Knowledge of stroke among hypertensive patients in selected hospitals in the Tanga Region, Tanzania

By

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ABSTRACT

Meeting the need for knowledge relating to the nature of stroke and risk factors for stroke is still a substantial challenge in the world. Lack of knowledge about stroke in general and specific knowledge of the risk factors, signs, and symptoms of stroke results in the late presentation of patients at hospital. The result is delay in prompt initiation of stroke management and non-compliance with follow-up rehabilitation. There is therefore a need to empower people to take control of their own health. In Tanzania it is likely that baseline knowledge about stroke is poor due to general lack of access to education and knowledge sources, such as newspaper, television and other literature. If the baseline knowledge of the causes and symptoms is established, appropriate education programmes targeted at lifestyle changes and prevention of stroke can be developed. In addition, those who do develop warning signs will be more likely to seek appropriate care as soon as possible. The aim of this study was to determine the knowledge of stroke among hypertensive patients in the Tanga region of Tanzania. To investigate this, a cross-sectional survey using a quantitative research design was used. The study was carried out in selected district hospitals in the Tanga region of Tanzania. A sample of convenient of 256 hypertensive patients was recruited and a self-administered questionnaire, with both closed and open-ended questions were used for data collection. Descriptive and inferential statistics analysis were carried out to ascertain frequencies and percentages, and to assess the influence of demographic characteristics on participants' knowledge of stroke. The Kruskal-Wallis test was used to identify the relationship between the overall knowledge of stroke and the socio-demographic

characteristics. The test was also used to compare knowledge scores for the groups defined by age and education as these variables had more than two levels. Pairwise comparison of the groups was done using Dunn's method to determine the relationship within the levels in a group. The Wilcoxon Rank sum test was used for the gender and occupation type of data as these variables have only two levels. The mean age of the sample was 50.77 years (SD. 14.454). Most of the participants were females (61.3%). The findings indicate that a large percentage of the participants (52.1%) define stroke as paralysis of the whole body and (19.4%) as due to local beliefs. Further the findings revealed that (47.7%) were not able to differentiate between stroke and heart attack. The overall level of knowledge of stroke among the participants which included their general knowledge of stroke, knowledge of the risk factors, signs, and symptoms of stroke was low (49.20%). The participant's age, education level and employment were found to be positively associated (p= 0.000) with participant's level of knowledge of stroke. These findings point to the need for the implementation of appropriate health education and health promotion programmes providing information about stroke in target populations. Therefore, health professionals will have to be more involved in not only treating the patients' symptoms, but also educating patients, caregivers as well as the general public on the consequences of stroke.

DECLARATION

I hereby declare that **Knowledge of stroke among hypertensive patients in selected hospitals in the Tanga region, Tanzania** is my own work, that it has not been submitted, or part of it, for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Signature: …….……

John Joseph Tesha

November 2006

Witness: …….

Anthea Rhoda

DEDICATION

To my mother Anna Laurent Comu and father Boniface Tesha who have always been there for me. Thank you so much for giving your love and support.

To my wife Elice Tesha for being so patient during the time that I have been away. You are wonderful and I am very proud of you. Thank you.

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ABBREVIATIONS

WHO World Health Organization.

NINDS National Institute of Neurological Disorders and Stroke.

SAS Statistical Analysis System

HBM Health Belief Model

SPSS Statistical Package for Social Scientist

HIV Human Immunodeficiency Virus

AIDS Acquired Immunodeficiency Syndrome

SSA Sub-Saharan Africa

ICF International Classification of Functioning, Disability and Health

USA United States of America

UWC University of the Western Cape

MOH Ministry of Health

DDH Designated District Hospital

CHAPTER ONE: INTRODUCTION

1.0 Background

Stroke is the third most common cause of death in the world after heart diseases and cancers (Cubrilo-Turek, 2004; Banerjee, & Das 2006). Annually, 15 million people worldwide suffer from a stroke. Out of these, 5 million attain optimal recovery, 5 million die, and 5 million suffer from a long lasting disability, placing a huge burden on families and communities (World Health Organization, 2004a). Walker, Rolfe, and Kelly et al. (2003), suggest that cases of fatality in those who develop a stroke are more in Sub-Saharan Africa than in developed countries. Sub-Saharan Africa is the term used to describe all those countries in the African continent that are not considered part of North Africa (Wikipedia, 2006c). These include central, West, South, and East African countries, including African Island nations (see map appendix A). Tanzania, a Sub-Saharan African country found in East Africa, faces challenges relating to the outcomes of stroke, similar to other Sub-Saharan countries (Walker, Mclarty, Kitange et al., 2000). According to the Ministry of Health of Tanzania (2001), the burden share of conditions requiring long-term rehabilitation, including cardiovascular disorders, cancer, and anemia, account for 25% of the disease burden. Out of these, cardiovascular disorders alone account for 11.9% (Mohr, Albers, Amarenco et al., 1997).

One of the main reasons for the rise in stroke as a cause of death is patients' lack of knowledge of the risk factors involved (Walker, Mclarty, Kitange et al., 2000). In addition,

there is lack of patient participation in the management of the disease. This participation demands motivation, knowledge, and compliance from the patient since it is a complex lifetime regime that needs to be followed. Patients who do not have knowledge of the risk factors of stroke are less likely to engage in stroke prevention practices like controlling their blood pressure and behavioural pattern change includes smoking cessation and following a low-salt diet (Schneider, Pancioli, Khoury et al. 2003; Samsa, Cohen, & Goldstein, 1997).

In Sub-Saharan African countries, there is extensive lack of knowledge pertaining to stroke within the population in general, and among the medical staff, especially on how to rehabilitate people affected by a stroke (Connor, 2004; Walker, Rolfe, Kelly et al., 2003; Walker, Mclarty, Masuki et al., 1999). In the Tanga region most of the people live in the village since they are heavily dependant on farming. A large proportion of them are poor local peasants and they are therefore not exposed to health educational campaigns happening in cities. Additionally most of these people firstly consult traditional healers who would not provide correct knowledge about stroke (Walker et al., 1999, 2003). Poor knowledge leads to low compliance in making use of prevention programmes, thus, patients are less likely to attend stroke management programmes (Walker et al., 1999; Wellwood, Denis, & Warlow, 1994).

