & Liu, 2010). And Saribekian, Arzamastsev & Bibilashvili (2008) showed that atrial fibrillation is also an important risk factor for stroke due to arterial sclerosis and fibrinoid necrosis, as well as focal aneurysmal dilatation (Charcot-Bouchard intracerebral microaneurysm). Similarly, atherosclerosis or arteriosclerosis may result into haemorrhage which may arise from rupture of the damaged blood vessel and the rupture is believed to occur at Charcot-Bouchard aneurysms (Wilkinson, Wolfe & Warburton, 1997).

Blood circulation problems such as heart diseases (atrial fibrillation, heart failure, and rheumatic heart diseases), hypercoagulation, increased plasma fibrinogen levels, hypercholesterolemia, homocystinuria and homocysteinemia are equally important risk factors for stroke as they predispose the brain tissue to infarction following ischaemia hence stroke (Wilkinson, Wolfe & Warburton, 1997).

The Southern Africa Stroke Prevention Initiative (SASPI) study of stroke prevalence in rural South Africans, found hypercholesterolemia, diabetes mellitus, active smoking or passive smoking, heavy alcohol consumption, physical inactivity, obesity and poor diet (Low fruit and vegetable consumption) to be among the risk factors for stroke in the rural areas. This is likely to be similar in Zambia as the two populations

share similar attributes (Connor, Thorogood & Casserly and SAPSI project team 2004).

### **2.3.2 Non modifiable risk factors**

Some risk factors are permanent situations and cannot be controlled to prevent stroke and therefore predispose an individual to having stroke. Increasing age is a major non modifiable risk factor for strokes whether in developed or developing countries (Warlow, 2008). But though age is a risk factor of stroke, research has shown that the incidence of stroke in young adults in developing countries is higher than in developed countries because of the higher incidence of stroke related to infection, rheumatic heart disease and undetected or uncontrolled vascular risk factors (Martin, Denis & Liu, 2010).

Studies comparing incidence for men and women have also shown that the incidence of stroke varies between sexes. In Europe for example, the incidence varies from 101.1 to 239.3 per 100,000 in men and 63.0 to 158.7 per 100,000 in women and within 5 years of a stroke, over half of patients aged  $\geq 45$  years will die: 52% of men and 56% of women (Roger, 2011). But arguments have arisen indicating that the difference is due to the fact that women have a higher life expectancy as compared to men and stroke which has age as a risk factor is more in women (Charles & David, 2006).

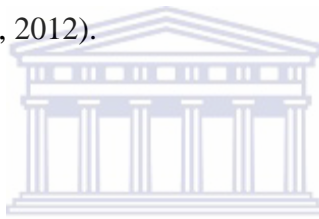
Research has also found stroke incidence in blacks to be high with an approximate two fold increased risk compared to white groups regardless of the country of origin

or ethnicity (O'Donnell et.al., 2010; Charles & David, 2006). This has led to the scientific conclusion that race or ethnicity is a non-modifiable risk factor for stroke.

Family history of stroke is a non modifiable risk factor for stroke in that relatives of stroke victims are more likely to have stroke unlike those who do not have stroke relatives (Di legge et.al., 2012). Equally individuals with a previous history of stroke are likely to have another stroke (Joubert, 1991).

In Zambia, age, hypertension, alcohol intake, previous stroke, family history, HIV infection, hypercholesterolemia and tobacco smoking or sniffing are associated with stroke, (Atadzhanov et.al., 2012).

## **2.4 Stroke Diagnosis**



Generally, the clinical diagnosis of stroke is made in a patient with vascular risk factors and with acute onset of symptoms and signs that match an arterial vascular territory (Rydberg, Buckwalter & Caldemeyer, 2000).

### **2.4.1 Vitals signs**

To make an effective diagnosis, the process begins with patient's surveillance of vital signs. Body temperature, pulse and blood pressure are part of the vital signs and in every patient, as they give the picture of the patients' condition during surveillance (Elliot & Coventry, 2012). This helps to know the general condition of the patient on presentation. Deviation from the normal reading of vitals (Temperature- 37°C, Pulse- 82/m, Blood pressure- 120/80mmgh), will alarm the health provider. In stroke cases, the temperature may be raised due to inflammatory response to the local lesion and systemic response to stroke, the pulse may be abnormal with increase in either

ischaemic or haemorrhagic stroke due to cardiovascular involvement (Karaszewski, Thomas, Dennis, Wardlaw, 2012). The blood pressure is equally increased or normal depending on the underlying cause; increase is common in haemorrhagic stroke. Vital signs are an important guide in clinical diagnosis (Ahmed & Senior, 2014)

## **2.4.2 Examination**

### **2.4.2.1 General Examination**

Stroke general examination includes taking history, physical examination and specific neurological examinations (Catangui, 2013). Although these are primary processes, they are not sufficient enough to make an accurate diagnosis as they are not detailed (Leonardi-Bee, Bath, Phillips & Sandercock, 2002). History, physical examination and specific neurological examinations are the basis of the clinical diagnosis which is very important in resource constraint settings where Zambia belongs (Imam & Olorunfemi, 2004). Although clinical diagnosis provides the evidence for management of stroke, it could be misleading as clinical presentation of ischaemic and haemorrhagic stroke may be similar, hence clinical diagnosis reliability is not accurate as radiological methods (Flossmann, Redgrave, Briley & Rothwell, 2008). Although the clinical presentation of both types of strokes may be similar, medical treatment is different and may be very dangerous if ischaemic stroke which is due to brain tissue ischaemia is treated as haemorrhagic stroke which is due to blood vessels rupture resulting mostly from hypertension (Imam & Olorunfemi, 2004; Ogun, Oluwole, Ogunseyinde, Fatade & Odusote, 2000).

### 2.4.2.2 Investigations

Investigations in stroke diagnosis are Imaging and biochemistry. The imaging investigations are more diagnosis confirmatory, while biochemistry investigations help in risk factor identification.

#### *i) Imaging*

1. Computed Tomography scan (CT scan) - CT scanning uses X-rays to show the structure of the brain. It may reveal underdeveloped parts of the brain or sites of injury from impact, tumours, lesions or infection (Rydberg, Buckwalter & Caldemeyer, 2000). In a CT scan, the general rule is that a black speck in the damaged area of the brain indicates ischaemia or infarct, whereas white represents a haemorrhagic stroke (bleed), contrast, calcium (bone) or haematoma (Leonardi-Bee et.al., 2002). The use of CT scan is an extremely important technique in the evaluation of the stroke patient; it is the only way to reliably differentiate between haemorrhagic and ischaemic strokes, which result in similar clinical manifestations but have different mechanisms (Leonard-Bee et.al., 2002). Hemorrhagic stroke accounts for about 20% of all strokes while Ischemic stroke represents about 80% of the strokes (Connor et.al., 2007).
2. Magnetic Resonance Imaging scan ( MRI scan)- MRI scanning uses a strong magnetic field and radio waves to create pictures of the tissues and other structures inside the brain on a computer (Wright,2010). It can create clear and detailed pictures of the brain structure and identify any abnormalities. To improve contrast in the image, a dye may be introduced via a vein in the arm. MRI is more sensitive for the detection of acute brain

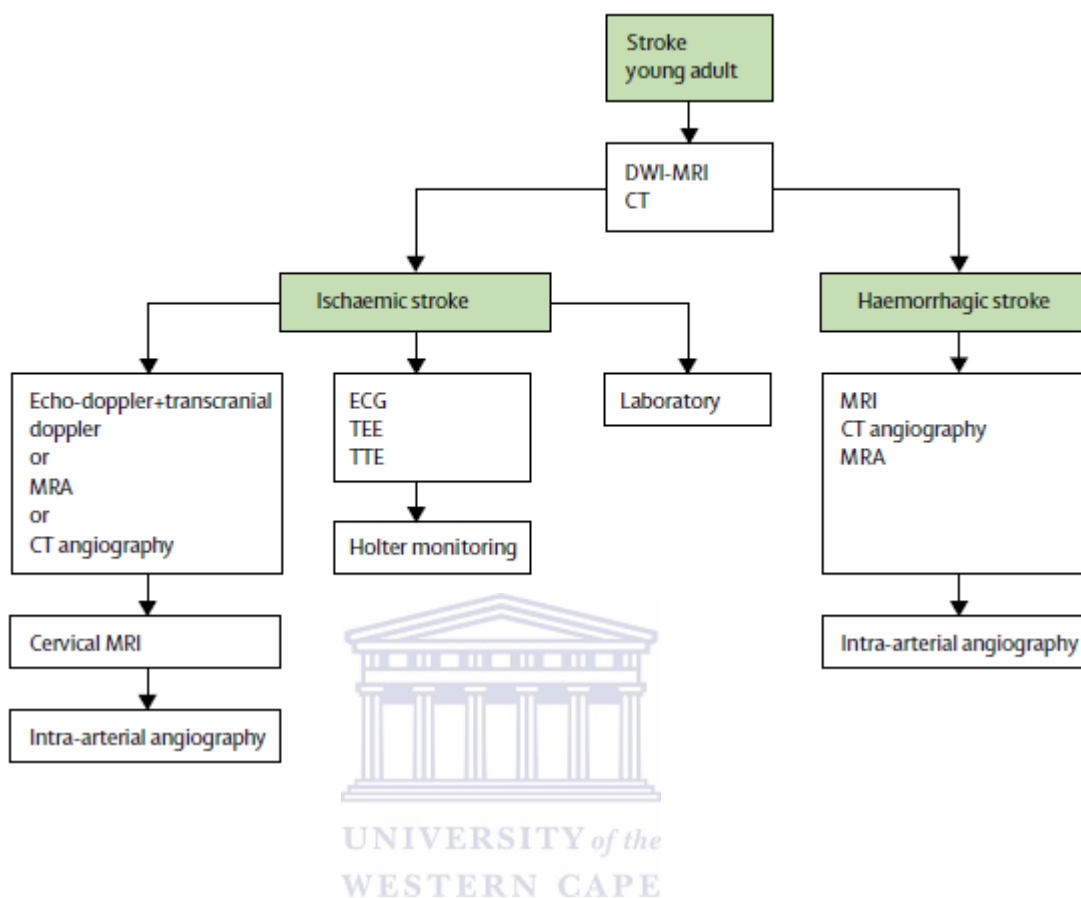
infarcts in comparison to CT, particularly with the use of MR diffusion-weighted and MR gradient-recalled echo (GRE) imaging and it is also superior in detecting hemorrhagic infarction be it acute or chronic by imaging hemosiderin ( Leary & Caplan, 2008). In the absence of MRI, CT is useful to rule out intracranial haemorrhage or a neoplasm, and to identify the extent of early infarct signs in candidates for intravenous thrombolysis.

3. Ultrasound- Khan, Cloud, Kerry & Markus (2007) suggests the use of ultrasound combined with Magnetic Resonance Angiography (MRA) to be as good as intra-arterial angiography. This can thence be used in the absence of angiography but the results efficacy is the same.
4. Electrocardiogram (ECG) - Electrocardiogram (ECG) is crucial to detect atrial fibrillation or other ECG evidence of cardiac disease which are strokes risk factors. This includes Holter ECG which is recommended to detect paroxysmal atrial fibrillation, but its yield is low (5%) and extended electroencephalogram (EEG) monitoring can be used to detect additional cases (6%) of paroxysmal atrial fibrillation (Liao, Khalid, Scallan, Morillo & O'Donnell 2007; Jabaudon , Sztajzel , Sievert, Landis & Sztajzel,2004)
5. Echocardiogram ( Echo)- This detects potential cardiac sources of embolism, particularly for mitral valve vegetations and for sources located in the left appendage, the atrial septum, and the aorta (Lerakis & Nicholson, 2005). The cardiac sources include mechanical prosthetic valves, mitral stenosis, endocarditis (infective and non-infective), dilated cardiomyopathies, intracardiac thrombus, and cardiac tumours such as myxoma and fibroelastom (Huang, Tseng, Liu & Lee, 2009).



6. Angiogram- Angiography offer better imaging of the vertebral and basilar arteries and hence helps to locate the lesion of deep vessels directly (Khan, Cloud, Kerry & Markus, 2007).

CT and MRI provide high spatial and high contrast resolution, respectively, of the cerebral parenchyma and its anatomical structure. The three roles of these imaging modalities in assessing the status of brain tissue in the suspected acute stroke patient are the same: a) the exclusion of haemorrhage, b) the detection of the ischaemic tissue, c) and the exclusion of conditions that mimic acute cerebral ischaemia (Latchaw, Albetts, & Lev, 2009). Hence to classify stroke, CT scan or MRI are very useful as they will exclude *haemorrhage* and detect *ischaemia* but in resource constrained countries like Zambia, CT Scan is the choice modality due to availability (Bryer, Connor, Haug, Cheyip, Staub, Tipping et.al., 2010). Differential diagnosis for stroke include multiple sclerosis, somatoform disorders, migraine with prolonged aura, post ictal focal deficits, neoplasm or encephalitis (Turner, 2008). MRI with Diffusion Weighted Imaging (DWI) is the best technique to confirm the diagnosis of ischaemic stroke in an emergency and to rule out the diagnosis, including parenchymal haemorrhage (Turner, 2008). Equally, Echo-Doppler or MRA and CT angiography are useful to confirm or rule out extra cranial or intracranial arterial disease or an occlusion in ischaemic strokes (Wright. 2010). Hence cardiac disease in ischaemic stroke can equally be ruled out by Electrocardiogram and Transoesophageal echocardiogram to detect cardiac sources of embolism. But in haemorrhagic strokes, MRI, CT angiography and MRA offer better imaging of the presence of an intramural haematoma (Catangui, 2013). Figure 2.1 show the processes followed to diagnosis stroke using imaging in young adults. The same applies for all age groups.



**Figure 2.1 Process of diagnosis using imaging (adapted from Ferro et.al., 2010)**

ii) *Biochemistry*

These are the laboratory tests to provide biological risk factors including Glucose, Full blood count, Coagulation studies, Electrolytes, Renal function tests, Liver function tests. Laboratory tests like complete blood and platelet count; erythrocyte sedimentation rate; C-reactive protein; serum, electrolytes, glycaemia, lipid profile, renal, and hepatic functions; activated partial thromboplastin time; and prothrombin time can detect biological risk factors and can provide insight into rare causes of ischaemic stroke such as

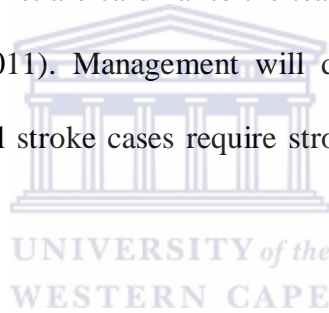
coagulation disorders (e.g.thrombocythaemia) or systemic diseases ( Wright 2010). Table 2.2 show the stroke causes, guided by clinical signs.

	Clinical signs	Confirmatory tests
Cervical arterial dissection	Minor head or cervical trauma, headache, facial or neck pain, Horner's syndrome, XII palsy	Cervical MT MRI with fat suppression, angiography
Atherosclerotic large-vessel disease	Multiple vascular risk factors, stroke preceded by transient ischaemic attacks, carotid bruit	Carotid/vertebral ultrasound, angiography
Small-vessel disease	Hypertension, diabetes, lacunar syndrome, capsular warning syndrome	MRI*
Patent foramen ovale	Stroke during Valsalva's manoeuvre, stroke after prolonged immobilisation	TEE, TCD with microbubbles
Other cardioembolic diseases	Clinical history and examination, cortical stroke*, haemorrhagic transformation, multiple infarcts in different arterial territories	ECC, cardiac monitoring, TTE, TEE, Holter
Pulmonary fistulae	Right-to-left shunt, no patent foramen ovale, Rendu-Osler disease	Chest CT
Systemic lupus erythematosus	Anaemia, low platelet count, arthralgias, fever, high ESR, skin or kidney involvement	Clinical criteria, ANA, anti-DNA and Sm involvement
Antiphospholipid syndrome	Miscarriages, venous thrombosis, prolonged aPTT	Lupus anticoagulant, anticardiolipin and $\beta_2$ -glycoprotein antibodies
Sneddon's syndrome	Generalised livedo reticularis, ischaemic and haemorrhagic stroke	Skin biopsy, digital artery biopsy
Takayasu's disease	Absent pulses in upper limbs, blood pressure difference between arms	CT or MRA, aortic PET
Primary CNS vasculitis	Multiple strokes, encephalopathy, headache	Lumbar puncture, angiography, meningeal-brain biopsy
Moyamoya syndrome	Multiple strokes, haemorrhagic stroke, cognitive decline	Angiography
Retinoarteriopathy and retinocochlear cerebral arteriopathy	Visual loss, progressive or episodic deafness, abnormal fundoscopy	ENT and ophthalmological consultation
Sickle-cell disease	African ethnic origin	Hg electrophoresis, genetic testing, TCD
Genetic thrombophilic diseases†	Arterial and venous strokes, family history	Antithrombin, protein C and S concentrations, genetic testing
CADASIL	Family history, multiple strokes, migraine, dementia, psychosis	Skin biopsy, genetic testing
HANAC syndrome, other COL4A1 disorders	Small-vessel disease, cerebral aneurysms, porencephaly, retinal arterial tortuosity, kidney disease, muscle cramps	Genetic testing
Fabry's disease	Skin, ocular, or kidney involvement; vertebrobasilar dolicoectasia	Genetic testing, GLA activity
MEIAS	Migraine, seizures, myopathy, deafness, short stature	EMG, muscle biopsy, genetic testing

**Table 2.2 Stroke causes and clinical signs and tests (adapted from Ferro et.al., 2010)**

## 2.5 Stroke management

All stroke patients should be treated in a *stroke unit* with multidisciplinary care, or stroke services that adhere as closely as possible to the criteria for stroke unit care (Bryer, et.al., 2010). Stroke management in a stroke unit facilitates a multidisciplinary team that is knowledgeable about the care of the stroke patient and provides care for such a patient. An effective team includes a specialised nursing staff – ICU or trauma trained, at least one physician (ideally but not necessarily a neurologist) with interest and expertise in stroke management, Social worker, Occupational therapist, Physiotherapist and Speech and language therapist, Psychologist and Psychiatrist are cardinal to the team (Bryer, Connor, Haug, Cheyip, Staub, Tipping et.al., 2011). Management will depend on the findings from the examination hence not all stroke cases require stroke management as written in the guidelines.



According to Wright, Hill, Bernhardt, Lindley, Ada, Bajorek et.al.. (2012), management should be tailored according to various stages such as follows:

### 2.5.1 Medical management

#### 2.5.1.1 Ischaemic stroke -Re-perfusion

Ischaemic stroke as a result of brain parenchyma ischaemia can be due to blockage of the vascular supply of a local region of the brain. Ischaemic stroke can also result from general circulatory failure or systemic hypertension (Rydberg, Buckwalter & Caldemeyer, 2000). The main objective of treatment in ischaemic stroke is re-perfusion of the blood to the brain parenchyma to enhance nutrition and hence avoiding necrosis and infarction (Zambia National Formulary, 2011).

### **2.5.1.1.1 Antiplatelet therapy**

In prior ischaemic stroke or TIA, aspirin long term is necessary to increase perfusion of blood to the brain tissue as it decreases platelet aggregation and inhibit thrombus formation in the arterial circulation (Zambia National Formulary, 2011).

### **2.5.1.1.2 Anticoagulant therapy**

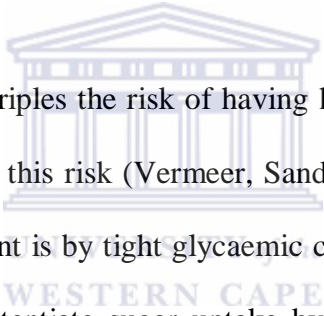
Anti-coagulants like heparin and warfarin are used in the management of thrombo-embolism as the cause of stroke (BNF, 2013). Heparin is usually a drug of choice in pregnancy because of its inability to cross the placenta but its short duration of action limits its use. Therefore, Bryer et.al., (2010) suggests that in patients with chronic atrial fibrillation, long-term Warfarin with a target INR (International Normalised Ratio which is the prothombin time in which the effects of vitamin K is active) of 2-3 should be given. After cardio - embolitic stroke from valvular heart disease and recent myocardial infarction, Warfarin with a target INR of 3-4 is necessary.

In developing regions including Africa, Anticoagulant (Warfarin) is used in the management of thrombo-embolism as respect to stroke. The use of thrombolysis in this region is limited because adequate patient inclusion and exclusion is not achieved due to poor health stroke services (Wright et.al. 2012).

### **2.5.1.2 Haemorrhagic stroke- Risk factor management**

Management of haemorrhagic stroke is tailored towards *management of risk factors* (Johnston, Gress, Browner & Sidney, 2000). Prevention plays a crucial role in counteracting morbidity and mortality related to stroke. Arterial hypertension (HTN)

is the single most important modifiable risk factor for haemorrhagic stroke (Cushman, Evans & Byington, 2010). It contributes to 60% of all strokes by causing atheroma in carotids, vertebral arteries and aortic arch; increasing friability of small cerebral arteries; precipitating the left ventricular dysfunction and atrial fibrillation. Management of hypertension is by diuretics or beta blockers (Ministry of Health, 2011). Diuretics are known to inhibit sodium re-absorption at the beginning of the distal convoluted tubule hence reduce blood pressure by inducing diuresis, while Beta blockers reduce blood pressure by blocking beta-adrenoreceptors in the heart and peripheral vasculature reducing heart blood pumping activity thereby reducing blood pressure (BNF, 2013).

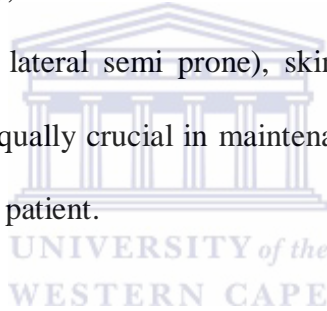


Diabetes mellitus almost triples the risk of having haemorrhagic stroke while current cigarette smoking doubles this risk (Vermeer, Sandee, Algra, Koudstaal, Kappelle & Dippel, 2006). Management is by tight glycaemic control either by improving diet or insulin replacement to potentiate sugar uptake by the body. Atrial fibrillation due to cigarette smoking, although often asymptomatic and undetected, is an important risk factor for haemorrhagic stroke, increasing stroke risk about 5-fold throughout all ages and its relevance could be underestimated (Elijovich, Josephson, Fung & Smith, 2009). Management is by anticoagulant in form of warfarin or aspirin.

Hyperlipidemia is the abnormally high levels of fats in the blood. The levels of lipoproteins, particularly LDL cholesterol increases the chance of atherosclerosis and therefore haemorrhagic stroke (Curb, Abbott & Rodriguez, 2004). Lowering cholesterol levels using Statins is beneficial, but caution should be exercised in its routine use in haemorrhagic stroke (Wright et.al. 2012).

### **2.5.2 Maintenance therapy**

Provision of supplemental oxygen to patients with hypoxemia, checking the blood glucose level, avoidance of the administration of glucose-containing fluids (unless the patient is hypoglycaemic) and rapid initiation of transport (load and go) to make hydration are key procedures in maintenance therapy of a stroke victim (Acker, Pancioli, Crocco, Eckstein, Jauch, Larrabee et.al. 2007). These are believed to maintain the body's internal environment to enhance biological functions. Research has shown that in stroke management, unstable body internal environment such as elevated blood glucose is an independent factor in poor functional outcomes, increased length of stay, and increased mortality (Acker et.al. 2007). Hence positioning in lying (left lateral semi prone), skin care (turnings two hourly) and feeding (oral, NGT) are equally crucial in maintenance therapy to maintain optimum body functions of a stroke patient.



### **2.5.3 Lifestyle modification**

Stroke risk factor management is achieved better by health promotion. Health education of people at risk for stroke is essential (Rundek & Sacco, 2008). Health education about the consequences of physical inactivity, alcohol usage, smoking, obesity are achieved hence health promotion. Stroke can be prevented by controlling the modifiable risk factors. Modifiable risk factors are lifestyle situations which can be altered to prevent stroke. The Australian National stroke Foundation (2010) outlines that after assessment; victims are made aware about their risk factors. The risk factors and intervention may include stopping smoking, improving diet, increasing regular exercise or avoiding excessive alcohol intake (American Stroke Association, 2015). Meanwhile, intervention should be individualised and delivered in

a motivational or counselling manner (Legg, Drummond & Langhorne, 2006; Hackett & Anderson, 2005).

## **2.6 Rehabilitation**

According to Wright et.al. (2012), rehabilitation starts as soon as the patient's condition stabilizes and continues until the individual has reached his or her maximum ability to function within the family and the community. As rehabilitation of stroke is a multidisciplinary process, a variety of professional staff contribute to the overall management of patients and their families. The Multidisciplinary team is most often made up of doctors, nurses, physiotherapists, occupational therapists, speech and language therapists and, where resources permit, other professionals like psychologists and social workers (Bryer et.al., 2011). If the team members have specialization in stroke rehabilitation, it is very beneficial.

Langhorne, Bernhardt & Kwakkel (2011) states that stroke rehabilitation should be structured with great intensity in the first six months, with a minimum of five days per week and continuation of exercises should be done at home. Rehabilitation should begin early. They further states that stroke rehabilitation typically entails a cyclical process which involves (1) physical assessment; to identify and quantify the patient's needs; (2) goal setting; to define realistic and attainable goals for improvement; (3) intervention; to assist in the achievement of goals; and (4) reassessment; to assess progress against agreed goals. The National Stroke Foundation *Physiotherapy Clinical Guidelines for Stroke Management* (2010) outlines rehabilitation as follows;



### **2.6.1 Sensori-motor**

Progressive resistance exercises, electrical stimulation, electromyographic biofeedback in conjunction with conventional therapy interventions should be used for people with reduced strength in case of weakness (Schabrun & Hillier, 2009). For loss of sensation, sensory-specific training such as brushing or approximation for joints can be provided to stroke survivors who have sensory loss. That is to say that sensory training can be designed to facilitate transfer can also be provided to stroke survivors who have sensory loss.

### **2.6.2 Physical activity**

Doyle, Bennett, Fasoli & McKenna (2010), highlights the physical activity in stroke with victims with different needs. Exercises for sitting practice, reaching beyond arms length in sitting with supervision/assistance should be provided for people who have difficulty sitting and practising standing up. These should also be undertaken by victims who have difficulty in standing up from a chair. Task-specific standing practice with feedback can be provided for people who have difficulty standing.

All people with difficulty walking should be given the opportunity to undertake tailored, repetitive practice of walking (or components of walking) as much as possible (Young & Foster, 2007). Young & Forster (2007), further states that one or more of the following interventions can be used in addition to conventional walking training outlined in;

- (a) cueing of cadence
- (b) mechanically-assisted gait (via treadmill or automated mechanical or robotic device) joint position biofeedback

(c) Virtual reality training.

(d) Ankle-foot orthoses, which should be individually fitted, can be used for people with persistent drop foot

Meanwhile all people with difficulty using their upper limbs should be given the opportunity to undertake as much tailored practice of upper limbs activity (or components of such tasks) as possible (De Wit, Putman, Lincoln, Baert, Berman, Beyens, et.al. 2006). Interventions which can be used routinely include constraint-induced movement therapy in selected people, repetitive task-specific training, mechanical assisted training, mental practice, electromyography (EMG) biofeedback in conjunction with conventional therapy, electrical stimulation, mirror therapy and bilateral training.

### 2.6.3 Management of complications

Morbidity due stroke may give rise to some complications which could interfere with the process of management especially rehabilitation. Common complications include spasticity, subluxation, pain, contractures, swelling, loss of cardiovascular fitness, fatigue and falls (Mclean, 2004).

**Spasticity-** Interventions to decrease spasticity other than an early comprehensive therapy program is not routinely provided for people who have mild to moderate spasticity [i.e. spasticity that does not interfere with a stroke survivor's activity or personal care]( Satkunam, 2003). But in stroke survivors who have persistent moderate to severe spasticity, botulinum toxin A should be trialled in conjunction with rehabilitation therapy which includes setting clear goals and electrical stimulation or EMG biofeedback can be used (Brashear, Gordon & Elovic , 2002).

Conventional therapy (i.e. early tailored interventions) is provided for stroke survivors at risk of or who have developed **contractures** (Lannin & Herbert, 2003). Hence for stroke survivors at risk of or who have developed contractures and are undergoing comprehensive rehabilitation, the routine use of splints or prolonged positioning of muscles in a lengthened position is not recommended. Overhead pulley exercise should not be used routinely to maintain range of motion of the shoulder but serial casting can be used to reduce severe, persistent contracture when conventional therapy has failed (Lannin & Herbert, 2003).

In **Subluxation**, for people with severe weakness who are at risk of developing a subluxed shoulder, management includes electrical stimulation, firm support devices, education and training for the patient, family or carer and clinical staff on how to correctly handle and position the affected upper limb (Ada, Foongchomcheay & Canning, 2005). For people who have developed a subluxed shoulder, management may include firm support devices to prevent further subluxation.

**Pain** management for people with severe weakness who are at risk of developing shoulder pain, management includes, shoulder strapping, interventions to educate staff, carers and people with stroke about preventing trauma (Vuagnat, Chantraine, 2003). For victims who develop shoulder pain, management must be based on evidence-based interventions for acute musculoskeletal pain (Price & Pandyan, 2001). Hence the routine use of corticosteroid injections and ultrasound interventions is not recommended for people who have already developed shoulder pain.

**Swelling** prevention of the extremities for people who are immobile can include dynamic pressure garments, electrical stimulation, and elevation of the limb when resting (Ada, Foongchomcheay & Canning, 2005). For victims who have swollen

extremities, management to reduce swelling in the hand and foot can include dynamic pressure garments, electrical stimulation, continuous passive motion with elevation, elevation of the limb when resting.

When there **is loss of cardio-respiratory fitness** rehabilitation should include interventions aimed at increasing cardio-respiratory fitness once patients have sufficient strength in the large lower limb muscle groups. Patients must be encouraged to undertake regular and ongoing fitness training (Mclean, 2004). Increasing fitness reduces the chances of another stroke.

In case of **fatigue**, therapy for stroke survivors should be organised for periods of the day when they are most alert (Mclean, 2004). Stroke survivors and their families or carers should be provided with information and education about fatigue; including potential management strategies such as exercise, establishing good sleep patterns, avoid sedating drugs and too much alcohol (Legg, Drummond & Langhorne, 2006).

**Falls** risk assessment should be undertaken using a valid tool on admission to hospital. A management plan should be initiated for all those identified as at risk of falls (Mackintosh, Hill, Dodd, Goldie & Culham, 2006). Multifactorial interventions in the community, including an individually prescribed exercise program, should be provided for people who are at risk of falling to increase stability.

#### **2.6.4 Transfer of care from hospital to community**

Prior to hospital discharge, all patients should be assessed to determine the need for a home visit, which may be carried out to ensure safety and provision of appropriate aids, support and community services (Mackintosh, Hill, Dodd, Goldie & Culham,

2006). Hence to ensure that safe discharge occurs, hospital services should ensure the following are completed prior to discharge:

1. patients and families or carers have the opportunity to identify and discuss their post-discharge needs (e.g. physical, emotional, social, recreational, financial and community support) with relevant members of the multidisciplinary team including Group Pharmacy Practice ( GPP), general practitioners, primary healthcare teams and community services are informed before or at the time of discharge.
2. All medications, equipment and support services necessary for a safe discharge are organised by GPP, any continuing specialist treatment required is organised by GPP.
3. A documented post-discharge care plan is developed in collaboration with the patient and family and a copy provided to them. This may include relevant community services, self-management strategies (e.g. information on medications and compliance advice, goals and therapy to continue at home), stroke support services, any further rehabilitation or outpatient appointments, and an appropriate contact number for any queries.

A locally developed protocol may assist in implementation of a safe discharge process (Oliver, Connelly, Victor, Shaw, Whitehead, Gene et.al., 2007). A discharge planner may be used to coordinate a comprehensive discharge program for stroke survivors. Unfortunately, there is no information on the transfer of stroke patients from the hospital to the community in resource constrained countries and this poses a challenge in the continuity of rehabilitation.

### **2.6.5 Carer training**

Relevant members of the multidisciplinary team should provide specific and tailored training for carers or family before the stroke survivor is discharged home (Wasserman, de Villiers & Bryer, 2005). This should include training as necessary, in personal care techniques, communication strategies, physical handling techniques, ongoing prevention and other specific stroke-related problems, safe swallowing and appropriate dietary modifications, and management of behaviours and psychosocial issues (Legg & Langhorne, 2004).

### **2.6.6 Community rehabilitation and follow up services**

Health services should provide comprehensive, experienced multidisciplinary community rehabilitation and adequately resourced support services for stroke survivors and their families and carers (Wasserman, de Villiers & Bryer, 2005). If services such as the multidisciplinary community rehabilitation services and carer support services are available, early supported discharge is possible for all stroke patients with mild to moderate disability. Rehabilitation delivered in the home setting should be offered to all stroke survivors as needed (Legg & Langhorne, 2004). Where home rehabilitation is unavailable, patients requiring rehabilitation should receive centre based care. Contact and education by trained staff should be offered to all stroke survivors and families or carers after discharge (Smith, Forster, House, Knapp, Wright & Young 2008). This means that stroke survivors should have regular and ongoing review by a member of a stroke team, including at least one specialist medical review. Stroke survivors and their carers or families should be provided with the contact information for the specialist stroke service and a contact person (in the

hospital or community) for any post-discharge queries for at least the first year following discharge (Smith et.al. 2008).

### **2.6.7 Long term rehabilitation**

Stroke survivors who have residual impairment at the end of the formal rehabilitation phase of care should be reviewed usually by the general practitioner or rehabilitation provider to consider whether access to further interventions are needed (Forster, Lambley, Hardy, Young, Smith, Green, et.al. 2009). Thence a referral for further assessment should be offered by a relevant allied health professional or general rehabilitation services if there are new problems which were not present when undertaking initial rehabilitation or if the person's physical or social environment has changed. Stroke survivors with residual impairment identified as having further rehabilitation needs should receive services with new goals and improve task-orientated activity. Stroke survivors with confirmed difficulties in performance of personal tasks, instrumental activities, vocational activities or leisure activities should have a documented management plan updated and initiated to address these issues (French, Thomas, Leathley, Sutton, McAdam, Forster, et.al.. (2007). Therefore stroke survivors should be encouraged to participate in long term appropriate community exercise programs.

### **2.6.8 Standardised assessment**

A validated and reliable assessment tool or measure that meet the needs of the patient to guide clinical decision-making need to be used by clinicians in stroke assessment during rehabilitation (Ellis, Mant, Langhorne, Dennis & Winner, 2010). This standardised tool should be suitable to the area is necessary so as to assess the real needs of the patients (Maleka, Stewart & Haler, 2012).

### **2.6.9 Goal setting**

Stroke survivors and their families or carers who are involved in the recovery process should have their wishes and expectations established and acknowledged (Lui, Ross & Thompson, 2005). This means that stroke survivors and their families or carers should be given the opportunity to participate in the process of setting goals unless they choose not to or are unable to participate. This calls for health professionals to collaboratively set goals for patient care. Therefore goals should be prescribed, specific and challenging (Ellis et.al., 2010). They should be recorded, reviewed and updated regularly. Stroke survivors should be offered training in self-management skills that include active problem solving and individual goal setting (Walker, Leonardi-Bee, Bath, Langhorne, Dewey, Corr, et.al. 2004).

### **2.6.10 Multidisciplinary Team meetings**

Discussion and assessment of new patients, reviewing patient management and goals, and plan for discharge need to be done in a multidisciplinary stroke teams regularly as multidisciplinary teams have been found to be effective (Langhorne, Bernhardt & Kwakkel, 2011).

### **2.6.11 Information and education**

All stroke survivors and their families or carers should be offered information tailored to meet their needs using relevant language and communication formats (Lui, Ross & Thompson, 2005). This means that they should be provided with routine, follow-up opportunities for clarification or reinforcement of the information provided. Information should be provided at different stages in the recovery process.



### **2.6.12 Family meetings**

Lui, Ross & Thompson (2005), advises that the stroke team should meet regularly with the patient and their family or carer to involve them in management, goal setting and planning for discharge. The idea is to involve family members in the care of stroke (Smith et.al. 2008).

### **2.6.13 Stroke service Improvement**

All stroke services should be involved in quality improvement activities that include regular audit and feedback (Aziz, Leonardi-Bee, Phillips, Gladman, Legg, and Walker, 2008). This implies that indicators based on nationally agreed standards of care should be used when undertaking any audit.

### **2.6.14 Speech therapy**

The European Stroke Organisation (2008) emphasizes the need for common speech therapy practice which should be provided early. Intensive input from a trained speech and language therapist would provide several strategies to improve language and communication.

Currently, there is no data regarding the process of care of stroke in Zambia (MOH, 2010b). For South Africa, a country within the same region as Zambia has endeavoured to develop stroke services and therefore aims to establish a comprehensive programme to optimise the prevention and management of stroke, to facilitate optimum patient care by early diagnosis and appropriate therapy to prevent secondary complications, to provide education of patients and their families with the community and health professionals to enhance adherence. It also aims to improve

most effective use of resources in relation to different types of stroke and to evaluate and monitor policy outcomes (Department of Health, 2001). With proper planning, this is equally achievable in Zambia.

## **2.7 Stroke services organisation**

### **2.7.1 Global Stroke Health services**

Health services for stroke patients are organized at different levels in countries with high income. (Scottish Intercollegiate Guidelines Network, 2010). All levels coordinated multidisciplinary personnel should exist. These are;

1. Organisation of hospital care- This admits all stroke patients regardless of the severity in a stroke unit of rehabilitation ward.
2. Hospital or home based care – All post stroke victims should be linked to the hospital or home based care for evaluation and reassessments.
3. Discharge and post-discharge services – Stroke victims continue to receive support services by trained personnel. Carer training and community services fall in this category.
4. Ongoing rehabilitation and follow up- Due to residual disability, ongoing rehabilitation services should be provided in the community or at the hospital if possible.

### **2.7.2 Ideal Stroke Unit**

According to the Stroke Unit Trialists' Collaboration (2006), the ideal stroke unit should handle comprehensive assessment of medical problems, impairments and disabilities by specialist staff (i.e. professionals interested and trained in stroke care). It should have established pathways and management protocols for acute and post acute management of stroke (including pre-hospital and emergency unit management

of stroke) with careful attention to active management of physiological abnormalities to maintain homeostasis. Langhorne & Dennis (1998) suggests that a stroke unit should be co-ordinated by a multidisciplinary team (MDT) with regular scheduled ward rounds attended by the full MDT to discuss management strategy for each patient. The coordinated MDT should ideally include a stroke physician, nursing staff, occupational therapist, physiotherapist, speech pathologist, dietician, social worker and, where possible, a psychologist.

Meanwhile, Cifu & Stewart (1999) adds that the unit should ideally be in a designated space within hospital, with designated stroke unit beds. The result of the stroke unit should be early mobilization, skilled nursing care, early initiation of rehabilitation plan involving the carers. It should handle scheduled patient and family education concerning management, rehabilitation program, causes of stroke, secondary prevention and community resources. Cifu & Stewart (1999) emphasizes that the unit should strive to perform early assessment and planning of discharge needs and planning for home-based care with a family member, a care-giver or a community rehabilitation worker. The stroke unit should perform initiation of secondary prevention strategies. All staff must undertake ongoing training and education in stroke management

### **2.7.3 Stroke health services for resource constraint countries** (Based on a recommendation by Bryer et.al. 2011)

For resource constraint countries like Zambia, a recommendation has been made as follows;

### *2.7.3.1 Level one stroke unit or service*

Minimum staffing requirements are medical, nursing and physiotherapy personnel trained in stroke care comprehensive assessment of medical problems, impairments and disabilities established pathways and protocols for acute and post acute management of stroke with careful attention to active management of physiological abnormalities to maintain homeostasis early initiation of rehabilitation plan involving the carers scheduled patient and family education about management, rehabilitation program, causes of stroke, secondary prevention and available community resources early assessment and planning of discharge needs . The team should be able to conduct initiation of secondary prevention strategies, ongoing staff training and education in stroke care, and protocol for referral and transfer of selected stroke patients to a level two or three facility. Where there are large distances between level one and level two or level three hospitals, the use of telemedicine or other telecommunication links should be explored.

### *2.7.3.2 Level two stroke unit*

The Multidisciplinary team should include internal medicine specialist trained in stroke care, CT scan facility on site with radiology cover to interpret scans. The essential investigations available here should include electrocardiogram, chest x-ray, basic laboratory service for FBC, erythrocyte sedimentation rate, international normalized ratio, syphilis testing (RPR and VDRL), blood sugar, urea and electrolytes. Level two hospitals should have easy access to echocardiography. Stroke patients who require investigation and management by a team led by a specialist physician will probably be managed at a level two unit.

### 2.7.3.3 Level three

These facilities are a comprehensive stroke unit and service requirements as follows:  
Staffing to include stroke specialists (specialist physicians or neurologists trained in stroke care, neurosurgical service) and a full MDT (all disciplines). A 24-h comprehensive laboratory service including haematology with a clotting profile, full neuroradiology service (CT, MRI with software for diffusion-weighted and MRA images, angiography, duplex Doppler carotid sonography), catheter laboratory facility with a stroke interventionist available for endovascular procedures, focused vascular surgery available (carotid, coronary, peripheral, full cardiac service including transthoracic and transesophageal echocardiography) should be in place.

## 2.8 Research framework- The Donabedian model

This conceptual model is a framework for examining health services and evaluating quality of care. In this model of quality of healthcare, the physician Donabedian distinguished three components: *structure, process & outcome* (Donabedian, 1988). He defined structure as the environment in which healthcare is provided, process as the method by which healthcare is provided and outcome as the consequence of the healthcare provided. The framework is useful for assessing health services and evaluating quality of care. The process of care of stroke in Zambia is an analysis of stroke health services hence the use of this conceptual framework.

In quality of health assessment, information about quality of care comes from three categories: structure, process and outcomes. Structure is the set-up in which care is delivered, including hospital buildings, staff, financing, and equipment; Process is the interactions between patients and providers throughout the delivery of healthcare;

Outcomes refer to the result of healthcare on the health status of patients. The Donabedian Model continues to be the dominant paradigm for assessing the quality of stroke health care (Hoenig et.al. 1999) and hence was used in this study.

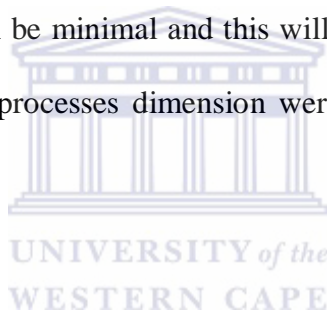
### **2.8.1 Structure of healthcare**

Structure is the context in which care is provided, including hospital infrastructure, staffs, financing, and equipment. Structure includes all the factors that influence the context in which care is provided. This includes the physical facility, equipment, and human resources, as well as organizational efforts such as staff development and remunerations. These factors affect how health care providers and patients in a healthcare system interact and are indicators of the average quality of care within a health system. Structure can be observed and measured and it may be the main cause of problems identified in process (Donabedian, 2003). Hence structural components of care of the healthcare system should facilitate the provision of health services (Lawson & Yazdany, 2012). Stroke care demands a technical environment that is suitable for diagnosing and managing both neurological as well as cardiovascular diseases as stroke is such.

### **2.8.2 Process of healthcare**

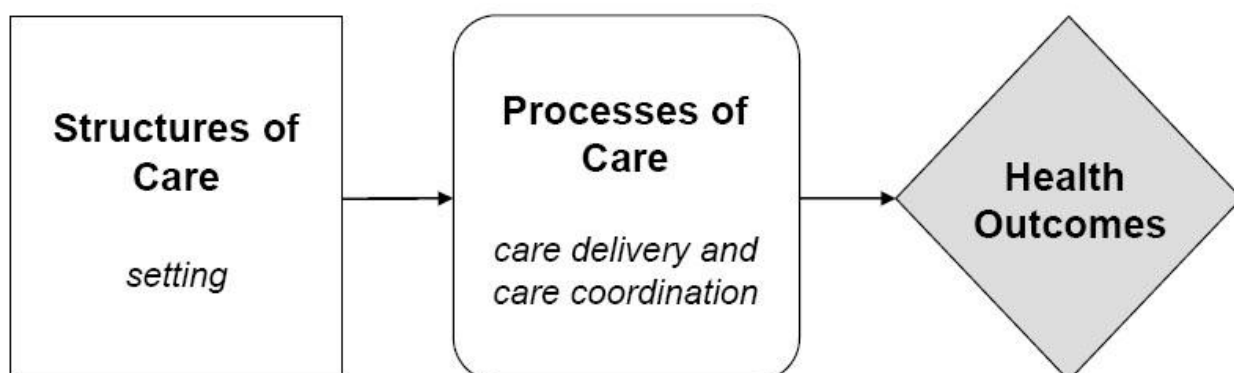
Process is the actual transaction between patients and healthcare providers throughout the provision of healthcare or the sum total of all actions that make up healthcare. These are diagnosis, treatment, preventive care, and health education. Processes are further classified as technical processes, how care is provided, or interpersonal processes, which all involve the manner in which care is provided (Donabedian, 1980). According to this model, the process is equivalent to quality of care because process contains all acts of healthcare provision (Donabedian, 2003). According to

this model, the process is equivalent to quality of care because process contains all acts of healthcare provision. Information about process can be obtained through medical records, interviews with patients and health workers, or direct observations of healthcare visits. The processes of healthcare include the actions performed in giving and receiving care as is the utilizing of the technical environment to achieved desired stroke outcomes. Good processes are those which deliver effective, safe, quality personal and non-personal health interventions to those who need them, when and where needed, with minimum waste of resources (Donabedian, 1980). The context (structure) in which care is delivered affects the processes and outcomes. If the facility or technical environment and health workers are below the expected standards, stroke care will be minimal and this will affect it impact on the patient. In this study, structure and processes dimension were readily measured using various bench marks.



### **2.8.3 Outcome of healthcare**

Donabedian's model has directionality in that the ultimate goal of healthcare delivery and quality assessment is to improve patient outcomes through the interactions of the structures and the processes of stroke care (Donabedian, 1988). Outcomes are the results of healthcare on the health status of patients and populations. Outcomes contain all the results of healthcare on patients or populations, including changes to health status, behaviour, or knowledge with patient satisfaction and health-related quality of life. Outcomes are the most important indicators of quality since improving patient health status is the primary objective of healthcare (Frenk, 2000). Figure 2.3 presents the research framework for the study.