In the Tanga Region of Tanzania where this study was sited, stroke patients often ask to be discharged from hospital as soon as they are hospitalized, even though they may not have had any form of physiotherapy management. This could be as a result of their lack of knowledge about stroke, in relation to medical and rehabilitative knowledge. A lack of knowledge about

stroke has also been found in studies conducted elsewhere (Pancioli, Broderick, Kothari et al., 1998; Hux, Rogers, & Mongar, 2000; Morgenstern, Smith, Steffen-Batey et al., 2001). Beckera, Fruina, Goodinga et al. (2001) in the USA and Seguraa, Vegab, Lópezc, Rubiod & Castilloe (2003) in Spain found that baseline knowledge about stroke among the public was poor. In these studies, the less educated and low-income residents were the least knowledgeable about stroke. Additionally Flaherty, Kleindorfer, & Kissela, 2004; Carroll, Hobart, Fox et al., 2004) in their studies, shows that public knowledge of stroke warning signs and risk factors is mostly limited especially in persons who are at greatest risk of stroke including the elderly.

Comparative study by (Bogoshi, Stewart, Hale, & Fritz, 2003) in South Africa among groups of patient with hypertensive, diabetic, and stroke revealed that knowledge of stroke risk factors amongst all groups was inadequate. A survey done by WHO (2005) in low and middle income countries on chronic diseases reported that public knowledge of the risk factors contributing to heart diseases, stroke, diabetes and cancer was limited.

Increased awareness and advocacy among policy makers, health-care providers, and the general public on the effect of stroke on society, health systems, individuals, and families is fundamental in improving the stroke prevention and management process. Advocacy and awareness are also essential for the development of sustainable and effective responses at the local, district, and national levels (Bonita, Mendis, Truelsen et al., 2004). Raised awareness through health education and health promotion, heavily relies on behaviour change, which means that people should adapt to behaviours or lifestyles that help them maintain an optimal

health status. Health education has been found to assist students in choosing behaviours that help them achieve a healthier lifestyle when these behaviours become consistent habits (Rozmus, Evans, Wysochansky, & Mixon, 2005). Therapeutic lifestyle changes such as smoking cessation, reduced alcohol intake, diet control, and physical activity, comprise the cornerstone of healthcare for patients who are at risk. Behaviour modification approaches have been founded to be useful in facilitating adherence to specific dietary regimens (Pi-Sunyer, 2006).

A study conducted by Tuomilehto, Lindstrom, Eriksson et al. (2001) revealed that changes in the lifestyles of both men and women at high risk of type 2 diabetes can prevent the onset of this disease. In their study, they observed that the overall incidence of diabetes was reduced by 58 percent among high risk subjects who underwent behaviour change. In another study, Glazebrook, Garrud, Avery et al. (2006) used multimedia health education to investigate the effect of different kinds of media in improving patients' knowledge and protective behaviours about malignant melanoma. In their study, the authors used animation, photographs, and simple texts to inform participants about the dangers caused by excessive sun exposure and how to protect the skin from the sun. They also included information on the characteristics of a skin at risk and early signs of melanoma**.** The intervention was associated with improvements in knowledge and protective behaviours at 6-month follow-up.

Therefore, to facilitate effective delivery, it is important that health care providers understand the level of knowledge amongst the recipients of health education programmes. Health care professionals in developing countries such as Tanzania could also implement health

education and health promotion programmes to improve the level of knowledge of stroke. In order for these programmes to be effective, the knowledge of stroke, especially in the target groups, need to be known. Thus the aim of this study was to determine the knowledge of stroke amongst hypertensive patients in the Tanga Region of Tanzania.

1.1 Motivation for the study

The researcher's clinical experience while working as a physiotherapist in Muheza District hospital motivated the initiation of this study. The researcher worked at the in-patient, as well as out-patient clinics, where a number of stroke patients are treated. As a clinical physiotherapist, the researcher encounters numerous barriers in connection with the rehabilitation of stroke patients. These include poor living conditions, disproportional distribution of health personnel in relation to the number of patients, which decreases the chance of educating the patients, poor infrastructures, local beliefs within the population, and long distances that patients need to travel to access health facilities. These barriers lead to patients relying on tradition healers, hence delay in early presentation to a hospital.

The researcher acknowledges the fact that it is very important for the patients to know the risk factors of stroke, failure to which they may not engage in prevention practices such as proper following of medication regimes, regular medical checkup, change of lifestyles including smoking cessation, stopping excessive alcohol intake, and avoiding sedentary life and poor diet. Further, the researcher recognizes that unless patients are made aware of the signs and symptoms of stroke, they will postpone early hospital presentation which decreases

recovery chances. These patients may also not willingly engage in post stroke rehabilitation programs.

The researcher was therefore motivated to embark on this study by the above realizations. The aim was to investigate the level of knowledge of stroke among patients as it will assist in the establishment of health education and health promotion programs, which in turn will raise the stroke awareness among the target society, and hence facilitate early hospital presentation and positive response to post stroke management and follow-up rehabilitation.

1.2 Statement of the problem

People suffering from hypertension are an eligible group of patients who are at risk of suffering from or experiencing a stroke. However, it is not known to what extent this group of patients in the Tanga region know about the consequence of hypertension in relation to stroke.

1.3 Study objectives:

The main objectives that guided this study were:

1. To determine the patients' general knowledge of stroke.
2. To determine the patients' knowledge of the risk factors of stroke.
3. To determine the patients' knowledge of the signs and symptoms of stroke.

4. To determine the relationship between socio-demographic factors and general knowledge of stroke, knowledge of risk factors, signs and symptoms of stroke.

1.4 Significance of the study:

The results of this study would provide information on the knowledge of stroke amongst hypertensive patients in Tanga region, Tanzania. This information could be used by health professionals to implement health prevention and promotion programmes relating to stroke and hypertension. Rehabilitation professionals could also use it to incorporate health education into their treatment regimes.

1.5 Definitions of terms

Activity limitations: are the difficulties that an individual may have in executing activities (WHO, 2001).

Brain damage or **brain injury:** The destruction or degeneration of brain cells (Wikipedia, 2005a).

Health education: Planned learning experience using a combination of methods such as demonstrations, dummies, pamphlets, and sketches as well as counseling and behavior modification techniques, which may influence patient's knowledge and health out-comes (Bartlett, 1985).