**Figure 2.3 Research framework**

#### **2.8.4 Limitation of the model**

Health outcomes that can be attributed directly to healthcare are very difficult to measure (Donabedian, 1980).

#### **2.9 Chapter summary**

The literature review looked at the process of care of stroke globally and regionally. The chapter shed light that stroke incidence has declined by over 40% in the past four decades in high-income countries, but over the same period, incidence has doubled in low- and middle-income countries, and a recent study in Zambia revealed high in-hospital mortality due to stroke at 40% of the total admissions. The chapter explained that stroke prevalence in Zambia has not been captured but the major risk factors of stroke are showing an increasing trend. Stroke incidence in Sub Saharan Africa has been further complicated by the HIV/AIDS pandemic. The chapter narrated that Zambia has not been spared hence reporting high mortality rates due to stroke and other NCDs at 1035/100 000. The chapter reviewed that to make an effective diagnosis, the process begins with patient's surveillance of body temperature; pulse



and blood pressure are part of the vital signs in every patient and progresses to special tests. In this chapter, it was discussed that stroke management is directed towards re-perfusion with anti-platelet or anti-coagulant if the stroke is ischaemic and if the stroke is haemorrhagic, control of risk factors is the principle treatment. The chapter highlighted the treatment progresses towards maintenance therapy, lifestyle modification and rehabilitation into the community if there is need. The chapter also shed light of the stroke health services at all levels of care and mentioned that the ideal stroke unit in a resource constrained nation like Zambia should have minimum staffing requirements are medical, nursing and physiotherapy personnel trained in stroke care comprehensive assessment of medical problems, impairments and disabilities established pathways and protocols for acute and post acute management of stroke with careful attention to active management of physiological abnormalities to maintain homeostasis early initiation of rehabilitation plan involving the carers scheduled patient and family education about management, rehabilitation program, causes of stroke, secondary prevention and available community resources early assessment and planning of discharge needs. The chapter ended with the explanation of the Donabedian model that defined structure as the environment in which healthcare is provided, process as the method by which healthcare is provided and outcome as the consequence of the healthcare provided.

# Chapter Three

## Methodology

### 3.1 Introduction

This chapter presents the methods used in this study. This study employed both quantitative and qualitative methods. The quantitative part was used to answer objective one of the study; to determine the process of care of stroke patients in Zambia. The qualitative part addressed objectives two and three; to explore the conditions under which diagnosis and management of stroke is done in Zambia and the factors influencing stroke diagnosis and management in Zambia. Data collection at each hospital commenced with a checklist which was quantitative to answer objective number one, and then followed by individual in-depth interviews with the health workers to answer objectives two and three.

In this chapter, methodology for the both quantitative and qualitative information are described in detailed pertaining to research setting, study design, data collection methods, participants, sample selection and procedure followed. The chapter also highlights how validity and reliability was ensured. It also discusses how data trustworthiness was ensured and how data was management. The chapter also highlights the ethical considerations taken to carry out the study.

### 3.2 Study design and methods

A descriptive and exploratory study design was used to address the objectives of this study. The study used both quantitative and qualitative methods of data collection as these different methodological perspectives complemented each other to achieve the

objectives of this study. Gerstman (2008) states quantitative research methods helps to generate numerical data and usually seeks to establish causal relationships (association) between variables, using statistical methods to test the strength and significance of the relationships. Quantitative data was collected to determine the process of care of Stroke. Meanwhile Neale (2009), states that qualitative research is beneficial in establishing what is not known in the area of desired research. Since process of care of stroke in Zambia is not known, the qualitative methods were beneficial in gaining a deep understanding and were advocated to achieve part of the aim of the study.

### **3.2.1 Study design for Quantitative part**

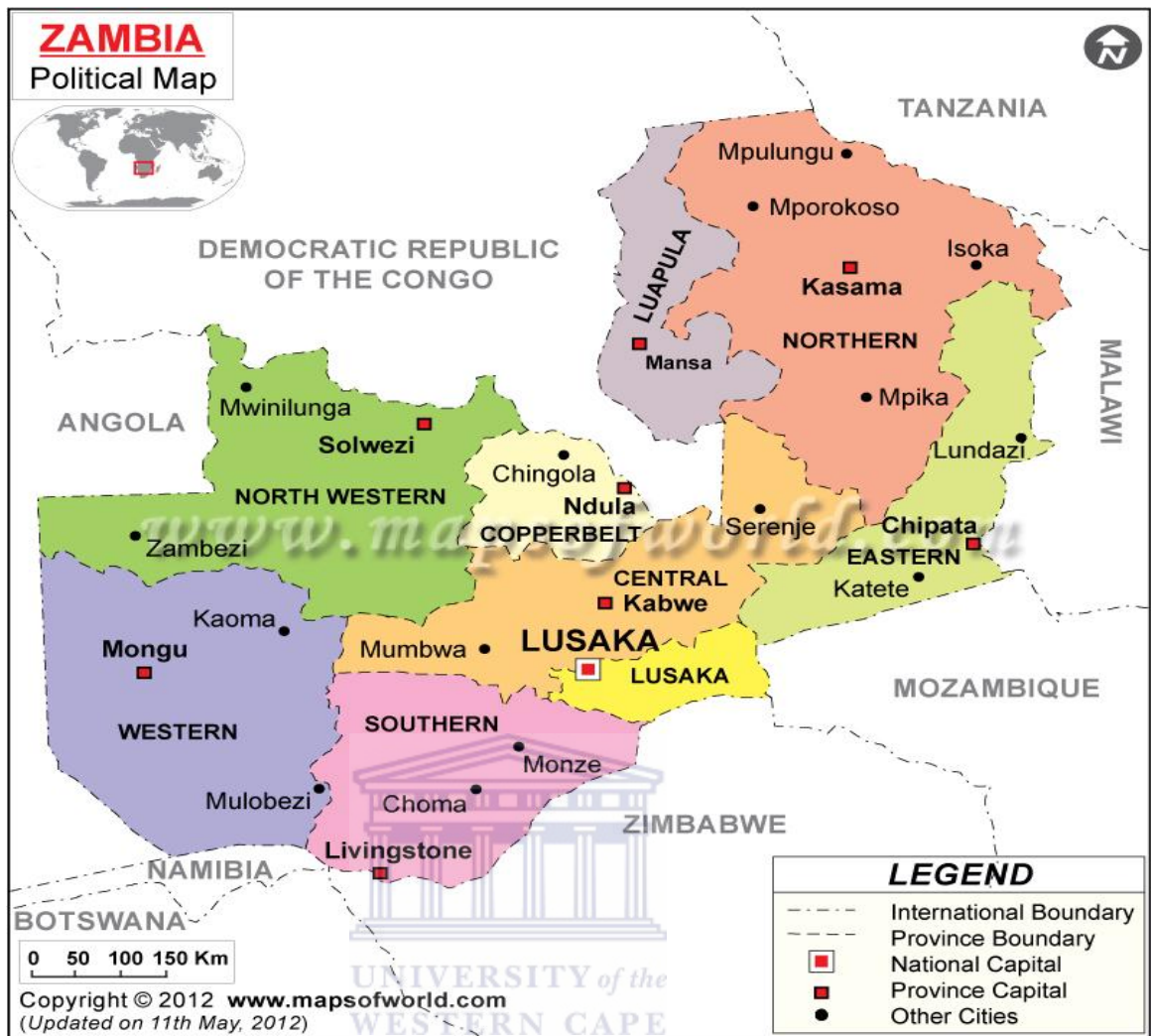
The quantitative design was used to answer objective number one of the study; to determine the process of care of stroke in Zambia. This study was a descriptive study in nature in that this study simply described what existed in terms of stroke care in Zambia. Descriptive studies serve to document what has already taken place in order to make decisions in the present based on past information (Domholdt, 2000). In this study, the researcher reviewed medical records as the primary source of information to meet the research objective one as “pre-recorded patient data” (Worster & Haines, 2004). Reviewing medical records at the hospital to determine the process of stroke care in Zambia was very necessary to meet the objective number one in this study. The medical records reviewed were for patients admitted to the hospital from 1<sup>st</sup> January 2014 to 30<sup>th</sup> October, 2014 as the time of review took place in the month of November, 2014.

### **3.2.2 Study design for Qualitative part**

The qualitative part addressed objective numbers two and three which were to explore the conditions under which diagnosis and management of stroke is done in Zambia and what are the factors influencing stroke diagnosis and management in Zambia. This was an explorative study in that it was establishing what is not known about the conditions under which diagnosis and management of stroke is made in Zambia, and the factors which influence diagnosis and management of stroke in Zambia (Polkinghorne, 2005). The use of this method allowed participants to freely express themselves and construct their own words and this allowed the researcher to get detailed information about the subject (Howitt, 2010).

### **3.3 Research setting**

The study was conducted in Zambia, Southern Africa with total population of approximately 13 million (Central Statistical Office, 2012). Zambia is a landlocked country that shares borders with the democratic Republic of Congo in the North, Republic of Tanzania in the North east, Malawi in the east, Mozambique in the south-east, Zimbabwe and Botswana in the south, Namibia in the south-west and Angola in the west. According to Central Statistical Office (2012), the country is administratively divided into 9 provinces, 74 districts, 150 constituencies and 1,430 wards. Zambia's main healthcare provider is the government and is complimented by faith based organisations. Figure 3.1 shows the political map of Zambia.



**Figure 3.1 Zambia’s political and administrative division as adapted from [www.mapsoftheworld.com](http://www.mapsoftheworld.com)**

Zambia’s healthcare is managed at three levels. District levels of care are in charge of all health activities in the *district* including district hospitals, zonal health centres, urban health centres, rural health centres and health post.

Provincial level of care is in charge of all health activities in the *province* including the general hospitals which are mostly provincial hospitals. In some instances, the province has more than one general hospital e.g. Southern province and Copperbelt provinces have more than one general hospital.

National level of care is Ministry of Health headquarters and is in charge of all health activities in the *country* including tertiary hospitals. Tertiary hospitals are the main referral hospitals in the country.

With three levels of health management, Zambia's health delivery is divided into five levels of care according to *The 2012 List of Health Facilities in Zambia, preliminary report* (Ministry of Health, 2013b). Table 3.1 shows Zambia's levels of care.

**Table 3.1 Levels of healthcare delivery**

<b>Health Facility</b>	<b>Level of service provision</b>
Health posts	Community level
Rural and urban Health centres	Community level
Level one Hospitals ( District hospital)	District level
Level two hospitals ( General Hospital)	Provincial level
Level three hospitals ( Tertiary Hospital)	National level

In Zambia, stroke clinical manifestations are managed at all the levels of care. Referral systems are from health centres to district hospitals then to provincial and national hospitals. The country's pledge to embark on NCDs treatment guidelines and protocol development was in second level hospitals to help improve the healthcare services in the country (MOH, 2010a). General hospitals have the personnel capacity to handle stroke but this does not include the machinery needed. Some provinces have more than one general hospital depending on the economic development of the province. For example, Southern province has more than one general hospital namely; Choma general hospital, and all the mission hospitals are classified as such Monze,

Macha, Chikankata, and Mtendere. Equally, the Copperbelt province has more than one general hospital but two tertiary hospitals including its provincial hospital. Lusaka province is different as it has one general hospital, two specialised hospital and one tertiary hospital.

In this study, data collection was conducted in second level hospitals. The second level or level two hospitals meet the government standards of level two general hospitals which were recommended for NCDs treatment guidelines development (MOH, 2013a).

According to the Ministry of Health in Zambia (2013b), second level hospitals, also referred to as general hospitals, are found mostly at provincial level. These general hospitals offer internal medicine, general surgery, paediatrics, obstetrics and gynaecology, dental, psychiatry and intensive care services. They are intended to cater for a catchment area of between 200,000 and 800,000 people. These hospitals also act as referrals for the first level institutions, including the provision of technical back up and training functions. They provide care requiring the intervention of general specialist as well as general practitioner services.

### **3.4 Data collection methods**

Quantitative and qualitative methods were used to collect data in order to meet the objectives of the study. This allowed the different methods to compensate for individual method limitations (Shenton, 2004). Data collection began with the quantitative study, using a checklist which was designed for the study based on literature. Qualitative data collection then followed using individual in-depth interviews with health workers who work with stroke patients.

### 3.4.1 Data collection instrument

#### 3.4.1.1 Checklist for Medical Record reviews

The medical record review was simply the collection of data from the patients files using the checklist (Appendix i). This was an assessment checklist in nature. It was developed based on existing literature on process of care of stroke. The initial checklist was developed based on other countries guidelines (National Stroke Foundation, 2010). When a pre-test study was done, it was suggested that information on social counselling and welfare, health education and psychological counselling be included on the checklist. After the pre-test study, the final checklist included the following;

##### *a) Demographic information*

This section included information on the patients' hospital number, checklist code number, patient identification number, age, gender, marital status, date of admission, date of discharge, diagnosis, type, and paralysis side. The *hospital number* was made for hospital identification purpose and so ranged from 1 to 5 as five hospitals took part in the study; hence each hospital had a unique number based on the alphabetical order of the hospital names. The *checklist code* was also made to identify patients on checklists and so ranged from 1 to 80. Each patient at the hospital had a unique number. The *patient identification number* was picked from the medical record file number which was also unique to the patient given by the hospital. Age, gender, marital status, date of admission, date of discharge, definitive diagnosis, type of stroke, and side of paralysis were important in the study as they showed the stroke victims profile.



***b) Vital signs***

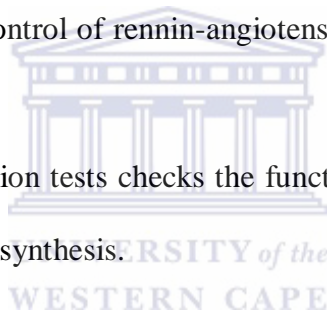
The vital signs in form of temperature, pulse rate and blood pressure contributes to the patients' surveillance. This helps to know the patients health picture, and guide in the diagnosis of the case. They provide a medical background of every case in healthcare.

***c) Examination***

This was divided into four parts;

- i) History- involved taking history of the aetiology and observation of the patient's clinical manifestations.
- ii) Physical examination- involved general examination of the patient to verify the history and the clinical manifestations. It also involved neurological examination to see the extent of neurological deficit.
- iii) Imaging-These are confirmatory tests. They provide definitive diagnosis;
  1. CT scan reveals parts of the brain or sites of injury from impact, tumours, lesions or infection and so helps differentiate ischaemic from haemorrhagic stroke.
  2. MRI scan can create clear and detailed pictures of the brain structure and identify any abnormalities.
  3. Ultrasound when used with MRA is helpful in the detection of arterial defects.
  4. Electrocardiogram is crucial to detect atrial fibrillation or other evidence of cardiac disease which are strokes risk factors.
  5. Echocardiogram detects potential cardiac sources of embolism, particularly for mitral valve vegetations and for sources located in the left appendage, the atrial septum, and the aorta.

6. Angiogram helps to locate the lesion of deep vessels directly.
- iv) Biochemistry tests are to verify the risk factors suspected.
1. Glucose levels helps to verify diabetes mellitus.
  2. Full blood count analyses the cell contents of the blood to check out the abnormal cells or infection.
  3. Coagulation studies verify coagulation disorders which are risk factors of stroke.
  4. Electrolytes tests checks for electrolyte balances in the blood which are important for normal body functions.
  5. Renal function tests checks the functioning of the urinary system for the body control of rennin-angiotensinogen hormone to regulate blood pressure.
  6. Liver function tests checks the functioning of the liver which helps in the protein synthesis.



***d) Medical management***

This was into two parts;

- i) Drug therapy for the management of stroke.
- Ischaemic stroke being Thrombolytics, Anti platelet (aspirin), Anticoagulant (Warfarin), Statins ( Atomastatin, simvastatin), Other drugs
  - .Haemorrhagic stroke being drugs for Risk factor management (blood pressure, blood sugar etc), other drugs

- ii) Maintenance therapy which aims to restore balance in the body. These can be glucose balance, oxygenation, hydration, positioning (left lateral semi prone), skin care (turnings two hourly) and Feeding (oral, NGT).

**e) Rehabilitation**

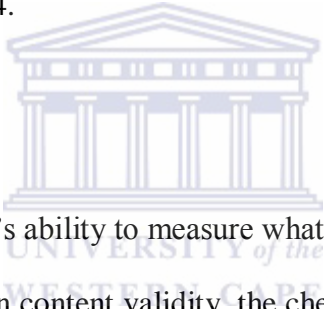
This was further divided into various parts as follows;

- i) Sensorimotor - weakness and loss of sensation
- ii) Physical activity- sitting, standing up, standing, walking, upper limb activity,
- iii) Management of complications
  - a) Spasticity- interventions to reduce spasticity, botulinum toxin A and electrical stimulation/EMG biofeedback
  - b) Contracture- convention therapy, splinting/prolonged therapy, serial casting
  - c) Subluxation- electrical stimulation, firm supporting devices, handling
  - d) Shoulder pain-shoulder strapping, pain prevention
  - e) Swelling extremities- Dynamic pressure garment, electrical stimulation, limb elevation, continuous passive movements.
  - f) Speech therapy.
- iv) Endurance which involved mainly Loss of cardio-respiratory fitness (Fitness training), Fatigue (Exercise intermission) and Exercise education and Falls (Awareness and support).

- v) Lifestyle modification with diet improvement (cholesterol reduction), physical activity, smoke cessation, alcohol intake reduction, HIV/AIDS management, blood sugar control, counselling.
- vi) Community linkages involving transfer of care from hospital to community, community rehabilitation and follow up services, long term rehabilitation (residual impairment), and social welfare services.

This checklist checked processes followed by health workers involved in the patients handling stroke patients from diagnosis to management. Records for stroke patients used were randomly selected from the Records department of the hospital for the year on interest which was 2014.

#### **3.4.1.1.1 Validity**



Validity is the tool's ability to measure what it is intended to measure (Babbie, 2007). To ascertain content validity, the checklist was given to more than one expert for verification at the University Teaching Hospital. One expert, a Medical Officer and professor of neurology in Zambia has been working in stroke area for more than 30 years, where he has been involved in the teaching and management of stroke and a professor of neurology. The other Medical Officer expert has been working in the stroke area for more than 10 years and was pursuing his Doctor of philosophy in the field of Stroke care. One expert, a Physiotherapist, has been working in the field of stroke for more than 15 years in the United Kingdom and has special interest in guideline formulation. The other one was an Occupational Therapist that has been working in stroke area and teaching Neurology at the University of Zimbabwe, which has similar country profile as Zambia and are in the same region. The researcher gave the

first draft to the Medical Officers in Zambia who suggested some changes in the medical management and included lifestyle management. The Britain based Physiotherapist suggested the expansion of the rehabilitation part while the Occupational therapist from Zimbabwe emphasized the community linkages and social services. All these were corrected and approved by the experts.

#### **3.4.1.1.2 Reliability**

A pre-test study for the data checklist was conducted using 15 files of stroke victims for the year of 2014 at Levy Mwanawasa General Hospital to ensure internal reliability. Levy Mwanawasa General Hospital is the only general hospital in Lusaka province. It sits on the grounds of Chainama Mental Hospital. The purpose of the pre-test study is to develop and test the adequacy of the research tool and to assess feasibility of the full study (van Teijlingen, Rennie, Hundley & Graham, 2001). The pre-test helped to determine that the checklist covered all the relevant information and to ensure that the all the data required was available in the medical records. Levy Mwanawasa General Hospital was deliberately picked because its shares the same attributes as the hospital to be included in the studied. After the pre-test study, changes on the checklist to include the definitive diagnosis were made. This is different from clinical diagnosis which is simply based on history and examination. Definitive diagnosis is only made using definitive diagnostic tools which may or may not be found in other general hospitals. The hospital used in the pre-test was not included in the main study.

To further ensure external reliability of the tool, test-retest was done on the checklist at Levy Mwanawasa General Hospital, (Eisinga, Te Grotenhuis & Pelzer, 2012). This was done at the same hospital where the pilot study was done. The checklist was administered *twice to the same set of records subjects*, and then correlates the two measurements. This action was repeated after two weeks. The two sets of data (which were two weeks apart) were analysed using Statistical Package for Social Science 22 (SPSS) soft-ware and scale test. Furthermore, the mean and standard deviation of the two sets of data did not to change. The resulting Pearson r was 0.80 and was satisfiable for the tool.

To estimate the internal reliability of the instrument, Cronbach's Coefficient Alpha after the split-half method was done. The Spearman-Brown corrected split-half reliability coefficient for every one of the possible split-halves was computed, and then the mean of the coefficients known as Cronbach's coefficient alpha using Statistical Package for Social Science 22 (SPSS) was done. The findings obtained were Cronbach's Coefficient Alpha of 0.758 which shows that instrument was reliable. To ensure fairness, this hospital did not take part in the main study.

#### **3.4.1.2 Interview schedule for individual in-depth interviews**

Data collection on conditions under which diagnosis and management of stroke is made in Zambia and the factors influencing diagnosis and management of stroke in Zambia was done through individual in-depth interview using an interview schedule (Appendix ii). The interview schedule was developed based on literature reviewed (Wanjau, Muiruri & Ayodo, 2012). Predetermined themes were used which are based

on literature. The study used themes based on literature by a recommendation for resource constraint countries like Zambia (Bryer et.al., 2011). This allowed for in-depth description of the conditions influencing diagnosis and management of stroke was made in Zambia and the factors influencing both diagnosis and management of stroke in Zambia. Discussions were guided and purposeful informed by existing literature on the subject (Hiller & DiLuzio, 2004). English language was used throughout the discussions.

### **3.5 Study population and sampling methods**

The study population and sampling methods for the qualitative and quantitative studies are presented separately.

#### **3.5.1 Sampling of provinces and general hospitals**

The study being a national study was done across the country. Out of 9 provinces, five took part in the study. To pick the participating hospitals, multi-stage sampling was done. Stage one involved Convenience sampling of the provinces which was done to select the five provinces which were to represent the country. This was done on the researchers' convenience to travel from the Capital city Lusaka. Stage two involved purposive sampling in each province to pick the qualifying hospital which is a general hospital as well as the provincial hospital. Table 3.2 presents multistage sampling in the study.

**Table 3.2 –Multistage sampling in the study**

Stage of selection	Stage selected	Type of selection	Number selected
Stage 1	Provinces	Convenient sampling	Five provinces
Stage 2	General hospitals	Purposive sampling	Five general hospitals
Stage 3	Medical records	Random sampling	80 at each hospital
	Health workers	Purposive sampling	3 at each hospital

According to the MOH (2013b), General hospitals have adult bed capacities ranging from 204 to 352. Patients are mostly admitted through the outpatients' department by the attending Clinical officers, and are reviewed by the Medical Officers in the wards. The wards are arranged according to patients' conditions being medical conditions, surgical conditions, obstetric and gynaecological condition with paediatrics unit. Stroke, being a medical condition is thence managed in medical wards. In the wards, no beds are dedicated to any specific condition but are arranged on patients' chronicity and stability. Acute or unstable cases are nursed near the ward entry for easier monitoring while chronic cases are put at the end of the ward. Table 3.3 presents selected hospitals and their capacities.



**Table 3.3- Selected hospitals and their capacities**

Province	Name of hospital	Bed capacity	Cot beds capacity
Central province	Kabwe general	352	56
Eastern province	Chipata general	325	92
North-western province	Solwezi general	250	40
Southern province	Choma general	204	157
Western province	Lewanika general	214	70

### 3.5.2 Sampling medical records for Quantitative study

The sample size to review the medical records in this quantitative study was calculated using the Yamane formula (Israel, 1992), at 95% confidence interval and  $P = 0.05$ . Stroke prevalence in Zambia as a country, as not been documented. The researcher therefore used the extrapolated country prevalence of 186,463 in the total country population of 13,000 000 for Zambia (Right diagnosis, 2014). This is the prevalence calculated based on the country's region and population and is used when the actual prevalence is unknown. It is more of a guide than a fact.

$$n = \frac{N}{1+N(e)^2}$$
$$n = \frac{186,463}{1+186,463(0.05)^2}$$
$$= \underline{400 \text{ records}} \text{ for whole study}$$
$$\frac{400 \text{ records}}{5 \text{ hospitals}}$$
$$= 80 \text{ records for each hospital}$$

Stroke patients' records for 2014 were selected, and patients' names were written on a slip, put into a box and mix thoroughly and then randomly pick 80 records using the lottery method out of 130 records, hence Stage three of the selection was random selection of 80 records. Eighty records were selected at each of the five hospitals making a total of 400 records altogether.

### **3.5.3 Sampling health workers for Qualitative study**

Fifteen health workers took part in this study. Each professional category working with stroke patients was represented by one member. The sampling frame was health workers who work in the stroke clinical areas of the hospital.

#### **3.5.3.1 Inclusion criteria**

Health workers (Medical Officers, Nurses and Physiotherapists) at the level two hospitals, which are the general hospitals, who have been working since February 2014, and had agreed to take part in the study, were purposefully included.

#### **3.5.3.2 Exclusion criteria**

Health workers working at level two hospitals since August 2014 were excluded.

#### **3.5.3.3 Sample selection**

Purposive sampling was employed to select health workers who were working in the area of stroke at the selected general hospitals and met the inclusion criteria. This included 5 Medical Officers, 5 Physiotherapists and 5 Nurses.

The health workers were individually interviewed to obtain information. Table 3.4 shows the distribution of health workers who took part in the study.

**Table 3.4- Health workers distribution in the study**

<b>Hospital</b>	<b>Medical Officers</b>	<b>Physiotherapist</b>	<b>Nurses</b>	<b>Occupational Therapist</b>	<b>Social Workers</b>
<b>Choma</b>	1	1	1	Nil	Unavailable
<b>Chipata</b>	1	1	1	Nil	Not present
<b>Kabwe</b>	1	1	1	Nil	Unavailable
<b>Lewanika</b>	1	1	1	Nil	Not present
<b>Solwezi</b>	1	1	1	Nil	On Leave
<b>Total</b>	5	5	5	0	0



### **3.6 Procedure for both quantitative and qualitative parts**

Ethical clearance to carry out the study was sought and granted by the University of the Western Cape Senate Research Grants and Study Leave Committee; Republic of South Africa. This was the University where the study was registered. This was then followed by ethical approval in Zambia, by ERES Converge, the private ethical institution in Zambia. This is the requirement by the Ministry of Health in Zambia that a study has to be ethically reviewed in Zambia for the study to take place in the country. Administrative permission was sought and was granted from the Ministry of Health, Zambia for the study to be done in the general hospitals. Advice was given by Ministry of Health to inform all the provinces involved in the study before proceeding to the general hospitals, therefore the Provincial Health Offices were informed about

the study. Further administrative permission was obtained from the General hospitals management to carry out the study at the each hospital.

### **3.6.1 Quantitative study procedure**

To carry out the quantitative study, the Medical Superintendent issued permission to review medical records. The researcher was therefore introduced to the Hospital Administrator who gave access to the medical records. Good relationship was maintained with Hospital Administrators in all the five hospitals for the study to go smoothly (Devers & Frenkel, 2000). Medical records from the medical wards for 2014 were accessed from the records department, where records are kept after patients are discharged from the hospital. In this procedure, the researcher worked with the Information Officer of the hospital who guided in retrieving the records. This was in order to pick out medical records for stroke victims. Stroke patients' records for 2014 were selected, and patients' names were written on a slip, put into a box and mix thoroughly and then randomly picked 80 records using the lottery method out of 130 records. After validation and ensuring reliability, the checklist was used to capture quantitative data from the randomly selected 80 records from each hospital. Data was captured as documented in the records. The researcher reviewed the patient's record herself. This was done for all the five hospitals which brought the total number of medical records to 400. Quantitative data was entered on excel spreadsheet, of which 2 data assistants were used for cleaning of data manually. Quantitative data was analysed using SPSS version 22

### **3.6.2 Qualitative study procedure**

For the qualitative study, the hospital's Medical Superintendent introduced the researcher to the Head of Clinical Care who was informed about the study to be

conducted at the hospital. The Heads of Clinical Care at the general hospitals are very important personnel who usually are Medical Officers with a clinical specialisation. Throughout data collection, the researchers maintained good relationships with Heads of Clinical Care in all hospitals as this was vital for the study and enabled effective sampling and credible research (Devers & Frankel, 2000).

A list of potential study participants was obtained from the Head of clinical care based on the inclusion criteria. The researcher was introduced to potential participants by the head of clinical care who handed over to the researcher. Information about study was given to the participants through the information sheets (Appendix vi). Participants were given consent forms to sign when they agreed to take part in the study. Data was collected using In-depth Individual interviews. The researcher conducted interviews with the health workers in their respective offices. Each interview lasted about 20 minutes. The interviews were recorded using a digital recorder. English was the language used in this study and was fitting because all the participants were able to express themselves properly in English and this reduced the costs of translating the information (Mangen, 1999).

### **3.7 Data management and analysis**

This section describes the methods that were used to manage and analyse data for the quantitative and qualitative studies.

#### **3.7.1 Quantitative Data analysis**

Raw data from the checklist was entered on excel spread sheet by two research assistants. The research assistants were undergraduate demography students from the University of Zambia. Data was cleaned manually from all variable inconsistencies.

Data was then transferred to Statistical Package Social Scientists (SPSS) version 22. Descriptive statistics in form of frequency tables and figures were made as this was a descriptive study. Chi square tests were done to associate CT scan and definitive diagnosis, and definitive diagnosis with medical management. The level of significance of this study was set at  $p < 0.05$ . The findings were compared with existing literature.

### **3.7.2 Qualitative Data analysis**

During interviews, digital recordings were done. The records were stored in a locked filing cabinet for confidentiality. Data was transcribed verbatim by an independent person. In transcribing, confidentiality was ensured by use of codes instead of names. Data was coded, according to professional categories and hospitals. The coding for health workers were numerical comprising of HW 01 for Medical Officers, HW 02 for Nurses and HW 03 for Physiotherapists. The coding for hospitals were in alphabetical order comprising of; 'a' for Chipata General Hospital, 'b' for Choma general Hospital, 'c' for Kabwe General Hospital, 'd' for Lewanika General hospital and 'e' for Solwezi General Hospital. Discussion notes were transcribed from the tape recorders by independent transcribers. After transcribing the data, the records were locked in a cupboard for in case more data will be needed for analysis. Transcribed data was entered into computer program Microsoft word documents and were stored in files. Transcribed data was stored on the computer protected by a unique password in a password protected file. Only the researcher had access to the information. Data was analysed manually. Transcribed data was read and re-read by the researcher several times for familiarity and general understanding of the scope of context of key information (Bradley, Curry & Devers, 2007). When the scripts were read and re-

read, interesting contents based on predetermined themes were grouped together into categories (Graneheim & Lundman, 2004). The categories that were coded were then compared based on the predetermined themes. All information was grouped into predetermined themes. Data from predetermined themes was analysed using content analysis and then compared to existing literature concepts. An independent person was asked to check if grouped themes and categories were appropriate. Saturation was reached when no new information was given by the health worker respondents.

### **3.7.2.1 Data trustworthiness**

Trustworthiness refers to the credibility, transferability, dependability and confirmability of the study results (Twinn, 1997). Credibility represents internal validity while dependability is the reliability of the results meanwhile transferability is the external validity (Graneheim & Lundman, 2004).

To ensure credibility two methods were used to compensate for individual method limitation and this was done by use of well-established methods. Equally before the interviews, each person was given an opportunity to agree or disagree to participate to enhance genuineness of the responses. Debriefing sessions with supervisor and peer scrutiny were done to allow corrections in the procedures. Credibility is also strengthened when the researcher opinion is given, and this is done at the end of the chapter.

Transferability of the research means that the readers should be able to determine whether the findings can be transferred to other contexts (Curtin & Fossey, 2007). In order for a study to be transferable, Shenton (2004) advised that a detailed context be given to allow the readers have a good understanding and hence can make comparisons with other contexts. In this study, in order to ensure transferability

background of the study is given to establish the study context and the study phenomenon are provided to allow comparison. The detailed context given include the study background itself and the methods including the setting, sample and sample selection and procedures taken to collect the data ( Graneheim & Lundman, 2004).

Dependability was ensured by methods overlapping and which are described to allow study to be repeated. Confirmability was equally considered in that two different methods were used and this reduced investigator bias. Also the researcher beliefs are admitted, with the shortcomings in the study recognised and their potential effects.

Data was transcribed and presented to participants to validate themes and categories and to confirm the accuracy of the discussion transcripts. Transcribed data from the discussion was also peer reviewed by an independent researcher for coding. Quantitative data was tallied by an independent person to avoid bias.

### **3.8 Ethical consideration**

Ethical clearance and approval was sought from the University of the Western Cape Senate Research Grants and Study Leave Committee in South Africa through written permission (Appendix iii). In Zambia, ethical clearance was obtained from the ERES Converge through written permission as well (Appendix iv). For administrative Permission to conduct the study, written permission to conduct the research was obtained from Zambia's Ministry of Health (Appendix v). This allowed the researcher to appraise the Provincial Health Offices and General hospital managements about the study to be carried out in their provinces and hospitals there on as directed by the Permanent Secretary, Ministry of Health in Zambia. Information about the study was provided to the participants through the information sheets. Permission from the participants was sought by signing consent forms provided to them. Participants were



given the right to withdraw from the study anytime if they wished so as there were no risks of losing their jobs if they did not participate in the study.

Information collected from all participants was treated with confidentiality as names of the participants were not required during data collection and was not given to any partner or project for further analysis. The data file on the computer was also protected with a password and was only accessed by the researcher. Participants were informed that there were no direct benefits to them but the study shed light on the processes followed to diagnose and manage stroke in Zambia.

### **3.9 Researcher reflection**

It is very important for the researchers to acknowledge their beliefs and biases in the research process to help understand how they themselves might influence the processes (Creswell & Miller, 2002).

In this study, there was a research assistant that was involved and both the researcher and research assistant are physiotherapists. The researcher was quite conversant with all the levels of care in Zambia as she had worked at all the three levels since 2001. In her physiotherapy practice, the researcher has special interest in stroke health services. As a Physiotherapist, the researcher is based at a general hospital which is a level two in the Southern province of Zambia. Her passion for stroke services comes because the researcher is of the opinion that the services are not developed especially where community care is concerned.

The researcher's experience with stroke patients discharged from the hospitals is that there is no care for their residual disability afterwards. Also, no guidelines are used in the management of stroke and this comes as a shortcoming as this prompted the

current study which aims at determining and exploring the process of care of stroke in Zambia. Zambia as a study site was very positive in that the researcher is very familiar with the country geography and also Ministry of Health as an organization. This comes to light because the researcher has collaborated with the organization in different circumstances.

Familiarity with Ministry of Health did not give this researcher unnecessary advantage during data collection, although the researcher's interest in stroke services could have biased the data collection process in that she could have pronounced highly the services shortcomings. The participants were all knew to the researcher. The only advantage was that the researcher knew mostly her way in the hospitals because she was not going there for the first time.

### **3.10 Chapter summary**

The chapter highlighted that the research setting was in Zambia five general hospitals. This chapter highlighted that an explorative study employing both quantitative and qualitative parts. The quantitative part involved reviewing randomly selected stroke patients' medical records from five conveniently selected general hospitals in Zambia, using a checklist which was specifically design for the study after literature review. The chapter explained that the qualitative part consisted of individual in-depth interviews with a purposefully selected sample of three health workers from each hospital making 15 health workers, and all the interviews were digitally recorded, transcribed verbatim and the predetermined themes were analysed using content analysis. The chapter explained that content validity was ensured by piloting the tool, while reliability by giving the background to the study. The chapter also explained that ethical clearance to conduct the study was obtained from the University of the

Western Cape Faculty Board Research and Ethics Committees and Senate Research Committee and ERES Converge in Zambia. The chapter finally explained that permission to conduct the study in Zambia was obtained from the Ministry of Health, Zambia.



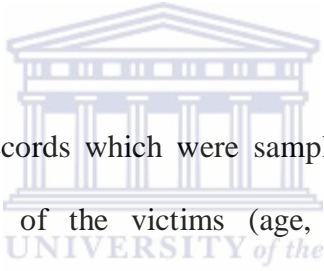
# Chapter Four

## Results

### 4.1 Introduction

Chapter four presents the results for both the quantitative and qualitative studies. The chapter has been divided into two parts. In the first part, which is a quantitative, result for the medical record review have been presented; while part two presents the qualitative results. At the end, the chapter summarises the findings from the two parts.

### 4.2 Quantitative Data



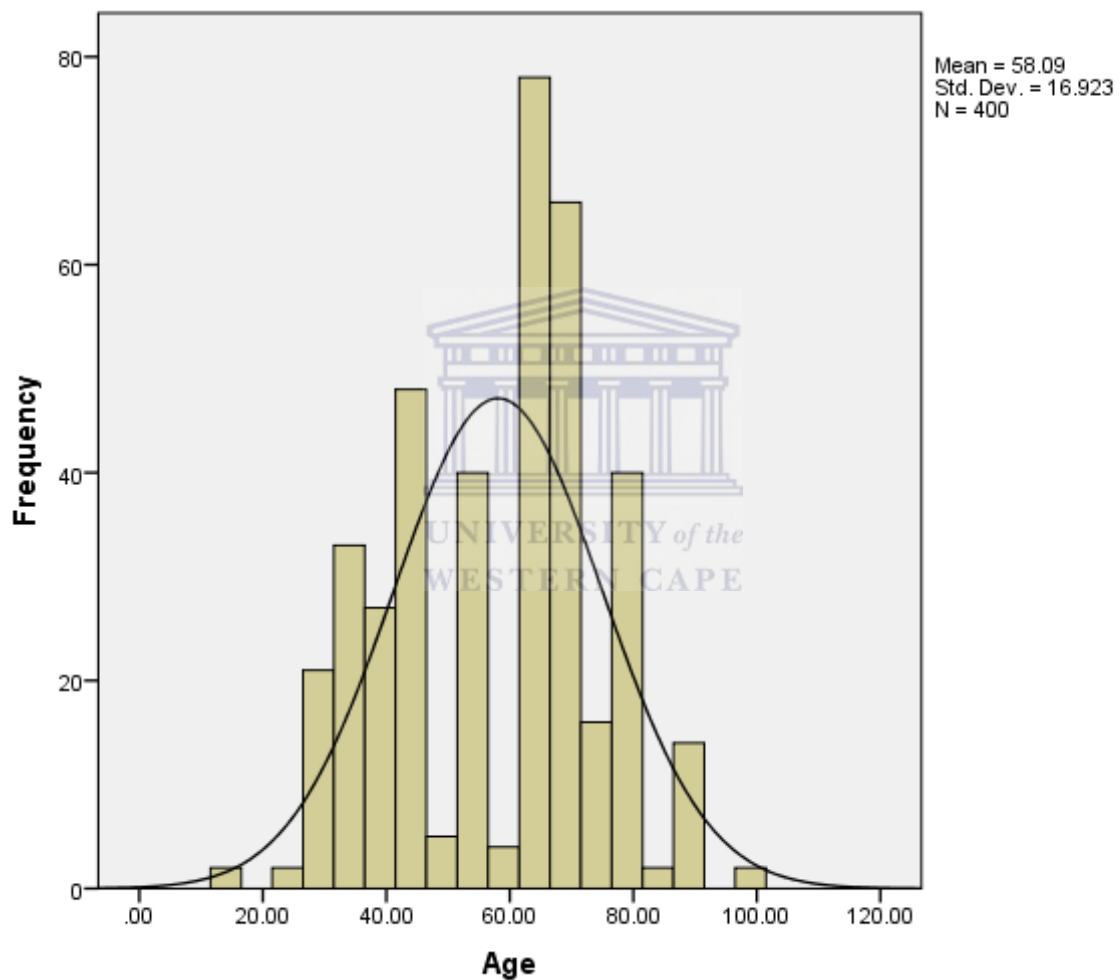
Data from the medical records which were sampled is presented according to the demographic information of the victims (age, sex, day of admission, stroke classification and side affected), vital signs, diagnosis, medical management, rehabilitation, lifestyle, community and social welfare. Cross tabulations are presented at the end of the quantitative part.

#### 4.2.1 Demographic details

Eighty records of patients treated for stroke in five general hospitals in Zambia in 2014 were assessed using a checklist. A total of 400 patients' records were reviewed.

i) *Age*

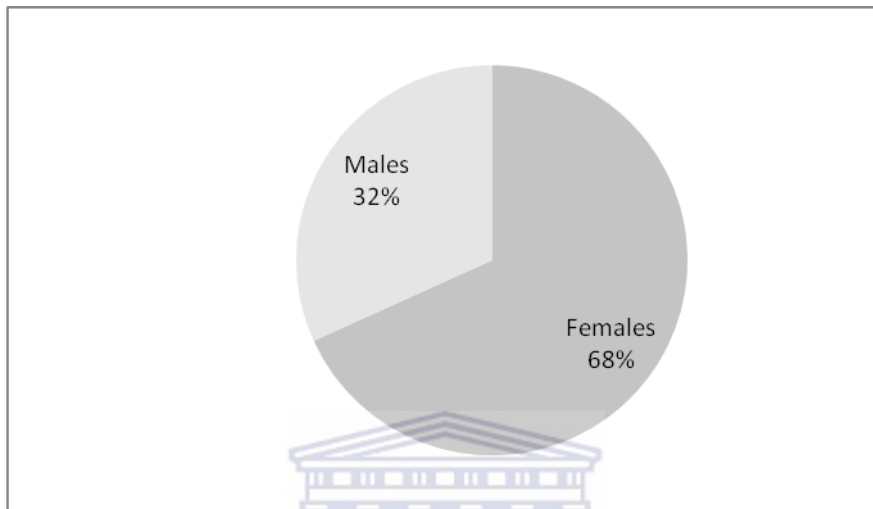
The patients' records showed that patients' age ranged between 14 and 98 years the mean age being 58.09. Figure 4.1 presents the age range of stroke patients according to the medical records.



**Figure 4.1- Ages of stroke patients in the study**

*ii) Gender*

Sixty eight percent (n= 272) of the patients were females while thirty two percent (n=128) were males. Figure 4.2 presents gender of stroke patients in the study.



**Figure 4.2- Gender of stroke patients**

*iii) Marital status*

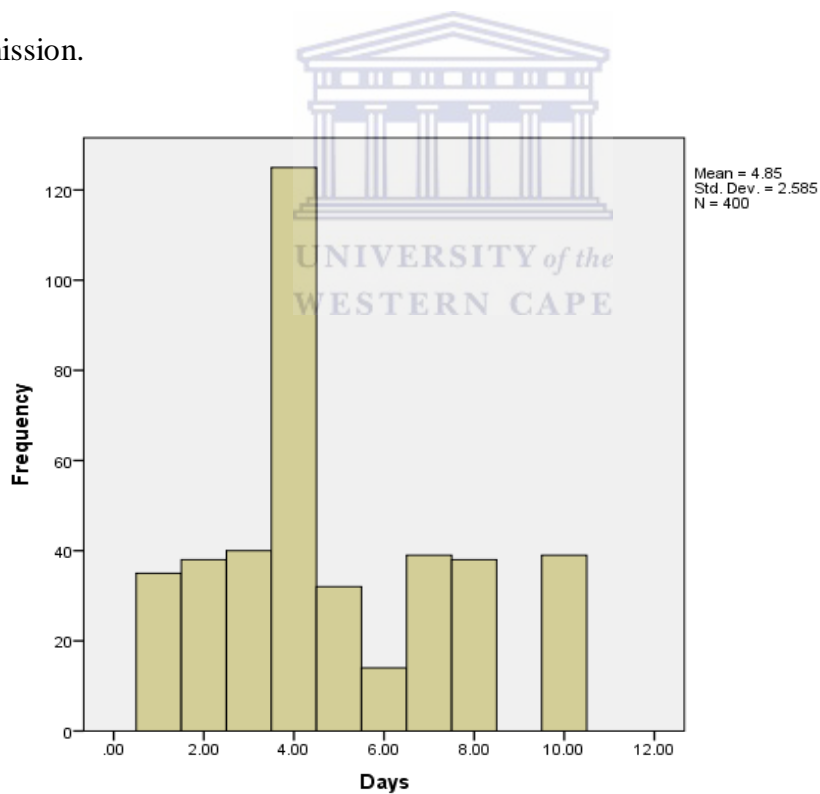
The majority 55.8% (n= 223) of stroke patients were married. 23.8% (n=95) were never married, 19.5% (n=78) were widowed. Those who were divorced were 0.8 % (n=3) and those that were separated were 0.3% (n=1).Table 4.1 presents the marital status of stroke patients.

**Table 4.1 Stroke patients' marital status**

Status	Frequency	Percentage
Married	223	55.8
Never married	95	23.8
Widowed	78	19.5
Divorced	3	.8
Separated	1	.3
Total	400	100.0

*iv) Admission*

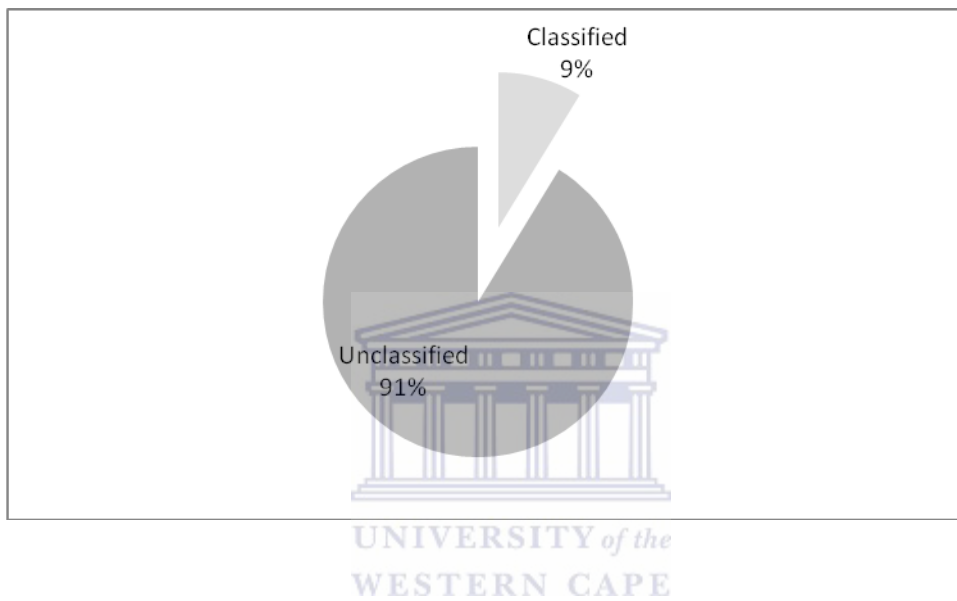
The days of admission ranged between 1 and 10 days in the hospital with the average patient admitted for 4.85 days. Figure 4.3 presents the stroke patients' days of admission.