Health Promotion: It is the process of enabling people to increase control over, and to improve, their health status; to reach a state of complete physical, mental and social well-

being and not merely the absence of disease (WHO as cited in Coulson, Goldstein, & Ntuli, 2002).

Hypertension: High blood pressure, defined as a repeatedly elevated blood pressure-a systolic pressure above 140mmHg with a diastolic pressure above 90mmHg (Musella Foundation, 2005).

Impairments: are the problems in body function or structure such as significant deviation or loss (WHO, 2001).

Knowledge: is the capacity to acquire, retain and use information; a mixture of understanding, experience, reasoning and skills (Wikipedia, 2006b; Badran, 1995).

Paralysis: The complete loss of muscle function of one or more muscle groups or loss of motor function (movement) in a certain part of the body and can be flaccid, in which muscles are weak and have little or no tone; or spastic, in which the muscles are tight (Wikipedia, 2005b; Foster & Smith 2005).

Participation restrictions: are the problems that an individual may experience in his or her involvement in life situations (WHO, 2001).

Physiotherapy/physical therapy: is a dynamic profession with an established theoretical and scientific base and widespread clinical application in the restoration, maintenance, and promotion of optimal physical function (APTA, 2001).

Rehabilitation: The combined and coordinated use of medical, social, educational, and vocational measures used for training or re-training individuals disabled by disease or injury to the highest possible level of functional ability, social integration, better quality of life and self-actualisation, consistent with physiologic and environmental limitations (Connecticut Department of Public Health, 2000; WHO, 1980)

Stroke: According to WHO (1989), "is rapidly developing clinical sign of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading death, with no apparent cause other than vascular origin".

1.6 Outline of chapters

Chapter One has introduced the background of the present study. In this chapter, the risk and incidence of stroke has been introduced as prevalent worldwide. In Sub-Saharan Africa, there is little awareness on prevention, risk factors, symptoms, early management techniques and follow-up rehabilitation. Therefore, there is a need to create awareness of stroke and its management among the people of Sub-Saharan Africa, It is for this reason that the researcher, motivated by experience in handling stroke patients in Muheza hospital in Tanga area of Tanzania, a Sub-Saharan country, undertook to investigate the awareness of stroke patients' general knowledge of stroke, knowledge of the risk factors, signs and symptoms of stroke, as well as the relationship between socio-demographic factors and general knowledge of stroke.

Chapter Two reviews the literature relevant to the current study. The epidemiology of stroke is also illustrated, focusing on both developing and developed countries. The chapter also discloses stroke as a global health problem. Thereafter, the literature reviews the main issues relating to the prevention and aetiology of stroke. These include, the risk factors of stroke, the signs and symptoms of stroke, the knowledge of stroke, and the impact of stroke on an individual and the society in general, The chapter also reviews literature on the effect of health education and health promotion, under the framework of the health belief model, in

facilitating and improving knowledge about stroke prevention and control of the risk factors, with the aim of raising awareness about the threat of the disease.

Chapter Three describes the methodological issues relevant to this study. In this chapter, the research setting, the study design, the study population, and the survey instruments used in the data collection, are explained. Finally the statistical analysis and ethical considerations are also explained.

The results of this study are presented in Chapter Four in respect to the specific objectives of this study. The result includes the descriptive and inferential statistics. The descriptive statistics illustrate the participants' socio-demographic information and the participants' general knowledge of stroke, risk factors, signs of stroke, symptoms of stroke and the overall knowledge of stroke. The inferential statistics demonstrate the relationship between the participants' socio-demographic characteristics and knowledge of stroke.

Chapter Five compares and discusses the findings of the present study with other similar studies. In this chapter, the researcher also provides possible explanations for the findings.

Chapter Six provides the summary, conclusions, recommendations and limitations relating to the main findings from the present study. It is expected that the result of this study will develop an insight into the existing profile of health care providers working with stroke patients, as it will place an increasing emphasis on patient health education and disease prevention strategies.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter presents an overview of the literature on certain aspects of stroke. The chapter also discusses stroke as a health problem that affects the entire world population. Thereafter, the chapter explains the risk factors, signs and symptoms of stroke, and the consequences of disabilities due to stroke for the individual patients, the immediate family and the society at large. The importance of knowledge of stroke has also been explained in relation to effective early management and follow-up rehabilitation after stroke. The challenges of changing unhealthy behaviour, through health education and health promotion programmes under a framework of health belief model, have been explained in relation to other studies. However, due to paucity of literature relevant to Tanzania and Sub-Saharan Africa situation, the literature reviewed focuses mainly on studies in other countries.

2.1 Epidemiology of stroke

Stroke is a global health problem and is the third commonest cause of death after coronary heart disease and cancer of all types (Cubrilo-Turek, 2004; Banerjee, & Das 2006). It is a leading cause of adult long-term physical and mental disability and has potentially enormous emotional and socioeconomic results for patients, their families, and health services worldwide (Foulkes, Wolf, Price et al., 1988; Zorowitz, Gross, & Polinski, 2002; World Health Organization, 2003). The number of patients with stroke will increase in the future because of demographic changes, which include improving survival (aging), living

conditions, advanced economy, and improving technology (Perkin, 1997; Reddy & Yusuf, 1998; Struijs, Van Genugten, Evers et al., 2005). The WHO (2003) further reports that inadequate control of major risk factors for stroke as also a contributing factor to the rise in number of stroke patients. In the developed world, stroke is the second commonest cause of death for men and women after heart diseases (WHO, 2004b). The WHO (2004b) report estimates further suggest that by the year 2020, stroke will be the second leading cause of death worldwide and one of the five leading causes of disability.

Over the past two decades, the world has become increasingly aware that stroke is not restricted to the developed world, but the problem affects all people, regardless of whether they live in developed or developing countries (Lopez, Mathers, Ezzati et al., 2006; Pais, 2006). Stroke causes 5·5 million deaths and the loss of 49 million disability-adjusted life years worldwide each year (WHO 2004a). The study by Murray, & Lopez (1997) predicted that by 2020, India alone may account for 2.6 million deaths from cardiovascular diseases, compared to 2.3 million deaths which have been predicted in the developed world. People affected by stroke living in the low socioeconomic countries might experience more severe strokes and lower survival after stroke, due to late hospital presentation and incomplete treatment of hypertension (Van den Bos, Smith, Westert and Straten 2002; Weir, Gunkel, McDowall et al. 2005 and Cox, McKevitt, Rudd & Wolfe 2006). The WHO (1997, 2000) predicted that by 2020, stroke and other cardiovascular diseases will cause 34% of deaths in developing countries and it is expected to be the leading cause of loss of healthy life-years. Hence, stroke places a huge burden on society in terms of premature deaths, disability, and cost of care (Rothwell, 2001; Lemogoum, Degaute, & Bovet 2005). In spite of a similar

prevalence three decades ago, current stroke rates in developing countries are higher than in the developed countries (Pais, 2006).

In the developed countries stroke is the second commonest cause of death for men and women after heart disease (Cox, McKevitt, Rudd & Wolfe 2006). It accounts for the greatest number of hospital admissions related to neurological conditions (Bonita, Beaglehole & Asplund, 1994). Bruno (2004) and Cappuccio (1997) reported that in developed countries, the incidence of stroke is age-related and is generally more prevalent in the fifth and sixth decade of life, although 28% of strokes occur in persons younger than 65 years.

Stroke remains a leading cause of death and a major cause of long-term neurological disability in the United States (American Heart Association 2003). Bruno (2004) further reported that in the United States, stroke is the most common disorder comprising 50% of all patients admitted to hospital for neurological diseases. Lemogoum, Degaute & Bovet, (2005) also reported that stroke mortality is indeed almost twice as high in male and female African Americans as in whites in the United States.

The prevalence of stroke in European countries varies but is estimated to be between 100 and 200 new strokes per 100,000 inhabitants each year, representing a huge economic burden (European Stroke Initiative, 2003). Although stroke rate is declining in most of the Western and Northern European countries (Stegmayr, Vinogradova, Malyutina, et al. 2000), it has been reported that stroke mortality in Eastern European countries has been increasing over the last three decades, and the prevalence will further increase over the next 20 years due to

health care services being less well resourced, risk factors exposures, and socioeconomic and lifestyles behavioural influences (Sarti, Rastenyte, Cepaitis, & Tuomilehto. 2000; Massing, Rywik, Broda et al. 2005).

Stroke is emerging as a leading cause of preventable death and disability in adults in developing nations (Lemogoum, Degaute, & Bovet, 2005), although Poungvarin (1998), Feigin, Lawes, Bennett, and Anderson (2003), and Connor (2004) reported that the information relating to stroke is limited in many of the developing countries. Murray & Lopez (1996) and Cox, McKevitt, Rudd and Wolfe (2006) found that stroke in the developing world is assuming increasing importance with two-thirds of all stroke deaths happening in these countries. Also, Walker (2003) and Lemogoum, Degaute, & Bovet (2005) reported that in some of these countries, especially in Sub-Saharan Africa, stroke mortality and case fatality exceed those in the developed world. Feigin, Lawes, Bennett, & Anderson (2003) and Lemogoum, Degaute, & Bovet (2005) further reported that stroke also occurs at much earlier ages in Sub-Saharan Africa, resulting in a greater number of years of prospective life lost. Walker (2003) suggested that case fatality due to stroke is based almost entirely on in-hospital mortality figures, as those who die in their homes are less frequently or not reported at all. Compared to what has been found in developed world, stroke in developing countries mainly affects the middle age group ranging from 20 to 65 years including few individuals who survive to the age above 65 years (Walker et al., 2000). The main reason is likely to be lower life expectancy and rapidly changing lifestyles, mostly caused by differences in public health and access to health care, medicine, nutritional diet,

exercise, tobacco smoking, and excessive drug and alcohol use (Feigin, Lawes, Bennett, & Anderson, 2003).

In the context of this study, the Tanzanian society has not been spared from being affected by this condition. According to Walker et al. (2000), 20% to 40% of deaths relating to stroke in certain areas of Tanzania occur in hospital, although the mortality and prevalence of this disease is under- reported.

2.2 Risk factors of stroke

There are a number of risk factors, which are associated with stroke. Transient ischemic attack or prior stroke (TIA) (Schneider, Pancioli, Khoury et al., 2003), TIA is often a warning that a person is at risk for a serious and debilitating stroke. A patient who has had a stroke is five times more at risk of having another stroke (Harvey, 1998). The remaining factors are classified as non-modifiable and modifiable risk factors.

Non-modifiable risk factors include age, gender, family history of heart diseases and ethnicity (Wolf, D'Agustino, O'Ncal et al., 1992). Within the non-modifiable risk factors, age is the single most important and most powerful risk factor for stroke (Cubrilo-Turek, 2004). Cubrilo-Turek (2004) further reported that risk of stroke increases with age such that each 10 years after the age of 55 years, the stroke rate is more than doubled, both for men and women. Pais (2006) also reported age (over 55 years in men and 65 years in women) as one of the most important risk factors.

Modifiable risk factors include hypertension, heart disease such as myocardial infarction and valvular defects, cigarette smoking, consumption of large amounts of alcohol, sedentary lifestyle, diabetes mellitus, obesity and viral infections (Mohr, Albers, Amarenco et al., 1997).

Viral infections are emerging, in the neurologic literature, as a significant risk factor for stroke, especially in children and young adults (Grau, Buggle, Becher et al., 1998; Kirkham 1999). Viruses may cause stroke by inducing inflammatory changes in the walls of small intracranial arteries or through an indirect prothrombotic effect (Bell & Buchhalter, 2004; Mandrioli, Portolani, Cortelli & Sola, 2004; Pascale, Liesnard, Rodesch et al., 2004). However, stroke becomes more common in immunocompromised patients, particularly those with opportunistic central nervous system infections (Restrepo & McArthur, 2003; Cole, Pinto, Hebel et al, 2004**)**