**Figure 4.3-Stroke patients' days of admission**

v) *Classified stroke cases*

Out of the 400 cases, only 9% (n= 35) were classified based on the CT scan. The remaining 91% were not classified. Figure 4.4 presents classified stroke against the unclassified.

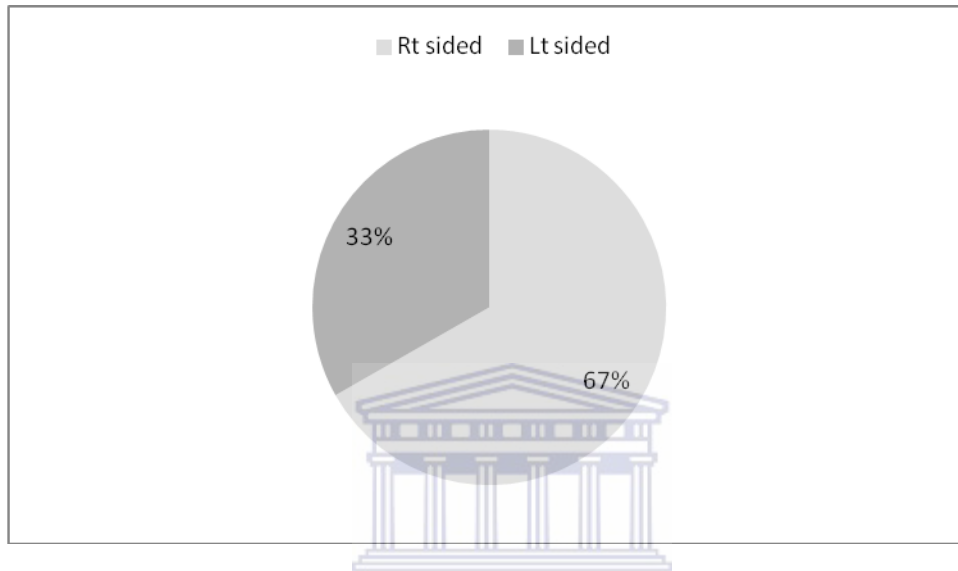


**Figure 4.4 -Classified stroke cases**



vi) *Paralysis side*

The majority 67% (n= 267) were paralysed on the right side while 33% (n=133) were paralysed on the left. Figure 4.5 presents the side paralysed of stroke cases.



**Figure 4.5- Paralysis side of stroke victims**

#### 4.2.2 Vital signs

All the cases had temperature, pulse and blood pressure taken throughout the stay in the hospital. Only 59% (n=237) of the cases had body weight recorded while the remaining 41% (n=163) did not have body weight recorded.

#### 4.2.3 Diagnosis

History and general examinations were done in all the patients, with neurological exams done on almost all of them (99%). Few patients had confirmatory test done e.g. Computerised tomography scan was only done on 10% (n=40), ECG on 11% (n=44) and EEG on 4 % ( 16) of all the cases, with Magnetic Resonance Imaging, Ultrasound

and angiography not done on any of them. Blood sugar tests were done on 49.8% (n=199), while 82% (n=328) had full blood count done. Coagulation studies were done on 22.3% (n=89) with electrolytes done on only 9.5% (n=38). Renal and liver function tests were done on 28.5% (n=114) and 40.8% (n=163) respectively. Table 4.2 shows processes followed to make diagnosis.

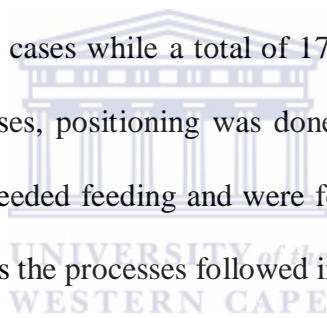
**Table 4.2-Processes followed to make diagnosis in the study**

<b>Process</b>	<b>Percentage</b>
History	100% (400)
General examination	100% ( 400)
Neurological examination	99% (396)
Full blood count	82% (328)
Blood sugar	49.8% (199)
Liver function	40.8% ( 163)
Renal function	28.5% (114)
Coagulation studies	23.3% (89)
ECG	11% (44)
CT scan	10% ( 40)
Electrolytes	9.5% (38)
ECG	11% (44)
EEG	4% (10)
MRI	0% (0)
Ultrasound	0% (0)
Angiography	0% (0)

#### 4.2.4 Medical management

Table 4. 3 presents processes followed in medical management. Of the total cases, 19 % (n=76) received thrombolytic drugs and 12.5% (n=50) received antiplatelets while 6.5% (n=26) received statins. A total of 34.5% (n=138) received antihypertensive drugs while 9% (n=36) received drug for cardiovascular risk factors. A total of 15.5% (n=65) received both antihypertensive drugs and thrombolytic drugs. About 2.8% (n=11) received other unspecified drugs.

None of the patients needed oxygen therapy and hence none received. Sugar balance was done to 25.3% of the cases while a total of 17.3% (n=69) needed hydration and were given. Of all the cases, positioning was done on 36.3% (n=145). Only 26.8% (n=107) of all the cases needed feeding and were fed, while 25.5% (n=102) received skin care. Table 4. 3 shows the processes followed in medical management.



**Table 4. 3- Medical management**

<b>Management</b>		<b>Frequency</b>
Ischaemic	Thrombolytic	19% ( 76)
	Antiplatelet	12.5% (50)
	Statins	6.5% (26)
Haemorrhagic	Antihypertensives	34.5% ( 138)
	Cardiac diseases	9% (36)
Thrombolytics & Antihypertensives		15.5% (65)
Other drugs		2.8% (11)
Oxygenation		0% (0)
Sugar balance		25.3% ( 101)
hydration		17.3% ( 69)
Positioning		36.3% (145)
Feeding		26.8% (107)
Skin care		25.5% ( 102)

## 4.2.5 Rehabilitation

### a) *Sensori-motor*

Of all the total cases, 91% (n=364) underwent rehabilitation. All of these cases (n=364) underwent strengthening exercises during rehabilitation. Of this total number, sensation stimulation was done to 90.1% (n= 328) while the remaining did not receive stimulation at all. Figure 4.6 shows percentage of those who did stimulation.



**Figure 4.6- Sensation stimulation**

### b) *Physical activity*

Of the total number of those who underwent through rehabilitation, only 67.3% (n= 245) underwent exercises for sitting up. Standing up exercises were done to 61.3% (n=223) with 58% (n= 211) undergoing exercises for standing, while 30% did not receive standing exercises and the remaining 12% did not require exercises for standing. Of those who underwent rehabilitation, a total of 86.5% (n= 315) required

walking exercises but only 38% (n=138) did walking exercises. Only 61.3% (n= 223) of the total number of rehabilitation cases received upper limb exercises. Table 4.4 shows physical activities done.

**Table 4.4-Physical activity done**

<b>Process</b>	<b>Frequency</b>
Sitting up	67.3% (245)
Standing up	61.3% ( 223)
Standing	58% ( 211)
Walking	38% (138)
Upper limb exercises	61.3% (223)

**c) Management of complications**

A total of 18.7% (n= 68) underwent anti-spastic exercises. Contracture splints were given to 17.8% (n= 65) of the rehabilitation cases. Contracture convention therapy was done to 8.8% (n=32). Limb elevation for swelling was done for only 8% (n=29). Shoulder strapping was done to 6.3% (n=23). . Table 4.5 shows the management of complications done.

**Table 4.5- Management of complications**

<b>Processes</b>	<b>Frequency</b>
Anti spastic exercises	18.7% ( 68)
Contracture splints	17.8% ( 65)
Contracture convention therapy	8.8% (32)
Limb elevation for swelling	8% (29)
Shoulder strapping	6.3% ( 23)

***d) Endurance training***

Fitness training and exercise intermission for fatigue was done to 12.1% (n= 44) separately. Exercise education for fatigue was done to 4% (n=14). A total of 104 (28.6%) cases were made aware of the falls and received support for falls following stroke. Table4.6 shows endurance training.

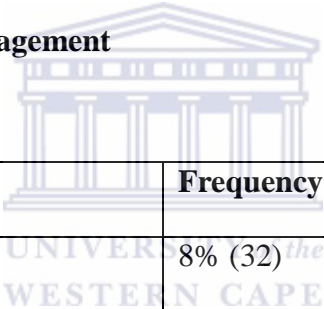
**Table 4.6- Endurance training**

<b>Process</b>	<b>Frequency</b>
Fitness training	12.1% ( 44)
Exercise intermission	12.1% (44)
Exercise education	4% (14)
Awareness of falls	28.6% ( 104)
Support for falls	28.6% (104)

#### 4.2.6 Lifestyle management

Diet improvement was done to 8% (n=32). Physical activity promotion was encouraged in only 17% (n= 62) of all the rehabilitation cases. A total of 11.5% (n=46) achieved smoke cessation was achieved. A total of 19.0% (n=76) were helped in alcohol cessation. HIV/AIDS management were done to 41.3% (n=165). Blood sugar control was done to 22.8% (n=91) Of the total number of cases, only a few (38%, n= 152) cases received counselling for their condition. Table 4 .7 shows the lifestyle management.

**Table 4 .7- Lifestyle management**



Processes	Frequency
Diet improvement	8% (32)
Physical activity	17% (62)
Smoke cessation	11.5% (46)
Alcohol intake reduction	19% (76)
HIV/AIDS management	41.3% ( 165)
Blood sugar control	22.8% (91)
Counselling	38% ( 152)

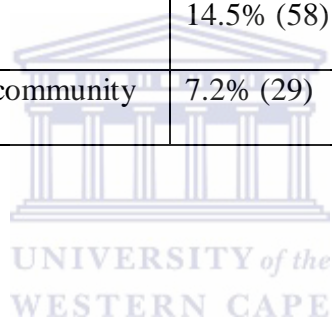


#### 4.2.7. Community linkages

Transfer to care from hospital to community was only done in 7.2% (n=29), while carer training was done in 14.5% (n=58) of the total cases. Community rehabilitation follow-up, long term or residual disability management and social welfares services were not done in all the cases. Table 4. 8 show community linkages done.

**Table 4. 8- Community Linkage**

Process	Frequency
Carer training	14.5% (58)
Transfer to care from hospital to community	7.2% (29)



#### 4.2.8 Cross tabulations

**Table 4.9- Chi-square association between CT scan and definitive diagnosis**

			Diagnosis		Total
			Unclassified stroke diagnosis	Classified stroke diagnosis	
CTscan Done	Count	0	40	40	
	% within Diagnosis	0.0%	100.0%	10.0%	
Not done	Count	360	0	360	
	% within Diagnosis	100.0%	0.0%	90.0%	
Total	Count	360	40	400	
	% within Diagnosis	100.0%	100.0%	100.0%	

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	Value	Degrees of freedom	Exact Significance. (2-sided)	Exact Significance. (1-sided)
Pearson Chi-Square	400.000 <sup>a</sup>	1	.000	.000
Continuity Correction <sup>b</sup>	388.966	1		
Likelihood Ratio	260.066	1	.000	.000
Fisher's Exact Test			.000	.000
Linear-by-Linear Association	399.000 <sup>c</sup>	1	.000	.000
N of Valid Cases	400			

Pearson Chi-Square test shows that CT scan was highly associated with definitive diagnosis in classifying stroke (p value is 0.000). Only Computed tomography was highly associated with definitive diagnosis with the p-value of 0.000.

**Table 4.10- Chi-square association between definitive diagnosis and medical management**

			Diagnosis		Total
			Unclassified stroke diagnosis	Classified stroke diagnosis	
Drugs	Antihypertensives	Count	120	18	138
		% within Diagnosis	33.3%	45.0%	34.5%
	Thrombolytics	Count	72	4	76
		% within Diagnosis	20.0%	10.0%	19.0%
	Other drugs	Count	115	8	123
		% within Diagnosis	31.9%	20.0%	30.8%
	Anti hypertensive with thrombolytic	Count	53	10	63
		% within Diagnosis	14.7%	25.0%	15.8%
Total		Count	360	40	400
		% within Diagnosis	100.0%	100.0%	100.0%

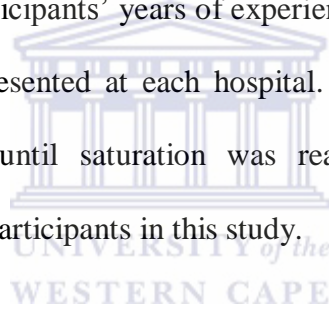
	Value	Degrees of freedom	Exact Significance (2-sided)	Exact Significance (1-sided)
Pearson Chi-Square	7.400 <sup>a</sup>	3	.058	
Likelihood Ratio	7.530	3	.062	
Fisher's Exact Test	7.259		.060	
Linear-by-Linear Association	.028 <sup>b</sup>	1	.880	.465
N of Valid Cases	400			

Pearson Chi-Square tests shows that diagnosis was not associated with medical management (p value=0.058). Having a definitive diagnosis did not influence the types of drugs given in this study (p value is 0.058 which is more than 0.05).

### **4.3 Qualitative Data**

#### **4.3.1 Demography**

Qualitative data was collected using individual in-depth interviews with 15 clinical health workers who work with stroke cases in the selected general hospitals. Health workers who worked in stroke clinical areas in the five general hospitals were individually interviewed. They comprised of Medical Officers, Nurses and Physiotherapists. The participants' years of experience ranged from 2- 25 years. Each of these cadres was represented at each hospital. Fifteen in-depth interviews were done in five hospitals until saturation was reached. Table 4.3.1 presents the demographic data of the participants in this study.



**Table 4.11 Health workers demography**

Hospital	Health worker	Years of experience
Chipata general hospital	Medical Officer	13
Chipata general hospital	Nurse	11
Chipata general hospital	Physiotherapist	6
Choma general hospital	Medical Officer	6
Choma general hospital	Nurse	15
Choma general hospital	Physiotherapist	4
Kabwe general hospital	Medical Officer	7
Kabwe general hospital	Nurse	25
Kabwe general hospital	Physiotherapist	6
Lewanika general hospital	Medical Officer	9
Lewanika general hospital	Nurse	2
Lewanika general hospital	Physiotherapist	3
Solwezi general hospital	Medical Officer	15
Solwezi general hospital	Nurse	18
Solwezi general hospital	Physiotherapist	4

### 4.3.2 Themes

The second objective of this study was to explore the conditions under which diagnosis and management of stroke is made in Zambia and the third objective was to explore factors influencing diagnosis and management of stroke patients in Zambia. The study used predetermined themes for the individual in-depth interviews which were related to the two objectives and are presented in table 4.12.

**Table 4.12- Research themes and emerging themes**

<b>Predetermined themes</b>	<b>Emerging themes</b>
<b>a) Staffing levels</b>	<b>Staff shortages</b>
<b>b) Multidisciplinary Team</b>	<b>Busy schedules</b>
<b>c) Treatment guidelines/ protocols</b>	<b>No guidelines</b>
<b>d) Staff clinical capacity for diagnosis, management and rehabilitation</b>	<b>Poor clinical capacity</b>
<b>e) Planning and budgeting for stroke</b>	<b>Lack of resources</b>
<b>f) Technical environment</b>	<b>Poor technical environment</b>

In each of the theme, to make it clearer, actual quotes from the health workers are also included. In order to uphold confidentiality and anonymity, transcribed quotations from the individual in-depth interviews are cited in the cryptogram HW 01a,b,c,d,e to HW 03a,b,c,d,e instead of their actual names and professions. The coding was ordinal for the health workers categories and alphabetical for the hospitals; HW 01 were medical officers, HW 02 were nurses while HW 03 were physiotherapists. a, b, c, d, e were general hospitals in alphabetical order i.e. a was Chipata general hospital, b was

Choma general hospital, c was Kabwe general hospital, d was Lewanika general and e was Solwezi general hospital.

### **Theme 1: Staffing levels**

When health workers were asked about staffing levels in relation to stroke care, they all complained about staff shortages. Health workers said they were few in the hospitals, facing patient overload which made it impossible to concentrate on specific cases. Normally, a Nurse, Medical Officer and a Physiotherapist have to manage one whole ward if the situation is good, but in most cases it will be more. This was expressed as a challenge, when they have to manage all cases to their best ability because they are not specialists in all areas of medical conditions. The theme which emerged from this interview was staff shortage.

#### ***Staff shortage***

The shortage of health workers has been made worse by the absence of Occupational therapists in the hospitals. This shortage affects the quality of rehabilitation work done because of detail and work overload. The health workers expressed themselves by saying the following:

*“...there is staff shortage everywhere not just in stroke area...” (HW 02c),*

*“...in situations like this (patient overload), you have to be knowledgeable of all cases but you cannot be perfect because we are not specialists...” (HW 01b)*

By these statements, the health workers were implying that they have a lot of patients to handle aside stroke patients. One health worker said;

*“...we do not have adequate staffing levels to rehabilitate stroke victims to the fullest functional activity...” (HW 03a).*

Stroke being the major culprit of adult disability; requires rehabilitation of the victim to the fullest functional activities. When all rehabilitation faculties are not met, disability is inevitable.

Rehabilitation requires various aspects including psychological and social faculties. Occupational therapists and social workers are well equipped in rehabilitation. In their absence, their duties are not taken up, thereby reducing the quality of rehabilitation performed in occupational faculty as well as social faculty. Occupational and social rehabilitation extends further into the home environment of the stroke victim, but in their absence, home rehabilitation is impossible as the present health workers are few and hence cannot do home visits.

Concerning home based rehabilitation, one health worker had this to say

*“...this is where community rehabilitation should come in...”(HW 03b)*

Inasmuch as the available health workers are willing to adapt to the situation of less health workers, those stroke victims who are not in the hospital are usually left out to fend for themselves.

*“...Our work does not allow us to follow up patients due to staff shortages...” (HW 03e).*

Quality of service in healthcare depends on how strong the workforce is, hence staff shortages in this study reduced the quality of stroke services given as one health workers agrees.



*“...we do not have adequate staffing levels to rehabilitate stroke victims to the fullest functional activity...” (HW 02 1c).*

This means that stroke patients are not receiving quality health services due to staff shortages.

According to the Donabedian model, staffs are part of the structure for healthcare. In this study, the structure of the stroke care is poor as there were staff shortages in all categories.

## **Theme 2: Multidisciplinary action**

As regard to working together, the respondents showed that they did work together except that they did not work in a multidisciplinary team. Although all the participants agreed that multidisciplinary team action is the best in healthcare, they confessed otherwise in their actions. The theme which emerged from here is busy schedules.

### ***Busy schedules***

One health worker had this to say,

*“...multidisciplinary action is what is being advocated for, not only for stroke, but for all cases....but the problem is our schedules which are busy and different...” (HW 01e).*

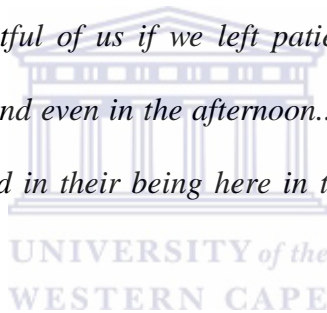
In this statement, the health worker was acknowledging the place of multidisciplinary team action required but showed how impossible it was to work together in this particular hospital. One health worker explained the effort made to constitute a multidisciplinary team but to no avail.

*“...I have tried to call physios to come for rounds but that is when they have a busy schedule with out-patients” (HW 02 c).*

The fact that they are unable to come together at an appointed time affects the separate decisions made by health workers hence disrupting the structure of care. Health workers communication regarding patients is enhanced by multidisciplinary action.

Health workers attend to a common patient at different times depending on their schedule. This comes in the event of different priorities and objectives of their work day. This was evident when one health worker said;

*“...it will not be thoughtful of us if we left patients in the department to see the inpatients who will be found even in the afternoon...these outpatients come from very far and they have invested in their being here in the morning, they have to be seen first...”(HW 03 a).*



Probed as to why a schedule to fit the situation cannot be put up for multidisciplinary action to take place, the same health worker said;

*“...we are only three here, and one cannot leave to go to the ward because the patient turn out is high. About 10 to 15, two people cannot manage, but those in the ward can be seen in the afternoon, we really have busy schedules...”*

Time management is paramount in making schedules practical. A different health worker also mourned how his schedule was busy to shift operations.

He said *“...the first thing of my work day is ward round to see the inpatients, and later the outpatients in medical clinic...it is difficult to switch because outpatients in medical clinic are many and so you cannot predict what time you will finish....it's all*

*the medical cases including patients on ART, we even go up to 3pm if we work throughout lunch...” (HW 01a).*

Health workers were therefore unable to come together because of their busy schedules, mostly due to low staffing levels.

With health workers unable to come together in a multidisciplinary team, referral systems are usually the solution. This study showed that actually health workers operate on referral basis, but in this case results are neither satisfactory nor progressive.

A health worker complains that “...when we refer patients to other departments... sometimes they come, sometimes they don’t... I have referred patients to the social worker but I have never seen her....” (HW 01d).

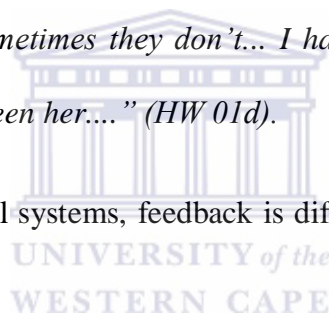
This shows that in referral systems, feedback is difficult hence unsatisfactory quality of service.

Good communication improves the quality of healthcare in any setting. Good communication can be achieved in open discussion of health workers regarding patients. Situation clarity can be attained in multidisciplinary teamwork.

For example one health worker said about the other “*I think she has a busy schedule to attend to stroke patients but is more involved in gender based violence.*” (HW 01c)

In teamwork, this would be clarified and what patients she attends to would be stated.

Equally one health worker laments that “...sometimes patients are not referred to us but are seen only when discharged i.e via physiotherapy...” (HW 03a).



In cases like this, rehabilitation services are not promoted for the patients because as one health worker puts it this way “..rehabilitation plans for stroke patients are not for one day, with our busy schedules, we would rather manage them in the wards when they are staying very far” (HW 01d).

This inability to work in a multidisciplinary team comes in the wake of staff shortage as all health workers confess to be busy to come together but all laments about the staff shortages. One health worker said that;

“...the challenge we have is shortage I should think because you can't leave what you are doing and go for a ward round” (HW 02c).

All the health workers would rather see patients at different times as they have different work schedules. The core of multidisciplinary teams lies in adequate staffing but the study indicates otherwise as one health worker says;

“the challenge we have is shortage I should think because you can't leave patients waiting in the department and go for ward-rounds, in patients are already under care and can wait” (HW 03e).

Multidisciplinary team action is a very important part of the process in the Donabedian model. Busy schedules in this case were as a result of work overload due to shortage of health workers (structure) in all the hospitals and this interferes with multidisciplinary teamwork. The health workers schedules were busy at different times and had different priorities of the day.

### **Theme 3: Treatment guidelines**

When health workers were asked what guides them in the diagnosis and management of stroke patients, they all revealed that there is nothing to guide in the care of stroke. The emerging theme here was lack of guidelines.

#### ***Lack of guidelines***

A guideline is a standard tool for health care operation. This is to say that stroke is cared for as a general medical condition in hospitals. One health worker had this to say;

*“...I am not aware of any treatment guidelines; we just follow medical procedures because of lack guidelines (HW 01d).*

The statement show that guidelines are lacking in the hospitals. To this event, health workers were further probed how they operate without guidelines for medical procedures. The probing was important to the objective of establishing the conditions under which diagnosis and management is made and factors influencing diagnosis and management of stroke in hospitals. Responses were similar in that one health worker said;

*“...we lack guidelines for stroke patients but we use those for cardiac patients for nursing care” (HW 02e).*

This was indicating that nursing guidelines are not present but are improvised with guidelines of cardiac patients, which should not always be the case as stroke is both a cardiovascular as well as neurological condition. In the absence of guidelines, health workers improvised like one health worker who said;

*“...we lack guidelines so we depend on the textbook and what we learnt in school, although some techniques are impossible because we are not properly equipped...”*  
(HW 03 c).

This is a challenge in the care of stroke because guidelines help health workers to care for patients effectively. Textbooks are a good source of information as they were used in school, but as opposed to guidelines they do not have specific standards for operation in that they are general. Zambia in particular has not authored any textbook on stroke care, but the available books are written in the affluent countries and are therefore advanced for the Zambian set-up, instead of guidelines which are specific to the set-up.

Health workers were further asked if they were aware about processes of guidelines formulation. To this question, most health workers showed ignorance except one who said she was part of the malaria case management protocol formation but as regards to stroke, she had this to say;

*“....no one has paid attention to stroke that is why there are no guidelines, I have never even heard of programmes of stroke guideline formulation...”* (HW 02 a).

This presents as a challenge of stroke care at the structure level of the Donabedian model of healthcare. With no guidelines, diagnosis and management is not standardized and the quality of service is diminished as no scientific evidence is applied. In this study, no guidelines were used in stroke care leading to non-evidence based practice. Hence stroke diagnosis and management is made with no guidelines. Here it shows that lack of guidelines influences the diagnosis and management of stroke in Zambia. Guidelines standardize case diagnosis and management and hence improve the quality service.

#### **Theme 4: Clinical capacity**

Clinical capacity as the capacity of health workers to perform stroke clinical duties effectively was explored to achieve the last two objectives. This was subjective as respondents had to say for themselves what they thought about their clinical capacity to perform stroke clinical services. Poor clinical capacity emerged as a theme.

##### ***Poor clinical capacity***

The health workers felt that their clinical capacity regarding stroke was not at its best due to lack of capacity building. One of them said regarding clinical capacity;

*“...most of us have clinical capacity in other cases like malaria or HIV/AIDS because we do refresher programme, there has been nothing on stroke so I can say clinical capacity is poor...” (HW 04e).*

The clinical capacity was reported to be poor in various aspects of clinical care. In diagnosis for example, one health worker put it this way,

*“...the greatest challenge due to poor clinical capacity is being unable to make a definite diagnosis based on CT scan....hence we base diagnosis on clinical findings but this can be misleading...” (HW 01c).*

By this statement the health worker meant that lack of clinical equipment which guides in diagnosis reduces the clinical capacity performance. Clinical capacity can thus be increased by updating equipment needed for operation. In the current situation, when circumstances allow, health workers refer patients to University Teaching Hospital where they do specific test and they follow the recommendations from University Teaching Hospital but this is not always feasible.

A health worker reported that what they learned in school regarding stroke management is what they do.

He said “...*the clinical capacity in management is poor but this should change, discoveries are made and more evidence has come up which we need to learn about hence clinical management capacity need to improve...*” (HW 03d).

He further said that “*besides guidelines in textbooks are given following specific tests, but when you have to manage stroke based on clinical diagnosis....it is very misleading because you do not know what you are treating if its stroke due to ischaemia or haemorrhage*”.

By this statement, he was indicating that there are no refresher courses on stroke and health workers advocated for refresher courses on new discoveries. This is only possible if stroke knowledge is brought to light in the Zambian context, since there is no information on stroke currently.

Clinical capacity in selected cases like HIV/AIDS and Malaria has been built in health workers. The health workers wished the same could happen as regards to stroke as it is an emerging disease of burden in the country.

One health worker said “...*I have never heard of workshops on Non Communicable diseases even when they are many case, that's the cause of poor clinical capacity because of lack of updates...*” (HW 03d).

Poor clinical capacity weakens the processes in the Donabedian model. Results have shown that clinical capacity for the health workers was poor in this study. Diagnosis and management are made under poor clinical capacity and therefore poor capacity influences diagnosis and management of stroke in Zambia. Health workers are critical



to ensuring high-quality outcomes and effective quality improvement to improve service delivery. For the better outcome in stroke service, capacity needs to be improved in all staff categories in the country.

### **Theme 5: Planning and budgeting**

With regard to case diagnosis and management, planning and budgeting plays an essential role. Planning and budgeting for stroke did not take place in any of the hospitals in this study. The emerging theme here is lack of resources.

#### ***Lack of resources***

Hospitals did not have specific budgets for stroke cases.

A health worker lamented that “.....*there is nothing specific for stroke... the entire hospital budget is small..the hospital cannot even manage to feed patients properly because of lack of resources*” (HW 02a).

The budgeting in the hospitals is general for the smooth running of the facility and hence does not include specific diagnostic and management tools as it comes as grant from the government.

At hospital level, there are diseases specific prevention programmes for Malaria or HIV/AIDS, but these programmes are donor funded programmes and mostly are communicable diseases as they have been diseases of burden in the country. The government is resource constraint hence only funding operational budgets for hospitals as emphasized by another health worker saying

“...*we don't have budget line for stroke, budget is small even for operations due to lack of resources*” (HW 03a)

Meanwhile the situation appears to be countrywide as one health worker says

*“...it’s not just here, the problem is everywhere because of resource constraints”* (HW 01e).

Planning and budgeting is important for procurement of equipment and prevention programmes. Good planning would enable the improvement of technical environment to enable effective diagnosis and management of stroke. Procurement of capital equipment is done by the Ministry of Health and is part of infrastructure development (MOH, 2012). In this development, the country has seen the need to equip second level hospitals with medical equipment for the management of stroke, but has not yet taken place due to resource constraints. One health worker said regarding national budgeting and planning for NCDs;

*“I wonder what the NCDs money at the headquarters is used for... We don’t receive anything for NCDs but we are the programme implementers”* (HW 01e).

For the structure of healthcare to be strong, financing is paramount and yet it seems missing in the care of stroke. This affects the operations of the health system. The results here show that the planning and budgeting for stroke was absent in the country due to lack of resources. The lack of resources therefore is the conditions under which diagnosis and management of stroke is made. This limits the activities for stroke care in the country.

### **Theme 6: Technical environment**

Technical environment being the technical structure for clinical activities, all the health workers complained that the stroke clinical environment is below average. The

respondents were asked to say how they viewed the technical environment for stroke. Poor technical environment was the emergent theme here.

### ***Poor technical environment***

The environment covers the continuum of care from diagnosis to rehabilitation. Concerning diagnosis, one health worker insisted that

*“...CT scan is very important in general hospitals.... we have a lot of stroke cases and you can't make a definitive diagnosis without CT scan, improvement is needed because of poor technical environment” (HW 01b).*

Proper management is based on proper diagnosis. With no CT scan available in the hospitals, good management is not guaranteed.

Specific environment for stroke care need to be well equipped as opposed to what is trending in the hospitals leading a health worker to say;

*“...the beds are broken, no bed accessories, no wheel chairs that is poor technical environment...” (HW 02d).*

This means that good nursing care may not be achievable due to poor technical environment.

Meanwhile technical environment is required according to the needs of the stroke cases.

A respondent puts it this way *“our clinical environment needs to improve; we need space dedicated specifically for stroke patients...they are many cases here now due to hypertension.....”(HW 03b).*

There is also need to care for stroke separately since stroke morbidity differs with other medical conditions.

One respondent said “...*Here we just mix them and stroke patients need specific attention...we don't have much space let alone gadgets to use*” (HW 03a).

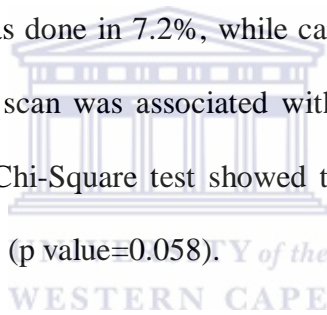
A good technical environment is spacious with right gadgets, to avoid injuries to stroke victims considering their inability to move freely. This specifically calls for better facilities for the management of stroke in the country.

The technical environment as part of the structure in the Donabedian model needs to be upgraded. The technical environment in the Donabedian model is a very vital structure as all process will take place according to the environment. Technical environment is part of the structure in the Donabedian model which is the base for health activities. When “...*the beds are broken, no bed accessories, no wheel chairs...*” it is an indication of poor technical environment which in turn affects the processes of care stroke care.

#### **4.4 Chapter summary**

Chapter four presented the results in two parts. Results from the quantitative part showed the process of care of stroke. The patients' records showed that patients' age ranged between 14 and 98 years the mean age being 58.09. Sixty eight percent of the patients were females. The majority 55.8% of stroke patients were married. The days of admission ranged between 1 and 10 days in the hospital with the average patient admitted for 4.85 days. Out of the 400 cases, only 9% were classified based on the Computed Tomography scan. The majority 67% had right sided paralysis. All the cases had temperature, pulse and blood pressure taken throughout the stay in the

hospital. History and general examinations were done in all the patients, with neurological exams done on almost all of them. Few patients had confirmatory test done e.g. Computerised tomography scan was only done on 10%, ECG on 11% and EEG on 4 % of all the cases, with Magnetic Resonance Imaging, Ultrasound and angiography not done on any of them. Of the total cases, 19 % received thrombolytic drugs and 12.5% received anti-platelets while 6.5% received statins. A total of 34.5% received antihypertensive drugs while 9% received drug for cardiovascular risk factors. A total of 15.5% received both antihypertensive drugs and thrombolytic drugs. About 2.8% received other unspecified drugs. Of all the total cases, 91% underwent rehabilitation. Diet improvement was done to 8 %. Transfer to care from hospital to community was done in 7.2%, while carer training was done in 14.5% of the total cases. Only CT scan was associated with definitive diagnosis with the p-value of 0.000. Pearson Chi-Square test showed that Diagnosis was not associated with medical management (p value=0.058).



The results for the qualitative study are also presented in this chapter. This is from the individual in-depth study with 15 health workers comprising of medical officers, nurses and physiotherapists. The themes were Staffing levels, Multidisciplinary Team, Treatment guidelines/ protocols, Staff clinical capacity, Planning and budgeting and Technical environment. The results showed that there are staff shortages in the hospitals and this made it difficult to make in a multidisciplinary team to manage stroke patients. The results also showed that there are no treatment guidelines hence stroke was managed like any other medical case and the health workers mourned the lack of clinical capacity for stroke in both diagnosis and management. The results also shows that there is no planning and budgeting specific for stroke in hospitals while the technical environment was poor due to resource constraints. The emerging themes

were staff shortages, busy schedules, no guidelines, poor clinical capacity, lack of resources and poor technical environment. The next chapter discusses the findings from the two parts of the study and relates to current literature.



# Chapter Five

## Discussion

### 5.1 Introduction

This chapter discusses findings from all two parts of the study. The results are discussed in relation to the objectives of the study as well as how they relate to relevant literature reported from other studies. The results are also discussed with reference to the Donabedian model which has three components i.e structure, process & outcome. The components referred to in this study are the structure and process only as the study did not set out to assess the stroke outcomes. The study had three objectives which were; to determine the process of care of stroke in Zambia, to explore the conditions under which diagnosis and management of stroke is made in Zambia and to explore factors influencing diagnosis and management of stroke in Zambia. The study questions will also be answered at the end of the chapter.

### 5.2 Process of care of stroke in Zambia

While there is literature on the process of care of stroke patients in developed lands, data on process of stroke care in Africa is scanty. General hospitals are recommended to provide extensive stroke health services, but stroke health services in Zambia's general hospitals are not well developed, other countries may have more developed hospitals with stroke health services, making comparison difficult. Despite these limitations, information on the process of care of stroke can be a source of useful information to health providers and the research fraternity including policy makers. This information can be used to understand the gaps in stroke health service delivery

and improve the quality of service delivery of stroke services to stroke victims. Stroke health services needs to be understood as its socio-economic impact is considerable. It is therefore important that health care planners and health service providers understand the extent of the problem in Zambia.

### **5.2.1 Demography characteristics of stroke victims**

Stroke mean age is relatively higher in developed countries than developing countries (Kissela, Khoury, Alwell, Moomau, Woo et.al., 2012). Equally, in developing countries, even though the stroke victims' age is increasing as was shown in the study, the proportion of stroke victims younger than 55 years of age is increasing. HIV/AIDS has been linked with this trend in developing countries especially Sub Saharan Africa, although the occurrence of stroke and HIV infection might often be coincidental (Benjamin, Bryer, Emsley, Khoo, Solomon & Connor, 2012).

Regarding sex, Caso, Paciaroni, Agnelli, Corea & Ageno (2010), writes that females are more affected than males by stroke citing women's longer life expectancy and the much higher incidence of stroke at older ages. Apart from women's' longevity Haast, Gustafson & Kiliaan (2012) states that the protection of pre-menopausal females from stroke by sex hormones means that in increased age, females are more at risk than males. This sex difference is what was observed in the current where female stroke victims were more than male.

### **5.2.2 Diagnosis**

Surveillance of patients' condition is helpful in diagnosis. Surveillance to check for pyrexia, hypertension and tachycardia alarms the health provider as the picture is negative and requires attention (Elliot & Coventry, 2012). Surveying for vital signs



help to assess the condition of the patient throughout their stay in the hospital. The vital presentations of stroke are usually high blood pressure if haemorrhagic or normal blood pressure if ischaemic, tachycardia and pyrexia due to inflammation (Giraldo, 2013). Attention should also be paid to clinical presentation of the stroke as the stroke victim may present themselves after other medical attempts and as such the vital signs would have normalised (Elliot & Coventry, 2012).

Obesity has been associated with stroke (Song, Sung, Smith & Ebrahim, 2004). Hence surveillance body weight check is very important for stroke and can be managed although only 59% of the patients had body weight check. Body weight is used in the calculation of Body Mass Index which gives a guide if one is overweight in relation to the height (WHO, 2006).

To arrive at a diagnosis, history and general examination are paramount in healthcare as was found in this study. History ascertains the background on the situation and further encompasses aetiology to associate the risk factors (Moncayo-Gaete & Bogousslarsky, 2011). In clinical diagnosis, history plays a vital role in the classification guidance of stroke in the absence of definitive diagnostic tools (like Computed Tomography scan) although this has been found to be unreliable (Flossmann, Redgrave, Briley & Rothwell, 2008). This is simply because some clinical presentations can be found in both haemorrhagic and ischaemic strokes. Resource constraints countries including Zambia rely more on clinical diagnosis (Imam & Olorunfemi, 2004), this reduces the quality of health services provided as clinical diagnosis is 7.5 times unreliable (Flossmann, Redgrave, Briley & Rothwell, 2008).

To understand the extent of paralysis and classify the side affected, neurological examinations are essential (Kattah, Talkad, Wang, Hsieh & Newman-Toker, 2009). Neurological examinations in this study were done on 99% of the stroke victims. This is to say that not all stroke victims end up with neurological deficits hence did not need the exams.

Update on diagnosis of stroke states that CT scan is the definitive tool for classifying whether the stroke case is ischaemic or haemorrhagic (Leary & Caplan, 2008; Catanguí, 2013). Hence CT scan is the standard tool for definitive diagnosis and in this study only 10% of the victims had definitive diagnosis based on CT scan. In this study though, only 9% of the stroke victims were classified based on CT scan, the difference of 1% could have been inconclusive. Definitive diagnosis is established using special tests like CT scan or MRI. This fact was supported by a clinical trial by Adams, Bendixen, Kappelle, Biller, Love & Gordon (1993) who demonstrated how imaging using CT, ECG and EEG are very effective in the diagnosing stroke definitively as they would eliminate conditions mimicking stroke like Seizure, hypoglycemia, drug overdose, hyponatremia, migraine or brain tumour. The definitive tool guides the management as they confirm what is suspected (Giraldo, 2013). The use of special tests in this study was minimal due to poor structures of health care.

Biochemical and haematological tests regarding stroke are a feature of level two hospitals where this study was conducted. Some studies (Moskau, 2010) argued that these tests might not be very useful in the management of stroke. This could explain what was found in this study where coagulation studies were done in 22.3% of the victims. However, even if electrolytes balance were not routinely done, imbalance can be very fatal in patients (Bhalla, Sankaralingam, Dundas, Swaminatham, Wolfe & Rudd, 2000). Electrolyte imbalances can lead to unchecked blood pressure either low

or high which can lead to mortality in a patient. This is an important test in the assessment of a stroke patient considering the risk factors of stroke. Similar to this is renal function tests which were not routinely done but it is associated with stroke and other co-morbidities which could put stroke patients on further risk of stroke recurrence (Banerjee, Fauchier, Voure'h, Andres, Taillandier & Halimi , 2013). Liver function tests are equally not an exception (Zhou, Zhao, Song, Yang & Gao, 2014).

In this study, it was revealed that only definitive diagnosis which was CT scan was associated with classification of stroke with a p-value of 0.000. Hence CT scan was highly associated with classification of stroke. Other factors including examination and biochemical tests were not associated with stroke.

### **5.2.3. Medical Management**

The fact that the majority of stroke victims received anti hypertensives is in line with the findings of Atadzhanov et.al. (2012) which revealed that that majority of the stroke cases in the country are due to hypertension. The lack of tools for special tests is seen in the treatment methods where combinations of anti-hypertensives and thrombolytics are given, with the aim of addressing the two types of stroke, thus showing the failure of clinical diagnosis. The study also shows that diabetes is an important risk factor of stroke as it was very frequent in maintenance therapy to restore internal environment balance ( Keating , Penney, Russell & Bailey, 2012).

This study revealed that diagnosis was not associated with medical management (p - value is 0.058. This could be that medical management was based on clinical diagnosis and not definitive diagnosis.

#### 5.2.4 Rehabilitation

Stroke as a “rapidly developing clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin”( Aho et.al., 1980), does not always result in neurological deficit. This was shown in the study as not all stroke patients needed rehabilitation hence not all the cases in this study were referred for rehabilitation. However, with increased numbers of residual disability among stroke survivors, neuro-rehabilitation remains one of the cornerstones of post stroke treatment as it plays a central role in successfully reducing the long term effects of stroke and achieving optimal functional recovery for community integration (Brewer et.al., 2012). All those stroke victims who were part of the rehabilitation programme underwent strengthening exercise programme. This is consistent with the physiotherapy guidelines of stroke management that all stroke patients with neurological deficits should receive rehabilitation either institution based or community based to avoid adverse consequences (National Stroke Foundation, 2010b). Muscular strengthening is top priority in stroke as the main presentation of stroke is hemiparesis (Giraldo, 2013). To restore back the patient to the fullest functional activity, strengthening exercises are necessary to build up the diminished muscle power (Langhorne, Bernhardt & Kwakkel, 2011).

Due to nerve supply disturbance resulting from stroke, sensation disturbance is also a symptom in stroke (Giraldo, 2013). Damage resulting in decreased sensory awareness has a number of functional implications which can reduce an individual’s ability to function independently and impact upon their quality of life. Sensation has to be re-

stimulated to enable the fullest functional activity. This helps the victims to be aware of their environment and avoid further accidents as in burns or falls (Carey, Macdonell & Matyas, 2011). Sensory training involves a series of exercises designed specifically to train sensory function like practising tactile sensation or proprioception.

Paralysis of one side of the body makes it difficult for a stroke victim to sit up from lying. Sitting up exercises have to be done to retrain sitting up again. Retraining should be highly functional and targeted to goals that are relevant for the needs of the patient like lying to sitting. This takes advantage of the strength in the unaffected side of the body since the presentation is hemiplegia or hemiparesis. Adaptive strategies that compensate for impaired body functions should be used in form of activities like rolling in bed (Gordon, Gulanick, Costa, Fletcher, Franklin & Roth, 2004).

Loss of hand activity as a result of upper limb paresis after stroke reduces the probability that a stroke victim can return home to pre-morbid activities (Buschfort, Brocke, Heß, Werner, Waldner & Hesse, 2010). Rehabilitation of the upper limbs is important as the hand has specific functions which are important in promoting independence of the victims (Langhorne, Bernhardt & Kwakkel, 2011). This program is achieved better with the help of the Occupational therapists who unfortunately were not found at the general hospitals.

One of the syndrome of stroke is spasticity (Dietz, 2010), which can be prevented by exercises or positioning or gadgets. Most of the stroke patients need this kind of prevention to avoid progression hindrance (Brashear, Gordon & Elovic, 2002). Botulinun toxin A and electrical stimulation was not given to any cases due to their absence in the hospitals. In its place were contracture splints or contracture serial

casting. Spastic symptoms can induce pain, ankylosis, tendon retraction or muscle weakness in patients, which may limit the potential success of rehabilitation (Duncan, Zorowitz, Bates, Choi, Glasberg & Graham, 2005; Brown, 1994). It can also affect quality of life and be highly detrimental to daily function (Doan, Brashear, Gillard, Varon, Vandeburgh & Turkel, 2012). Occupational therapy is effective in the prevention of upper limb spasticity but unfortunately, Occupational therapists were not part of the health workers in the general hospitals and this contributed to disabling the quality of health service provided to stroke patients (Laver, George, Thomas, Deutch & Crotty, 2012).

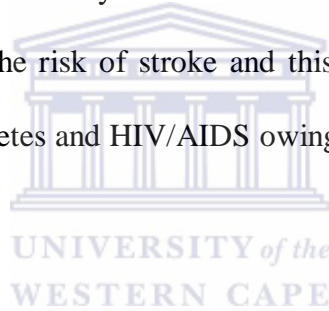
Risk factor management in rehabilitation comprises of Cardio-respiratory training for fitness, general physical activity and exercise intermission for fatigue. This helps to improve the cardiovascular system to prevent further strokes (Thrift, Srikanth, Nelson, Kim, Fitzgerald & Gerraty, 2014). Fewer cases benefited from risk factor management compromising the quality of health service for stroke. This increases the chances of the victims having another stroke in future since recurrence was not effectively addressed.

Falls are a complication of stroke as balance is reduced to due disturbance in proprioception (Leibowitz, Levy, Weingarten, Grinberg, Karniel & Sacher, 2008). Only a few of the rehabilitation were made awareness of falls. Balance trainings help reduce chances of falls as victims become more stable.

Speech therapy is needed when there is disturbance of the speech centre resulting in Broca's aphasia, global aphasia or nominal aphasia (Vidovic, Sinanovic, Sabaskic, Haticic & Brkic, 2011). None of the cases benefited from speech therapy due to lack of speech therapists in the general hospitals.

### **5.2.5 Lifestyle management**

Lifestyle management is a very important aspect of stroke management (Rundek & Sacco, 2008). Diet improvement, smoke cessation, counselling and alcohol intake reduction are part of the lifestyle management which were done in this study. Lifestyle management reduces the chance of having another attack as risk factors are reduced. (Rundek & Sacco, 2008). To better manage lifestyle, specialised workers are essential to manage some risk factors e.g. Nutritionists and psychologists. HIV/AIDS and diabetes were effectively managed in relation to stroke in this study. This could be explained by the support the two conditions have been receiving in the country (MOH, 2015). Another study in Sub Saharan Africa encouraged lifestyle management to reduce the risk of stroke and this included diet, smoke cessation, alcohol intake, while diabetes and HIV/AIDS owing to the disease burden (Benjamin, et.al., 2012).