Hypertension is the strongest risk factor compared to other modifiable risk factors especially in middle and late adult life in both males and females (Collins & McMahon, 1994). Hypertension is a blood pressure of 140/90mmHg or above, which is an addition of 10 mmHg or more above normal 120/80mmHg (Wikipedia, 2006a; Holm, Cunningham, Bensadoun & Madsen, 2006). Collins and McMahon (1994) further report that hypertension is present in approximately 70% of all cases of stroke. Barbara (2004) reported that the association between blood pressure and the risk of stroke has been shown to be constant, reliable, and independent of other risk factors. The report further indicated that as blood pressure increases, so does the possibility of stroke. For patients between 40 and 70 years

old, each increment of 20 mmHg in Systolic Blood Pressure, or 10 mmHg in Diastolic Blood Pressure, doubles the risk of stroke across the entire range from 115/75 mmHg to 185/115 mmHg (Barbara, 2004). Joffres, Ghadirian, Fodor et al. (1997) estimated that over one in five adult Canadians have high blood pressure, but only 16% of people have their hypertension well controlled. Several surveys have demonstrated very low prevalence of hypertension control (BP less than140/90 mmHg) in Africa (Matenga, 1997; Walker, Mclarty, Kitange et al., 2000; Cannor, Thorogood, Casserly et al., 2004; Ogun, Ojini, Ogungbo et al., 2005). A survey in Ghana on hypertension showed that out of 34% of patients who were hypertensive, only 18% were treated and 4% were controlled (Amoah, 2003). Steyn, Gaziano, Bradshaw et al. (2001), reporting on treatment status for South African black people with hypertension, indicated that 41% male and 67% female of the total patients were aware of their condition, 39% males and 55% females were treated, and only 26% males and 38% females were controlled. Joffres, Ghadirian, Fodor et al. (1997) concluded that controlling of blood pressure reduces the incidence of stroke.

Among the Tanzanian population, hypertension has been reported as the main risk factor for stroke (Swai, McLarty, Kitange et al., 1993; Walker, Mclarty, Kitange et al., 2000). The survey in urban and rural Tanzania reported that less than 20% of hypertensive patients were aware of their diagnosis, approximately 10% of them were treated, and less than 1% were controlled (Richard, Nigel, Ferdinand et al., 2000). Swai, McLarty, Kitange et al. (1993) reported that hypertension was found in 6.6% of men and 7.5% of women in the Kilimanjaro region, 3.3% and 4.7% in Morogoro, and 2.6% and 3.4% in the Mara region. A greater proportion of patients who were previously diagnosed with hypertension died from stroke in

the Hai District when compared to Dar es Salaam and Morogoro (Walker et al., 2000). These authors further reported that the high death rates resulting from stroke in Tanzania are due to untreated hypertension.

Following hypertension, diabetes and smoking are also rated as major risk factors of stroke. Diabetes has been associated with high risk for stroke and other cardiovascular diseases *(Gray, O'Connell & Lloyd 2001;* Cubrilo-Turek 2004 and Smith & Maynard 2004). It is a national health care concern both in developed and developing countries (Kuei-Yun, Pi-Li, Li-Chi et al., 2005). Most recently, hyperglycemia <6.9mmol/L or hypoglycemia >6.0mmol/L has been shown to be present in 47–68% of all acute stroke patients (Scott, Robinson, O'Connell et al., 1999). Overall, individuals with diabetes have a 2- to 3-fold increased risk of stroke and other cardiovascular diseases compared with individuals without diabetes (Goldberg, 2000; Hobbs, 2006). The number of adults with diabetes worldwide reached 171 million in 2000, and is expected to more than double by 2030 as a result of aging and change in lifestyle behaviour (Wild, Roglic, Green et al., 2004). The data for parts of Asia and Africa are of even more concern. It is estimated that by 2025, the number of adults with diabetes in these regions will rise by almost 200% (Goldberg, 2000). The author further reported that approximately 80% of all diabetes-associated mortalities and most hospitalizations can be accredited to stroke and other cardiovascular complications. Diabetes mellitus has also been shown to be associated with increased mortality and reduced functional outcome after stroke (Bonow & Gheorghiade, 2004).

Cigarette smoking is the most important public health problem. Smoking doubles the risk of stroke and increases both hemorrhagic and ischemic stroke risk and a wide variety of other health problems (National Stroke Association as cited in Lemogoum, Degaute, & Bovet, 2005; Stanton, Martin, & Henningfield, 2005). The number of smokers worldwide is currently estimated to be 1·3 billion, of which 82% are in developing countries (Thun & da Costa e Silva, 2003). Mackay & Ericksen (2002) reported that during the 20th century, 100 million individuals died worldwide as a result of tobacco-related diseases. Smoking is particularly strong and important when combined with other risks including hypertension and diabetes (Lemogoum, Degaute, & Bovet, 2005). The author further reported that the population attributable to smoking as risk of stroke is about 15% and they are a six-fold risk compared with non-smokers. There is an apparent relationship between the number of cigarettes smoked, and the risk of stroke (Lemogoum, Degaute, & Bovet 2005).

While tobacco use is decreasing in developed countries due to strong tobacco control programs, the opposite trend is observed in many developing countries (Mackay & Mensah, 2004). Current overall prevalence of tobacco smoking is 36% among men and 11% among women in Sub-Saharan Africa (Mackay & Eriksen, 2002). Among children, the Global Youth Tobacco Survey indicates that greater than 10% of 13- to 15-year-olds use tobacco in many Sub-Saharan African countries, and this prevalence can be as high as 33% in South Africa (Asma, Blanton, Eriksen et al., 2002).

Obesity is considered an epidemic health problem as populations adopt sedentary lifestyles and increase their caloric intake (Monteiro, Benicio, Conde, & Popkin, 2000; Seidell, 2000).

It is further reported as a major risk factor for many chronic diseases, including hypertension, type 2 diabetes mellitus, coronary heart disease, and stroke (Thompson, Edelsberg, Colditz et al., 1999). Obesity is usually defined as a Body Mass Index (BMI) of 30 kg/m^2 or higher while overweight is defined as a BMI between 25 and 29.9 kg/m^2 (Seidell & Flegal, 1997).

2.3 Signs and symptoms of stroke

There are number of signs and symptoms of stroke but the following are the major important signs and symptoms of stroke:

(i) Sudden numbness or weakness of the face, arm, or leg, especially on one side of the body;

(ii) Sudden confusion or trouble speaking or understanding speech;

(iii) Sudden trouble seeing in one or both eyes;

(iv) Sudden trouble walking, dizziness, or loss of balance or coordination; and

(v) Sudden severe headache with no known cause, unconsciousness, nausea, and vomiting (Greenlund, Neff, Zheng et al., 2003; Flaherty, Kleindorfer, & Kissela, 2004).

Greenlund, Neff, Zheng et al., 2003 further mentioned difficulty in swallowing and confusion as other symptoms of stroke.