### **5.2.6 Community linkage**

Rehabilitation should not only be provided along a continuum of care between services, it should also follow a continuum of progression in individual lives from basic outcomes like physiological stability and prevention of secondary complications, to advanced outcomes, such as community care and integration (Landrum, Schmit & McClean, 1995). This is vital because the greatest impact on patient health and well-being is from the long-term consequences faced when stroke survivors leave the hospital. In this study, linkage to community care was done in only 7.2% of the rehabilitation cases. This is because community based rehabilitation for stroke does not exist at all. This makes it difficult for community linkage and management of residual impairment after the victim has been discharged from the

hospital especially in the event that they cannot even afford to attend out patients department programs due to lack of transport. Studies have shown that specialist rehabilitation of stroke patients in the community can lead to improved recovery, with regaining of independence and improved abilities to perform activities of daily living (Walker, Sunnerhagen & Fisher, 2012). This brings into play the work of Occupational Therapists and Social workers. In its lack of health workers, Zambia as a country does not have Occupational therapy at general hospital level and hence the breakdown in service provision (Ferrinho, Siziya, Goma & Dussault,, 2011). In this study, no social worker took part in the study as only two hospitals had social workers who were not present and did not attend to stroke patients hence community follow-up, residual disability management and social welfares services were not done at all.

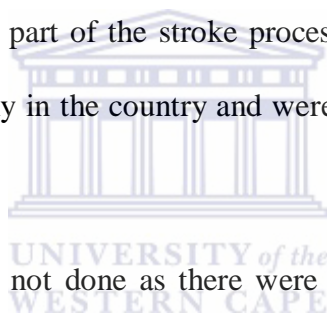
Carer training is a good alternative when there are staff shortages, and they lay a good foundation for community care. Studies have shown that auxiliaries have been able to provide a service when they are trained to do so (Rajaraman & Palmer, 2008). This could be the same for stroke when a care taker is trained in rehabilitation and hence can help with rehabilitation at home. In this study, only 14.5% of cases had carers trained to look after them at home. This left the majority to absence of rehabilitation continuation at home.

### **5.3 Process of care- Donabedian model**

The stroke process of care which is the content of care, the referral process to and through the system, as well as the services that the patient receives has been explored in this study. Unlike the process of care of an effective stroke unit (Langhorne & Pollock, 2002), the stroke process of care in Zambia ranged from diagnosis through to physical rehabilitation and lifestyle management. The stroke process if care was



challenged in the area of diagnosis using biochemistry, haematology, CT scan, MRI and Angiography etc (Langhorne & Pollock, 2002). Poor diagnostic measures led to inadequate medical management. The process of care in rehabilitation was challenged by lack of gadgets and space to use in rehabilitation and this is similar what Hale & Wallner (1996) found as a challenge in another resource constraint country. Meanwhile, community linkage, speech therapy and social welfares services were not part of the stroke process of care in Zambia as the study as established. Although some study in Africa found that physiotherapy is used more than Occupational therapy and speech therapy (Rhoda, Mpofu & DeWeerd, 2009; De Villiers, Kalula, Bryer & Ferreira, 2006), in Zambia's general hospital, Occupational therapy and speech therapist were not part of the stroke process of care. These important health workers are in short supply in the country and were just found in tertiary hospitals in the country (MOH, 2015).



Coordination of care was not done as there were no multidisciplinary teams in the general hospital due to lack of general staff for to stroke services. Carer training was not performed by the health workers. Carer training enables stroke carers manage stroke patients from home when the health workers cannot be reached. Community linkages, Community based rehabilitation and Social services did not exist in the general hospitals catchment area. But with no financing related directly to stroke and no inadequate staffing levels, stroke management was only institutionalised.

The study found that there was a strong association between CT scan and definitive diagnosis of the stroke patient (p value= 0.0000). But there was no association between diagnosis and medical management (p value=0.058).

## **5.4 Conditions under which diagnosis and management of stroke is made in Zambia and factors influencing diagnosis and management of stroke in Zambia**

Conditions under which diagnosis and management of stroke is made and factors influencing diagnosis and management of stroke are components of the Structure in the Donabedian model. General information on the structure of health care in Africa is less developed making health service delivery difficult (The Economist, 2012). Structures of health care are the conditions of health care delivery as well as factors influencing health care delivery. Information on the structure of health care delivery is beneficial to understand the process of care of health service delivery and in this case, stroke in particular. Poor infrastructure contributes to poor service delivery enabling poor health outcomes (Street, 2014).

### **5.4.1. Staffing levels**

The emerging theme from the predetermined theme staffing levels was *staff shortage*. Zambia, as a country, is currently experiencing staff shortages in all health care categories (Kamwanga, Koyi, Mwila, Musonda & Bwalya, 2013). The findings from this study confirmed that shortages of health workers in the area of stroke in all categories are consistent with the country situation. Zambia as a country has been facing general shortage of health care workers for quite a long time (Herbst, Vledder, Campbell, Sjoblom, & Soucat, 2011; Gowa, George, Mutinta, Mwamba & Ingombe, 2011). The country situation has been complicated by brain drain and increased disease burden leaving the few health workers to carry the work burden. Shortage of human resources for health leads to poor service quality (Wanjau et.al., 2012; O'Neill, Takane, Sheffel, Abou-Zahr & Boerma, 2013).

This staff shortage explains the poor stroke process of care observed in the current study. Nurses especially could not do the two-hourly turnings and constant weight checks as they had a lot of patients to attend to. Equally, the shortage also made it very difficult for Medical Officers to follow thorough investigations as one doctor would see all the cases in the ward regardless of the condition. For physiotherapists, this was a challenge to thoroughly follow up a case when they equally have to attend to the other outpatients in the departments. Rehabilitation was only done by Physiotherapists or Physiotherapy technologists in the general hospitals. This led to incomplete rehabilitation especially, upper limb rehabilitation. Occupational therapy is very effective in the reduction of spasticity (Thibaut, Chatelle, Ziegler, Bruno, Laureys & Gosseries, 2013). Occupational therapy focuses on adapting to the victims environment, modifying the task, skills education, teaching the client and family in order to encourage participation and performance in the activities of daily living especially those that are meaningful to the victim (Quiroga, 1995). Occupational therapists were not part of the health workers in the general hospitals disabling the quality of health service provided to stroke patients (Laver et.al., 2012). Occupational therapists work closely with the communities and social workers. Social workers “*did not attend to stroke patients*” and were unavailable. Occupational therapists and social workers who are the key to community linkage were not part of the team which manages stroke victims and hence community care was not done for stroke victims.

#### **5.4.2 Multidisciplinary teamwork**

The emerging theme from the predetermined theme Multidisciplinary teamwork was *busy schedules*. Multidisciplinary team is ideal in the management of stroke patients (Bryer et.al., 2010). Without a multidisciplinary team, health workers do not work on

common objectives or goal regarding the stroke victim (Scottish Intercollegiate Guidelines Network, 2010). In this study, health workers did not work in a multidisciplinary team in the area of stroke. They operated on referral basis due to staff shortages. Multidisciplinary teams have been shown to significantly reduce length of stay at the hospital and increase the likelihood of improving independence in stroke survivors (Langhorne & Holmqvist, 2007).

Referring stroke victims for physiotherapy upon discharge is not helpful as rehabilitation should begin in the hospital (National Stroke Foundation-Physiotherapy Guide, 2010). This inability to work in a multidisciplinary team comes in the wake of staff shortage as all health workers confess to be busy to come together for multidisciplinary action. But some researchers have argued that multidisciplinary teamwork does not necessarily require high numbers of health workers but simply good coordination of activities (De Wit, Putman, Dejaeger, Baert, Berman, Bogaerts, et.al., 2005). This study showed that health workers attended to stroke patients at different times, but in agreement with De Wit et (2005), with good planning and coordination, a combined ward round would be possible once a week even with staff shortages.

#### **5.4.3. Treatment guidelines**

The emerging theme from the predetermined theme Treatment guidelines was *no guidelines*. Guidelines are a distillation of primary evidence which have been critically appraised and then summarised for the convenience of the user (Scottish Intercollegiate Guidelines Network, 2010). A treatment guideline helps to improve and standardise the management of services. In this study, there were no treatment guidelines followed. This made health workers to manage stroke like any other

medical condition or basing the treatment on a foreign guideline like the British or as per text book. Zambia in particular has not authored any textbook on stroke care, but the available books are written in the affluent countries and are advanced for the Zambian set-up to be used instead of guidelines specific to the hospital set-up. Although the Ministry of Health embarked on guideline formulation in level two hospitals, with no outside pressure from interested associations, this has not been possible at all. This is not to say that guidelines formulation is not possible in Zambia, with interest groups, guidelines formulation is possible even in resource constraints countries (Cockburn, Fanfon, Bramall, Ngole, Kuwoh & Anjonga., 2014; European Stroke Organisation, 2008).

#### **5.4.4 Clinical capacity**

*Poor clinical capacity* emerged from the theme clinical capacity. Research has shown that poor clinical capacity negotiates the quality of services provided by health workers (Wanjau et.al. , 2012). In as much as they are able to attend to stroke patients, they can do better if their clinical capacity can be updated. Health workers capacity in service delivery requires specific skill levels and experience which must be continuously updated through seminars and workshop (Muula, Misiri, Chimalizeni, Mpando, Phiri & Nyaka, 2004). This can be done through associations or interest groups, e.g. the American National Stroke Association that has a mission to reduce the incidence and impact of stroke by developing compelling education and programs focuses on prevention, treatment, rehabilitation and support for all impacted by stroke including health workers, stroke victims and caregivers (Saenger & Christenson, 2010). This aims at updating their knowledge trends as some left health schools many

years ago and science has since been updated and many new discoveries are done following research. This should call for interest groups to be formed in Zambia.

#### **5.4.5 Planning and budgeting**

The emerging theme from the predetermined theme planning and budgeting was *lack of resources*. Unlike HIV/AIDS and Malaria, Stroke did not have any specific financial allocation. This made it impossible even for preventive programs to be put up, as hospitals were barely struggling to meet the health service demands of the population. The lack of financial allocations for conditions, specifically stroke, means that no further clinical capacity is built in staffs be it in short or refresher courses or workshops (Ministry of Health 2014). But contrary to common belief that good health can only be achieved with high budgets, studies have shown that good health can also be achieved at low cost (Balabanova, Mckee & Mills, 2011). This call on political and technical commitment to health as social goal which enables activities to be done at cheaper costs provided initiatives by health workers are appreciated.

#### **5.4.6 Technical environment**

The emerging theme from the predetermined theme technical environment was *poor technical environment*. For proper diagnosis, definitive tools are needed like Computed Tomography, MRI, Angiography (Kattah, Talkad, Wang, Hsieh & Newman-Toker, 2009). This was not found in any of the hospitals, and the patients had to travel to other hospitals outside town. This made it a challenge for victims who could not afford and left medical officers to diagnose clinically. This was equally a challenge when a victim presented with signs of ischaemic stroke and haemorrhagic stroke in that the Medical Officer had to manage both at the same time, of which scientifically contraindicating one another. For effective nursing care, the

environment needs to be favourable for stroke care (Summers, Leonard, Wentworth, Saver, Simpson & Spilker, 2009). The general hospitals were challenged by broken beds and poor space. Effective rehabilitation was equally challenged by the clinical environments like lack of exercises gadgets and machines. Poor technical environment poses a challenge to good services delivery in health sector and Zambia as a country has had poor infrastructure as a bottleneck of service delivery (Stephen, Lee, Kombe & Sinyinza, 2008). This underscores the fact that structure of stroke care existing in the country is poor leading to poor outcomes due to stroke (Mapulanga, Nzala & Mweemba, 2014).

### **5.5 Structure of care- Donabedian model**

The structure is the operational area for stroke activities and includes staffing, multidisciplinary teams, Treatment guidelines, staff clinical capacity, financing and infrastructure (Langhorne & Dennis, 1998). In the current study, these directly influenced the process of stroke care in Zambia's general hospitals. The staff shortages, busy schedules, no treatment guidelines, poor clinical capacity, lack of resources and poor technical environment impacted negatively on the stroke process of care according to this study. Diagnosis and management of stroke was made with no treatment guidelines, poor clinical capacity and poor technical environment. The same were the factors which were influencing diagnosis and management namely staff shortages, no multidisciplinary teams due to busy schedules of health workers, lack of treatment guidelines, poor clinical capacity by health workers, lack of resources for stroke and poor technical environment.

According to Kunkel, Rosenqvist & Westerling (2007), Structure is related strongly with process and outcome; moreover, process is related positively with outcome. In

their study, Structure and process together explained most of the variation in outcome. The structural model with relationships between structure, process, and outcome reasonably represented quality systems at hospital departments. This would be similar to Zambia if the structures and processes were strong in the diagnosis and management of stroke.

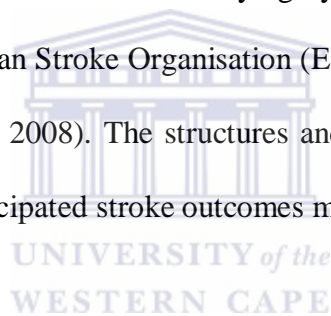
The structure of a health care system is described by its governance, economic conditions, and workforce development. Zambia has been striving to build effective health systems since its independence in 1964. To build a strong health system, the Zambian Government has been implementing significant health sector reforms, aimed at strengthening health service delivery in order to improve the health status of Zambians (MOH, 2010b). Currently, Zambia has a high burden of disease, which is mainly characterised by high prevalence and impact of communicable diseases, particularly, malaria, HIV and AIDS, STIs, and TB, and high maternal, neonatal and child morbidities and mortalities. The country is also faced with a rapidly rising burden of NCDs, including mental health, diabetes, cardio-vascular diseases and violence (MOH, 2010a). Until the country pays attention to the increasing NCDs, and develop structures for its management, it will affect the outcomes on such.

The process of a health care system is described by its access, comprehensiveness, continuity, and coordination of care. According to this standard stroke process is not accessible to the general population in the country. For patients to access these, they have to travel to the capital city, of which they face financial risks in travelling and health service fee for the diagnostic tools (WHO, 2010). This makes the process inaccessible to the general population. Comprehensiveness of health services demand that the services be holistic (Basu, Andrews, Kishore, Panjabi & Stuckler, 2012).



Equity in health is the absence of systematic and potentially remediable differences in health status across population groups (Kringos, Boerma, Hutchinson, Van der Zee & Groenewegen, 2010). Not all stroke victims in Zambia access quality stroke health services due to the poor structure in the general hospitals which needs to be improved.

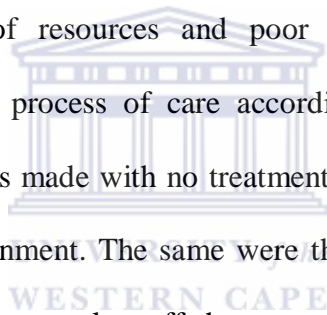
Recognising stroke as a serious condition can help to improve the structure and process of stroke care to achieve better outcome. This should move all professionals involved in the care of stroke to work in the multidisciplinary manner to come up with treatments guidelines (Saenger & Christenson, 2010). This requires good political will to improve the structure for stroke care despite resource constraint (Department of Health, 2001). This should also call for lobbying by the health professionals involved in the stroke care (European Stroke Organisation (ESO) Executive Committee and the ESO Writing Committee, 2008). The structures and process in this study have been inadequate and hence anticipated stroke outcomes may not be favourable.



## **5.6 Summary of Discussion**

This chapter discussed findings from all two parts of the study. The results are discussed in relation to the objectives of the study as well as how they relate to relevant literature reported from other studies. The results are also discussed with reference to the Donabedian model which has three components i.e. structure, process & outcome. The study had three objectives which were; to determine the process of care of stroke in Zambia, to explore the conditions under which diagnosis and management of stroke is made in Zambia and to explore factors influencing diagnosis and management of stroke in Zambia. The study questions have been answered at the end of the chapter. Unlike the process of care of an effective stroke unit, the stroke process of care in Zambia ranged from diagnosis through to physical rehabilitation

and lifestyle management. The stroke process of care was challenged in the area of diagnosis using biochemistry, haematology, CT scan, MRI and Angiography etc. Poor diagnostic measures led to inadequate medical management. The process of care in rehabilitation was challenged by lack of gadgets and space to use in rehabilitation. Meanwhile, community linkage, speech therapy and social welfares services were not part of the stroke process of care in Zambia as the study as established. The structure is the operational area for stroke activities and includes staffing, multidisciplinary teams, Treatment guidelines, staff clinical capacity, financing and infrastructure. In the current study, these directly influenced the process of stroke care in Zambia's general hospitals. The staff shortages, busy schedules, no treatment guidelines, poor clinical capacity, lack of resources and poor technical environment impacted negatively on the stroke process of care according to this study. Diagnosis and management of stroke was made with no treatment guidelines, poor clinical capacity and poor technical environment. The same were the factors which were influencing diagnosis and management namely staff shortages, no multidisciplinary teams due to busy schedules of health workers, lack of treatment guidelines, poor clinical capacity by health workers, lack of resources for stroke and poor technical environment.



# Chapter Six

## Conclusion and Recommendations

### 6.1 Introduction

This last chapter presents conclusion and limitations of the study. The chapter also looks at the recommendations following the study. The recommendations are given according to the Donabedian model components of structure and process following what the study looked at.

### 6.2 Conclusion

The study aimed to explore and determine the process of care and explore the conditions under which diagnosis and management of stroke is done in Zambia and what are the factors influencing stroke diagnosis and management in Zambia. Using the Donabedian model, the study used both quantitative and qualitative methods. To determine the process of care of stroke, the study used quantitative methods. A total number of 400 records were reviewed from the five general hospitals in Zambia using a checklist to collect quantitative data. To explore the conditions under which diagnosis and management of stroke is done in Zambia and what are the factors influencing stroke diagnosis and management in Zambia, qualitative methods were employed by interviewing 15 health workers individually.

#### 6.2.1 Process of care of stroke in Zambia

A total number of 400 records were reviewed from the five general hospitals in Zambia. These were medical records for the 2014 admissions. The results showed that

stroke process of care is inadequate because not all processes were followed. Definitive diagnoses to differentiate between ischaemic and haemorrhagic stroke were not done due to lack of CT scan. Equally, rehabilitation was not complete because Occupational and speech therapy were not done. Community linkages and long term rehabilitation were not done due to lack of coordination of services and shortage of staffs including occupational therapist and social workers. The findings reveal that the processes of care of stroke in Zambia are incomplete based on the recommendations made for resource constraint nations like Zambia in the management of stroke.

### **6.2.2 The conditions under which diagnosis and management of stroke is done in Zambia and the factors influencing stroke diagnosis and management in Zambia**

The second part used individual in-depth interviews with health workers to explore the conditions under which diagnosis and management of stroke is done in Zambia and what are the factors influencing stroke diagnosis and management in Zambia

- Diagnosis and management of stroke were made under unfavourable conditions which were no treatment guidelines, poor clinical capacity and poor technical environment.
- The factors which were influencing diagnosis and management were staff shortages, no multidisciplinary teams due to busy schedules of health workers, lack of treatment guidelines, poor clinical capacity by health workers, lack of resources for stroke and poor technical environment.

### 6.2.3 Limitations of the study

This research study had the following limitations:

1. In the original concept, focus group discussions were planned as a way of qualitative data collection. Due to busy schedules of health workers, it was impossible to meet the health workers at the same time hence in-depth individual interviews were the option. Focus group discussions would have been a better technique to address the conditions under which diagnosis and management of stroke is done in Zambia and what are the factors influencing stroke diagnosis and management in Zambia in a collective manner hence establish common solutions to issues raised during probing.
2. The study used medical records review for quantitative study. This was a limitation because the review was as documented hence missed some processes of care which were not documented in the records.
3. The study used the Donabedian model employing only two components of structure and process. The study was limited in that it did not establish the outcomes of the stroke structure and processes.
4. The qualitative part of this study used predetermined themes. This was a limitation because discussions were based on the predetermined themes of which the other issues outside the predetermined themes could have been missed.

### 6.3 Recommendation

The research finding underscores the importance the health system *structures* play in the healthcare *processes* for the better *outcomes*. There is need to address stroke as an emerging NCD in Zambia. This calls for putting up funds needed for addressing the prevention and the severe outcomes of the diseases. The research findings reveal the bottlenecks we have in Zambia, in the diagnosis and management of stroke. It is evident that as a country, Zambia has never directed resources to stroke as a single disease and yet it is the major cause of adult disability. It is also true that health promotion in Zambia has rarely touched NCDs. What the healthcare in Zambia has achieved in the medical management of stroke, is in form of drug therapy.

It is evident from the interviews with the health workers in this study that the government as the main health provider in the country hasn't got organisational partners when it comes to stroke. The community has not been engaged in the management of stroke either. Instead of stroke victims being dumped in the community, the community can be engaged in its management and thence promotes health.

It is also evident from the study that there is no continuation of stroke management at community level. Equally, rehabilitation results are best achieved in the natural set up of the victims as it is tailored according to the needs of the victims. It is therefore important that community linkage of stroke victims be part of the management of stroke in Zambia. To this effect the community can be used as a partner in the management of such conditions when it comes to prevention and care. Also key to the management of stroke is health workers themselves who need to have their

performance updated in form of capacity building. The health systems need to be up to date in the following areas;

### **1. Health care Capacity (Structures)**

- Health workers are in short supply, but are the key to adequate management of stroke. Although the shortage is in all categories, Occupational therapists and speech therapists that are the key to community rehabilitation, are absent in the general hospitals. There is need to train Occupational therapists and Speech therapists in the country so they can fill in the missing gaps in rehabilitation for it to be complete. Social workers on the other hand, need to be involved in the management of stroke victims as this condition has a very adverse social impact. Nutritionists also need to come on board in lifestyle management of stroke patients.
- The clinical environment for stroke management needs to be upgraded. This can be done by expanding the wards and rehabilitation spaces or forming stroke units. This should consider the stroke pathology and the spaces required to nurse or rehabilitate the victims.
- Facilities and equipment are very vital to proper diagnosis and case management. These need to be updated for effective management. These are the diagnostic tools and rehabilitation gadgets.
- Financing towards the prevention and management of stroke should be put in place. This may require partners who are stakeholders to come on board.
- Governance by interested associations should be encouraged as information can be shared, and policies can be adopted basing on evidence from research. This calls for more research entities to undertake researches in the area of non-communicable diseases specifically stroke.

- Standard Treatment guidelines to make care efficient needs to be developed. This would improve for the quality service provided.
- Multidisciplinary teams should be put in place in order to manage the victims holistically. This should be done by good coordination of health workers and working out work schedules by health workers.
- The interventions need to be efficient by all cadres to improve the management services through to the community. Healthcare should be well coordinated by creating a proper information system specific to stroke.
- Range of stroke prevention services need to be improved aside what is existing in form monitoring blood pressure. Not all strokes are caused by high blood pressure but also necrosis leading to infarction due to atherosclerosis or arteriosclerosis. Services to check who is at risk for stroke need to be increased as part of health promotion. Services to promote physical activities which promote cardiovascular training need to be part of the health systems.
- Knowledge base of both health workers and the community needs to be raised in form of seminars or workshops. Information between the two groups needs to be exchanged so that they are all involved in the prevention and management.
- Accessibility to health services for stroke needs to be adopted; this should range from diagnostic tools which are usually expensive for an average citizen to pay when available. These need to be subsidized stroke services for every citizen to access them.