2.4 Impact of stroke

Stroke patients present with a number of physical and psychological impairments, consistent with physiologic and environmental limitations. Majority of the people experiences serious

impairments in the early stages of stroke. These impairments include paralysis, sensory disturbances, language and speech difficulties, cognitive problems and emotional disturbances, that could improve significantly (Bergen & Silberberg, 2002; National Institute of Health, 2003; Bruno, 2004). The impairments affect the patient's social interactions, vocational life, as well as their activities of daily living. Teasall as cited in Rhoda & Hendry (2003) indicated that anxiety as a result of disability, difficulty in returning to work, family responsibilities, and dependence on others occur more often in younger stroke patients.

Approximately 10% of stroke survivors have no disability and are able to function independently. Another 10% are institutionalized because of severe disability and are unable to achieve functional independence in a home setting, regardless of intensive rehabilitation input. The remaining 80% have mild to moderately severe disability and could benefit from intensive rehabilitation (Reddy &Reddy 1997; Zorowitz, Gross & Polinski, 2002; Dogan, Nakipoglu, Aslan et al., 2004). Recovery is a continuous process, with stages sometimes overlapping, and complete recovery does not occur in all patients. Regardless of the exact cause, recovery depends on the size and location of the damaged area in the brain (Reddy & Reddy, 1997; Kistler & Stanford, 1999; National Institute of Health, 2003). The bigger the area and the more complex activities the area controls, the worse the condition will be.

2.5 International Classification of Functioning as a conceptual framework

The International Classification of Functioning (ICF), Disability, and Health have been designed to provide a common language and framework for describing health and health-

related states. The ICF is based on two parts, each part with two components (World Health Organization, 2001). Part one (the functional and disability) consists of components of body functions, structures as well as activities and participation. Part two (the contextual factors) comprises of environmental and personal factors. WHO (2001) further defined the two umbrella terms, functioning and disability. It defined functioning as all body functions, activities, and participations. Disability is defined as any alteration in function in terms of performance or capacity, which may lead to impairments, activity limitations, and participation restrictions. Stroke will not only leave the patient with disabilities which are restricted to those related to impairments of body structure and function, but also with problems that are defined by components of activity limitations and participation restrictions (Manns & Darrah, 2006)**.** Therefore they require assistance from family members or others to act as caregivers (WHO, 1989; Manns & Darrah 2006). The ICF model views the disability and function as the interaction between the person, their health conditions, and the environment (WHO, 2001). The ICF model further identifies how a health condition such as stroke, can interrelate with features of a person and the environment to produce the three levels of potential disablement; impairments, which occur at the level of body structures and functions, activity limitations, which occur at the level of performance of tasks or actions by the person, and participation restrictions, which occur at the level of persons in social situation (WHO, 2001).

2.6 Knowledge of stroke

Lack of knowledge about stroke and a lack of information from healthcare providers in UK about diagnosis, rehabilitation and prognosis of stroke are reported as the main causes of dissatisfaction and frustration amongst hospitalised stroke patients (Tyson & Turner, 1999). Inadequate recognition and reaction to symptoms by patients has been recognized as a limiting factor for delayed early presentation at hospital and immediate initiation of in-patient stroke management (Azzimond, Bassein, Fiorani et al., 1997; Derex, Adeleine, Nighoghossian et al., 2002; Yoon & Byles, 2002). Patients may react slowly because they interpret their symptoms incorrectly or fail to realize their urgency (Nolte, Rossnagel, Jungehuelsing et al., 2005). Further, knowledge about stroke is of major importance in patients at high risk of getting a stroke and thus should represent the target population for health promotion programmes (Nolte, Rossnagel, Jungehuelsing et al., 2005). However, a number of studies indicate that the majority of people, including those at higher risk, have poor knowledge of stroke risk factors, warning signs and appropriate response to warning signs (Pancioli, Broderick, Kothari et al., 1998; Hux, Rogers, & Mongar, 2000; Morgenstern, Smith, Steffen-Batey et al., 2001).

A study done in the USA by Beckera, Fruina, Goodinga et al. (2001) found that baseline knowledge about stroke among the public is poor and the knowledge deficit was greatest among Asian-Americans, men, the less educated and low-income residents. In a study done in Spain, Seguraa, Vegab, Lópezc, Rubiod & Castilloe (2003) confirmed that the community was still unfamiliar with stroke. Studies shows that public knowledge of stroke warning signs

and risk factors is limited, with persons at greatest risk of stroke including the elderly who have the least knowledge (Greenlund, Neff, Zheng et al., 2003; Flaherty, Kleindorfer, & Kissela, 2004; Carroll, Hobart, Fox et al., 2004).

In South Africa a comparative study comparing the knowledge of risk factors for stroke among hypertensive, diabetic, and stroke patients revealed that knowledge of stroke risk factors amongst all groups was inadequate (Bogoshi, Stewart, Hale, & Fritz, 2003). The low prevalence of awareness, treatment, and control of hypertension as the most reliable and influential predictor of stroke, poses a serious challenge for stroke prevention in Sub-Saharan Africa (Lemogoum Degaute, & Bovet, 2005). A survey done by WHO (2005) in low and middle income countries reported that public knowledge on chronic diseases, including heart diseases, stroke, diabetes and cancer and its risk factors, was limited. Other studies done in Tanzania and Gambia (Walker et al., 1999, 2003; WHO, 2005) reported that lack of knowledge about stroke and stroke risk factors leads to people, especially in rural areas, trying local herbs first instead of going to hospital immediately following a stroke.