## **6.6 Further research**

- The stroke outcome in Zambia was beyond this study. Looking at more than 400 individuals left out without community services is beyond imagination. It is imperative that a study on the stroke outcomes is done.



- There is need for a national study on the impact of stroke at population level as well as social-economic impact.
- As information in Zambia is scanty, there is also need for a study on the disease burden of stroke in the country.



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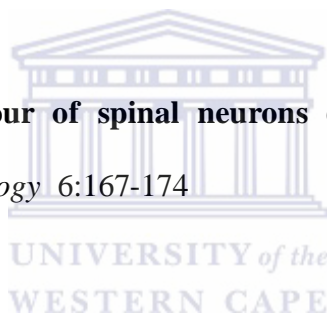
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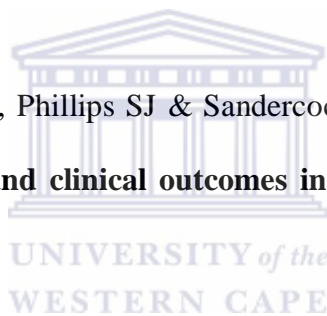
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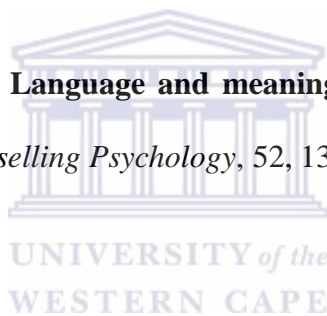
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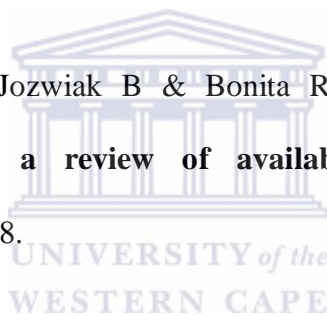
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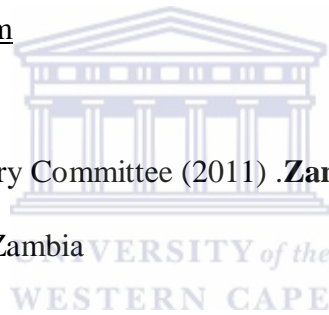
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## Appendices

### Appendix i -Checklist for medical records review

#### UNIVERSITY OF THE WESTERN CAPE



Private Bag X 17, Bellville 7535, South Africa

*Tel: +27 21-9592542, Fax: 27 21-9591217*

**E-mail:nmlenzana@uwc.ac.za**

#### Processes followed to diagnose and manage stroke in Zambia

##### Demographic information

Hospital code number	
Checklist code number	
Patient identification number	
Age	
Gender	
Marital status	
Date of admission	
Date of discharge	
Diagnosis	
Paralysis side	
Type	

## Processes

### *Vital signs*

Temperature	
Pulse rate	
Blood pressure	
Body weight	
Blood sugar	



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WESTERN CAPE

### *Examinations*

History		
Physical examination	General Examination	
	Neurological exam	
Investigations	Imaging	CT scan
		MRI scan
		Ultrasound
		Electrocardiogram
		Echocardiogram
		Angiogram
	Biochemistry	Glucose
		Full blood count
		Coagulation studies
		Electrolytes
		Renal function
		Liver function

**Medical management**

Ischaemic stroke			Haemorrhagic stroke		
Drugs	Thrombolytic		Drugs for risk factors	Blood pressure	
	Antiplatelet (Aspirin)			Cardiac diseases	
	Anticoagulant (Warfarin)			Blood sugar	
	Statins (Atomastatin, Simvastatin)			Other drugs	
	Other drugs				

**Maintenance therapy**

Glucose balance	
Oxygenation	
Hydration	
Positioning ( left lateral semi position)	
Skin Care (turning two hourly)	
Feeding ( oral or through naso-gastric tube)	

## Rehabilitation

Sensory-motor impairments	Weakness		
	Loss of sensation		
Physical activity	Sitting		
	Standing up		
	Stand		
	Walking		
	Upper limb activity		
Management of complications	Spasticity	Intervention to reduce spasticity	
		Botulinum toxin A	
		Electrical stimulation/ EMG biofeedback	
	Contractures	Convention therapy	
		Splinting/ prolonged therapy	
		Serial casting	
	Subluxation	Electrical stimulation	
		Firm support devices	
		Handling	
	Shoulder pain	Shoulder strapping	
		Prevention management	
	Swelling extremities	Dynamic pressure	
		Electrical stimulation	
		Limb elevation	
Continuous			



		pressure	
Speech therapy			
Endurance	Loss of cardio-respiratory fitness	Fitness training	
	Fatigue	Exercise intermission	
		Exercise education	
	Falls	Awareness	
		Support	

### *Lifestyle management*

Diet improvement	
Physical activity	
Smoke cessation	
Alcohol intake reduction	
HIV/AIDS treatment	
Blood sugar control	
Counselling	

### *Community linkage*

Carer training	
Transfer to care from hospital to community	
Community rehabilitation and follow up	
Long term rehabilitation	
Social welfare services	

## Appendix ii- Interview schedule for health workers

### UNIVERSITY OF THE WESTERN CAPE



Private Bag X 17, Bellville 7535, South Africa

*Tel: +27 21-9592542, Fax: 27 21-9591217*

**E-mail: [nmlenzana@uwc.ac.za](mailto:nmlenzana@uwc.ac.za)**

#### Interview schedule

- a) Staffing levels
- b) Multidisciplinary Team
- c) Treatment guidelines/ protocols
- d) Staff clinical capacity for diagnosis, management and rehabilitation
- e) Planning and budgeting for stroke
- f) Technical environment

## Appendix iii-Ethics clearance from University of the Western Cape, RSA



### OFFICE OF THE DEAN DEPARTMENT OF RESEARCH DEVELOPMENT

06 August 2014

#### To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape approved the methodology and ethics of the following research project by:  
Ms M Mapulanga (Physiotherapy)

Research Project: Exploration and determination of processes followed to diagnose and manage stroke patients in Zambia.

Registration no: 14/6/27

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

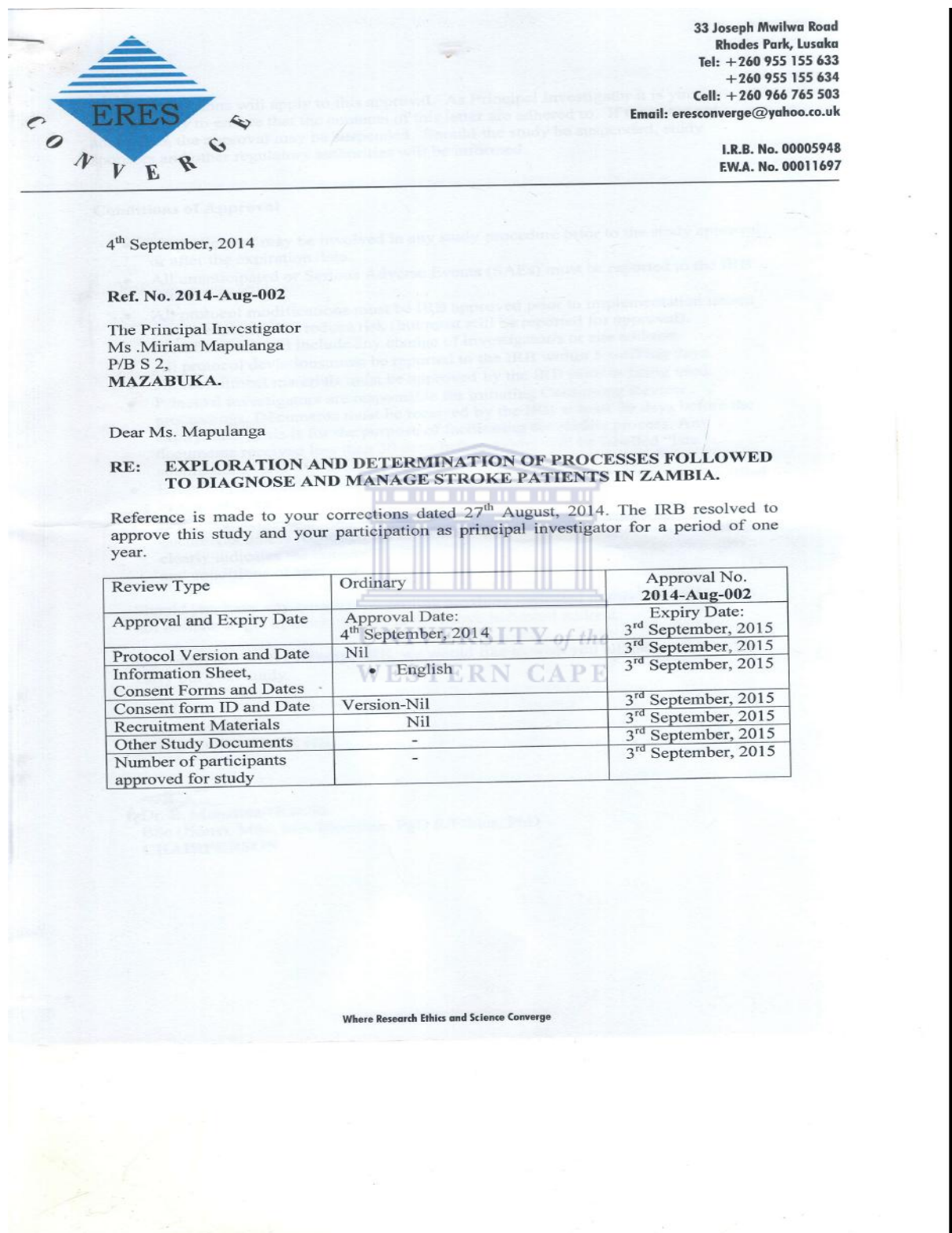
The Committee must be informed of any serious adverse event and/or termination of the study.

*Ms Patricia Josias  
Research Ethics Committee Officer  
University of the Western Cape*

Private Bag X17, Bellville 7535, South Africa  
T: +27 21 959 2988/2948 . F: +27 21 959 3170  
E: pjosias@uwc.ac.za  
www.uwc.ac.za

A place of quality,  
a place to grow, from hope  
to action through knowledge

**Appendix iv- Ethics clearance from ERES Converge, Zambia**



33 Joseph Mwilwa Road  
Rhodes Park, Lusaka  
Tel: +260 955 155 633  
+260 955 155 634  
Cell: +260 966 765 503  
Email: eresconverge@yahoo.co.uk

I.R.B. No. 00005948  
E.W.A. No. 00011697

4<sup>th</sup> September, 2014

**Ref. No. 2014-Aug-002**

The Principal Investigator  
Ms .Miriam Mapulanga  
P/B S 2,  
MAZABUKA.

Dear Ms. Mapulanga

**RE: EXPLORATION AND DETERMINATION OF PROCESSES FOLLOWED TO DIAGNOSE AND MANAGE STROKE PATIENTS IN ZAMBIA.**

Reference is made to your corrections dated 27<sup>th</sup> August, 2014. The IRB resolved to approve this study and your participation as principal investigator for a period of one year.

Review Type	Ordinary	Approval No. <b>2014-Aug-002</b>
Approval and Expiry Date	Approval Date: 4 <sup>th</sup> September, 2014	Expiry Date: 3 <sup>rd</sup> September, 2015
Protocol Version and Date	Nil	3 <sup>rd</sup> September, 2015
Information Sheet, Consent Forms and Dates	English	3 <sup>rd</sup> September, 2015
Consent form ID and Date	Version- Nil	3 <sup>rd</sup> September, 2015
Recruitment Materials	Nil	3 <sup>rd</sup> September, 2015
Other Study Documents	-	3 <sup>rd</sup> September, 2015
Number of participants approved for study	-	3 <sup>rd</sup> September, 2015

Where Research Ethics and Science Converge

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

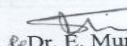
#### Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to the IRB within 5 working days.
- All recruitment materials must be approved by the IRB prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled "late submissions" and will incur a penalty.
- Every 6 (six) months a progress report form supplied by ERES IRB must be filled in and submitted to us.
- ERES Converge IRB does not "stamp" approval letters, consent forms or study documents unless requested for in writing. This is because the approval letter clearly indicates the documents approved by the IRB as well as other elements and conditions of approval.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of ERES Converge IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,  
**ERES CONVERGE IRB**

  
Dr. E. Munalula-Nkandu  
BSc (Hons), MSc, MA Bioethics, PgD R/Ethics, PhD  
**CHAIRPERSON**

  
**UNIVERSITY of the  
WESTERN CAPE**

## Appendix v-Administrative permission from Ministry of Health, Zambia

All Correspondence should be addressed to the  
Permanent Secretary  
Telephone: +260 211 253040/5  
Fax: +260 211 253344



REPUBLIC OF ZAMBIA  
**MINISTRY OF HEALTH**

In reply please quote:

MH/101/17/6  
No.....

NDEKE HOUSE  
P. O. BOX 30205  
LUSAKA

20<sup>th</sup> October, 2014

Ms Mirriam Mapulanga  
University of the Western Cape  
Private Bag X 17, Bellville 7535  
**SOUTH AFRICA.**

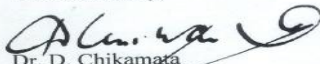
Dear Professor Mapulanga,

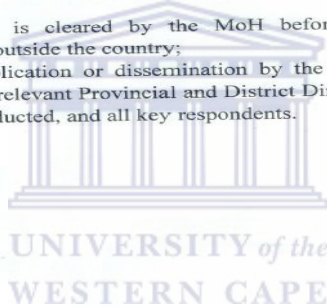
**Re: Request for Authority to Conduct Research**

The Ministry of Health is in receipt of your request for authority to conduct a study titled: **“Exploration and Determination of Procedures followed to Diagnose and Manage Stroke Patients in Zambia.”** I wish to inform you that following submission of your request to my Ministry, our review of the same and in view of the ethical clearance, my Ministry has granted you authority to carry out the above mentioned exercise on condition that:

1. The relevant Provincial and District Directors of Health where the study is being conducted are fully appraised;
2. Progress updates are provided to MoH quarterly from the date of commencement of the study;
3. The final study report is cleared by the MoH before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the MoH, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, and all key respondents.

Yours sincerely,

  
Dr. D. Chikamata  
Permanent Secretary  
**MINISTRY OF HEALTH**  
Cc: District Medical Officer



## Appendix vi- Information sheet for health workers



**UNIVERSITY OF THE WESTERN CAPE**

Private Bag X 17, Bellville 7535, South Africa

*Tel: +27 21-9592542, Fax: 27 21-9591217*

**E-mail: [nmlenzana@uwc.ac.za](mailto:nmlenzana@uwc.ac.za)**

### **INFORMATION SHEET FOR HEALTH WORKERS**

**Project Title:** *Exploration and determination of processes followed to diagnose and manage stroke patients in Zambia*

#### **What is this study about?**

This is a research project being conducted by *Miriam Mapulanga* at the University of the Western Cape. We are inviting you to participate in this research project because you are involved in the process of diagnosis and management of stroke patients at this hospital. The purpose of this research project is to explore and determine the processes followed to diagnose and manage stroke patients in Zambia.

#### **What will I be asked to do if I agree to participate?**

You will be interviewed individually about the procedures you follow when you are diagnosing and managing stroke patients in your hospital. You will be interviewed on your *process of diagnosis and management of stroke patients*. This will take about 20 minutes.

The sessions will be recorded on audiotape to make information collection effective. The two sessions will take place right at the hospital where you work.

#### **Would my participation in this study be kept confidential?**

We will do our best to keep your personal information confidential. To help protect your confidentiality, no names will be used during sessions but codes, and tape records will be stored in a locked filing cabinet. After transcribing the data, the tape records will be destroyed immediately. Transcribed data will be stored on the computer protected by a unique password in a password protected file. Only the researcher will have access to the information.

If we write a report or article about this research project, your identity will be protected to the maximum extent possible.

#### **What are the risks of this research?**

There are no known risks associated with participating in this research project.

**What are the benefits of this research?**

This research is not designed to help you personally, but the results may help the investigator learn more about the processes followed to diagnose and manage stroke patients in Zambia. We hope that, in the future, other people might benefit from this study through improved understanding of the procedures followed in the management of stroke patients in Zambia. The knowledge obtained from this study may help in the formulation of the Stroke management guidelines for Zambia.

**Do I have to be in this research and may I stop participating at any time?**

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

**What if I have questions?**

This research is being conducted by Miriam Mapulanga, Physiotherapy department, at the University of the Western Cape. If you have any questions about the research study itself, please contact Miriam Mapulanga at Private Bag X17, Bellville 7535, Cellphone 002609777477889/0027787701678, email- [mapulanga2002@yahoo.com](mailto:mapulanga2002@yahoo.com)

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

The Head of Physiotherapy Department

University of the Western Cape

Private Bag x 17

Bellville

7535

Phone-021-9592542

Email- [nmlenzana@uwc.ac.za](mailto:nmlenzana@uwc.ac.za)

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee in South Africa and the ERES Converge in Zambia



## Appendix vii- Informed Consent form for health workers

### UNIVERSITY OF THE WESTERN CAPE



Private Bag X 17, Bellville 7535, South Africa

*Tel: +27 21-9592542, Fax: 27 21-9591217*

**E-mail: [nmlenzana@uwc.ac.za](mailto:nmlenzana@uwc.ac.za)**

#### **Informed Consent**

I have had all the above information explained and I understood the explanation. I have offered to answer any of my questions concerning the procedures involved in this study and I have been given a copy of this form to keep.

#### **Audio taping**

To help protect your confidentiality, no names will be used during interviews but codes, and tape records will be stored in a locked filing cabinet.

This research project involves making *audiotapes* of you. The audiotapes are taken to make data collection effective. The audiotapes will be locked in a filing cabinet, and data will later be transcribed into verbatim after which the tapes will be destroyed immediately after transcription. Only the principal investigator will have access to data.

\_\_\_ I agree to be audio-taped during my participation in this study.

\_\_\_ I do not agree to be audio-taped during my participation in this study.

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Participants Name (Printed)

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Signature of Participant



Date

**Appendix viii- Consent form for health-workers**

**CONSENT FORM**

**UNIVERSITY OF THE WESTERN CAPE**



Private Bag X 17, Bellville 7535, South Africa

*Tel: +27 21-9592542, Fax: 27 21-9591217*

**E-mail: [nmlenzana@uwc.ac.za](mailto:nmlenzana@uwc.ac.za)**

UNIVERSITY of the  
WESTERN CAPE

**Title of Research Project: EXPLORATION AND DETERMINATION OF  
PROCESSES FOLLOWED TO DIAGNOSE AND MANAGE STROKE PATIENTS IN  
ZAMBIA**

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

**Participant's name.....**

**Participant's signature.....**

**Witness.....**

**Date.....**

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

**Dr Nondwe Mlenzana**

**University of the Western Cape**

**Private Bag X17, Belville 7535**

**Telephone: (021)959 2542, Cell: 27832261916**

**Fax: (021)959 1217**

**Email: [nmlenzana@uwc.ac.za](mailto:nmlenzana@uwc.ac.za)**



## Appendix ix- Professional status of health workers in the General Hospital

Health workers ID and their professional status

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HW 01a

Medical Officer at Chipata General Hospital. Has 13 years of experience in medicine. Current position is General Medical Officer at Chipata General Hospital. Trained in General Medicine and Surgery in the Democratic Republic of Congo and has worked in at Kitwe Central Hospital for three years and was posted to Chipata General Hospital two years ago.

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HW 01b

Medical Officer at Choma General Hospital. Has 6 years of experience in Medicine. Current position is Senior House Officer at Choma General Hospital. Trained in General Medicine and Surgery in Zambia, and has worked at the University Teaching Hospital for two years before was posted to Choma General Hospital two years ago.

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HW 01c

Medical Officer at Kabwe General Hospital. Has 7 years work experience in Medicine. Current position is Senior House Officer at Kabwe General Hospital. Trained in General Medicine and Surgery in Uganda, and has worked at Kenyatta Hospital for three years. Has been working for Kabwe General Hospital for four years.

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HW 01d

Medical Officer at Lewanika General Hospital. Has 9 years work experience in Medicine. Current position is General Medical Officer at Lewanika general Hospital. Trained in General Medicine and Surgery in Zambia, and has worked for Ndola Central for three years before the posting to Lewanika general Hospital.

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HW 01e

Medical Officer at Solwezi General Hospital. Has 15 years work experience in Medicine. Current position is General Medical Officer at Solwezi General Hospital. Trained in General Medicine and Surgery in the Democratic Republic of Congo, has worked for Kitwe central hospital and Chavuma District Health team for years before the posting to Solwezi General Hospital.

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HW 02a

Nurse at Chipata General Hospital. Has 11 years work experience in nursing practice. Current position is Nursing Sister in Charge of Male Medical Wing at the hospital. Trained at Livingstone School of Nursing, has worked at Katete Mission Hospital before current position.

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HW 02b

Nurse at Choma General Hospital. Has 15 years work experience in nursing practice. Current position is Enrolled Nurse in the male ward at the hospital. Trained in nursing at Monze School of Nursing, has worked for Mazabuka District Hospital for 10 years before the current position

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HW 02c

Nurse at Choma general Hospital. Has 25 years experience in nursing practice. Current position is Nursing sister in Charge of the male ward at Kabwe general Hospital. Trained at the Lusaka school of Nursing, has worked for Kabwe General Hospital for 25 years.

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HW 02d

Nurse at Lewanika General Hospital. Has more than two years work experience in nursing practice. After training at the Ndola School of Nursing, was posted straight to Lewanika General Hospital. Current position is Registered nurse at the Lewanika general Hospital.

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HW 02e

Nurse at Solwezi General Hospital. Has 18 years work experience in Nursing practice. Trained at Kitwe School of Nursing, was posted to Kitwe central hospital for 7 years. Has been working for Solwezi general Hospital for 11 years. Current position is Nursing sister in Charge of Male ward.

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HW 03a

Physiotherapy Technologist at Chipata general hospital. Has six years work experience in physiotherapy. Trained at Evelyn Hone College, posted to Chipata general Hospital. Current position is Physiotherapy Technologist at Chipata General Hospital.

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HW 03b

Physiotherapy Technologist at Choma General Hospital. Has four years work experience in physiotherapy. Trained at Evelyn Hone college, posted to Choma General Hospital. Current position is physiotherapy Technologist at Choma General Hospital.

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HW 03c

Physiotherapist at Kabwe General Hospital. Has six years work experience in physiotherapy. Trained at the University of Zambia, was posted to Kabwe General Hospital. Current position is Physiotherapist at Kabwe General hospital.

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HW 03d

Physiotherapist at Lewanika general Hospital. Has three years work experience in physiotherapy. Trained at the University of Zambia, was posted to Lewanika General Hospital. Current position is Physiotherapist at Lewanika General Hospital.

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HW 03e

Physiotherapy Technologist at Solwezi General Hospital. Has four years work experience in physiotherapy. Trained at Evelyn Hone College, was posted to Solwezi General hospital. Current position is Physiotherapy Technologist at Solwezi General Hospital.

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