2.7 Health promotion as a tool to educate the public about stroke

Since stroke outcomes can be improved by appropriate care (National Institute of Neurological Disorders and Stroke, 1995), knowledge is often a prerequisite to understanding the need for lifestyle change. Patient education includes interventions to inform patients and enhance their understanding of health conditions and their treatment, increase self-efficacy, and enabling them to participate in decisions about their care (Nilsson, Klasson, & Nyberg,

2001; Adamczyk, Flis, Zarzycka, & Rejszel, 2002). Health promotion is regarded as the most important strategy focusing on changes of both the environment and the individual to actively promote the health of the public (Chen, 2000). Health promotion campaigns to increase awareness among the general population and targeted messages to those at high-risk and their families may help to improve time to receive treatment for stroke sufferers. Effective and sustainable health promotion is about empowering people to gain control over the circumstances that affect their health and well-being (Ottawa Charter for Health Promotion, 2000; Provan, Nakama, Veazie et al., 2003). There is considerable evidence that health-promoting behaviors offer the potential for improving health status and quality of life as well as reducing the cost of health care (Heidrich, 1998; Beattie, Whitelaw, Mettler, & Turner 2003; Craig, Tom, & Glen 2005). Other studies reported that health-promoting lifestyle contributes to a positive quality of life because the individual who engages in a health-promoting lifestyle will remain healthy and functional without the burden of disease and disability (Walker, Volkan, Sechrist, & Pender, 1988; Green & Kreuter, 1991). Health promotion and disease prevention programmes have been reported to have implications that seek to influence decision-making processes affecting health-seeking behaviours (Jackson, Coombs, Wright et al., 2004).

Studies have reported that health promotion and support groups help people sustain health improvements, lower lifestyle-related health care costs, as well as lower utilization of hospital services (Erfurt, Foote, & Heirich, 1991; Gomel, Oldenburg, Simpson, & Owen, 1993; Goetzel, Jacobson, Aldana et al., 1998). A study conducted to evaluate the effectiveness of health promotion programs consisting of a main program provided over 4

days and a follow-up program provided over 1 year, was shown to be effective in improving obesity, high blood pressure, and other cardiovascular risk factors (Muto & Yamauchi, 2001).

Knowledge translation from health professionals to individuals or groups is an important tool in preventing and decreasing prevalence of disease. Knowledge translation tends to focus on health outcomes and changing behaviour. The Health Promotion framework incorporates the Health Belief Model (HBM) (Rosenstock, Strecher & Becker 1988; Janz & Becker 1984). The Health Belief Model fits the challenges of changing habitual unhealthy behaviour, such as being sedentary, smoking or heavy alcohol consumption. The Health Belief Model is a framework for motivating people to take positive health actions as it can be used to focus on primary as well as on secondary prevention (Fisher & Fisher. 1992). It addresses a person's awareness of the threat of a health problem and the accompanying evaluation of recommended behaviour for preventing or managing the problem. It is well recognized that knowledge alone does not necessarily imply adherence to prevention programmes or behaviour change (Rosenstock, Strecher & Becker 1988). However, patients need basic knowledge of disease management before they can begin to adhere to medical advice.

2.8 Literature summary

In this literature review, the author has explored the overview of the literature on certain aspects in stroke. The literature focuses on epidemiology of stroke, the impact of stroke as a cause of adult long-term physical, emotional, and mental disability to patients themselves

their families, and health services worldwide. The author also highlighted the risk factors, signs, and symptoms of stroke. The major risk factors of stroke, including hypertension, Diabetes, and smoking have been reviewed in details. The importance of having general knowledge about stroke, knowledge of the risk factors, signs and symptoms of stroke in relation to early presentation at hospital, and immediate initiation of stroke management, have also been reviewed in this chapter. More importantly, it has emerged that literature suggests that knowledge about the disease consequences facilitates the effective adherence to lifestyle behaviour change. Literature on health promotion and education on diseases of lifestyles as core programmes for changing unhealthy behaviour under a framework of health belief model has also been reviewed.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

In this chapter the method utilized in the study is described. The researcher explains in detail the research setting, research design, and the study population. The chapter also describes the pilot studies carried out to ensure the validity and reliability of the instrument. The chapter further describes the method of data analysis and ethical considerations in this study.

3.1 Research setting

The study was conducted in selected district hospitals in the Tanga Region, Tanzania. Tanzania is among the developing countries in Sub-Saharan Africa. The country is in the Eastern part of Africa and it is a result of a union in 1964 between Tanganyika and Zanzibar isles. The country is divided into 4 zones; the Eastern, the Northern, the Southern, and the Western zones. Each zone is composed of several administrative regions. Therefore, the country has a total of 26 administrative regions, 21 in the mainland and 5 in the Isles. Each Region is then divided into several districts creating a total of 130 districts (World Factbook, 2006; Tanzanian population census, 2002a). The latest house to house census carried out in 2002 estimates the country had a population of about 34,569,232 million people, of which 51% were female and the remaining 49% were males, with a population growth rate estimated at 1.83%. Of the total population of Tanzania, 36% are estimated to be below poverty datum line (Tanzanian population Census, 2002a).

Tanga Region, the focus of this study, has a total of seven districts, which are; Tanga, Muheza, Korogwe, Lushoto, Handeni, Kilindi, and Pangani (Tanzanian Population Census, 2002b). The region has six District Hospitals serving a population of approximately 1.8 million people (Tanzanian Population Census, 2002b). Most of the people in this region live in the villages since they are heavily dependant on agriculture. The fact that the largest population of Tanga relies on agriculture, a large proportion of them are poor local peasants.

Five among the six district hospitals in Tanga were selected for the present study. These are Muheza, Korogwe, Lushoto, Handeni and Pangani hospitals. Of these five, Muheza hospital is among 20 mission hospitals all over Tanzania which have been designated as District Hospitals (DDH) (Outline of Hospital Development, 2005). Although a DDH, Muheza hospital is operated as a private institution, although the government provides funding for recurrent costs, including salaries. The other hospitals have been decentralized and placed under the local Government (Semali & Minja, 2005). These hospitals accommodate both in-patients as well as out-patient clinics. The hospitals admit patients with different conditions including orthopedic conditions, acute stroke, malaria and other infectious diseases. Among the hospitals selected for this study, only Muheza hospital conducts Hypertensive clinic twice per week while other different out-patient clinics including, eye clinics, obstetric and gynecology (OG) and diabetes clinics are conducted once per week. The other remaining hospitals conduct a medical out-patient clinic on weekdays and attend to all medical cases including hypertension. Some of these hospitals also conduct eye and Obstetric and Gynecology clinics. The selection of the hospitals was based on two main criteria, namely,

number of patients attending per clinic and easy accessibility by road (See map, Appendix B).

3.2 Research design

A descriptive quantitative design using a cross-sectional survey was used to collect data in the present study. A quantitative design is regarded as an efficient way for investigating health issues in the communities as well as the best method for collecting large amounts of information in social and health research (Katzenellenbogen, 1997; Aljeesh, 2003). Mouton (2001) further adds that it is probably the best design in collecting original data for describing a population too large to observe directly. The research design was therefore appropriate for this study, as it was able to collect information relating to the knowledge of stroke amongst hypertensive clients in the Tanga Region.

3.3 Study population

The study population comprised of all adult hypertensive patients aged 25 years and above attending the selected hospitals' out-patients clinics for follow-up treatment. In the selected hospitals hypertensive patient attendances differ from hospital to hospital. A total of approximately 90-100 patients attend the hypertensive clinic weekly at Muheza hospital alone. This hospital conducts the clinic twice per week. Korogwe hospital has a total attendance of approximately 30-40 patients attending medical clinic per week. The remaining three hospitals see approximately 20-30 patients per week. A minimum total of 140 patients with hypertension were seen per week by all the hospitals. Within a period of six weeks, a

total of approximately 840 patients were seen. A total sample of 250 participants from the selected district hospitals was predetermined. This sample size was determined based on an estimated total population of 2500 of people attending the hospitals per week, and assuming a hypertension prevalence of at least 20% and accepting a margin error of about 5% with a 95% confidence level. Hence the needed sample size was calculated to be approximately 248. According to De Vos (2001) this sample will be large enough to reflect on the population from which it drawn.

3.4 Sampling method

A convenience sampling technique was used in the present study. In this method the sample is chosen purely on the basis of availability. It consists of taking all cases at hand until the sample reaches the desired size (Struwing & Stead, 2004). This sampling technique was chosen because it was appropriate for the researcher in terms of time and available funds (Burns, 2000; Bless & Smith, 2000). All diagnosed hypertensive patients attending the hypertensive or medical clinic the day the researcher visited the hospital to collect data were invited to participate in the study. The participants were recruited from the different clinics at the hospitals until the sample size of 256 subjects was obtained.

3.5 Inclusion criteria

The inclusion criteria were both male and female patients above the age of 25 years with a known diagnosis of hypertension and who voluntarily accepted to participate in the study. Patients with combination of diseases such as hypertension and diabetes were also included.

3.6 Exclusion criteria

Patients with induced hypertension, for example hypertension due to pregnancy, were excluded. Hypertensive patients with cognitive impairments and those who needed to be admitted as they were medically unstable were also excluded from the study.

3.7 Instrument

A structured self-administered questionnaire with both closed and open ended questions was used for data collection. This questionnaire was adapted from the questionnaires used by Wellwood, Denis & Warlow (1994); Yoon, Heller, Levi et al (2001a) and Bogoshi, Stewart, Hale & Fritz (2003), which assess knowledge and perception of stroke as well as knowledge of stroke risk factors. In these questionnaires, the sections which assess the demographic characteristics and the knowledge of stroke were adapted and combined to develop the questionnaire used in the present study. The developed questionnaire was divided into sections A and B. Section (A) targeted participants' socio-demographic characteristics including district of residence, age, gender, marital status, education, employment, and transport status. Part (B) focused on knowledge of stroke (see appendix C). The knowledge section was divided into sub-sections 1-4. Section (1) solicitated information on general knowledge of stroke, which included knowledge of the definition of stroke, the organ in which strokes do occur, knowledge of the causes, and how preventable stroke could be. Section (2) focused on knowledge of risk factors of stroke, section (3) on knowledge of signs of stroke while section (4) dealt with knowledge of the symptoms of stroke. (see appendix D).

3.8 Calculating level of knowledge

The questionnaire was scored to establish the level of knowledge of the participants relating to their general knowledge, knowledge of the risk factors, knowledge of the signs, and knowledge of the symptoms of stroke. Before scoring, the "No" and "Not sure" responses were combined and scored as "No" (Yoon, Heller, Levi et al 2001a). The different sections which measure the general knowledge of stroke, knowledge of the risk factors of stroke, knowledge of the signs of stroke, and knowledge of the symptoms of stroke were then scored independently according to the accuracy of the response (See appendix E). A correct response was either scored, 3, 2, 1 depending on the "accuracy" of the response; a more accurate response was given a higher score, while an incorrect response was scored 0 (Madsen, personal communication, June 17, 2006). Questions from different sections of the questionnaire was then scored to determine a most correct response (3 points), an acceptable response (2 points), trial response (1 point) and an incorrect response which catered for questions not answered (0 points). The scores were then grouped to get a total score in each section. Section one scored a total of 19 points, section two a total of 41 points, section three a total of 18 points and section four a total of 31 points. The level of knowledge was classified according to high, moderate, and low for overall knowledge and in each knowledge section. A score of $\geq$ 75% were classified as "high", from 74% to 50% classified as "moderate", and a score <50% was classified as "low" (Madsen, personal communication, June 17, 2006).

3.9 Validity of the Instrument

The modified instrument was given to 3 health professionals "experts" with experience in the field to ensure face and content validity. They concluded that the instrument was appropriately addressing all of the study objectives. Further inputs were given by the statistician who advised the researcher to divide the questionnaire into different sections so that it can easily meet the objectives. He further advised against putting the age into categories as it would limit utility of other important information including the minimum and the maximum age of participants. Due to the combined form of the questionnaire from two different questionnaires, the instrument was tested by using a small scale feasibility study (pilot study) using 10 (ten) hypertensive patients who were randomly selected from a hypertensive clinic. The aim was for determining the comprehensibility of the questionnaire and to determine how long it will take to complete the questionnaire. The researcher explained to the participants that they were required to answer all questions. They took an average of seven minutes to complete the questionnaire. The pilot study confirmed that the instrument was well understood by the participants.

3.10 Reliability of the research instrument

Reliability is the consistency of an instrument to provide a similar result from the same population when administered at different times (Currier, 1984). The same patients used in the pilot study were informed that they were to complete the same questionnaire after one week, which was done for re-testing purpose.

The two sets of data were first entered using excel soft-ware program under different codes and cleaned. Thereafter the file was transferred to the Statistical Package for Social Sciences (SPSS) Microsoft software in order to establish the correlation of the two sets of data. The Cronbach's Apha coefficient and Kappa statistics Scale test were used for reliability testing of the instrument. Cronbach's Alpha is used to measure the internal consistency of an instrument (Bland & Altman, 2002; Garson, 2006). Garson (2006) states that Cronbach's Apha measures the extent to which responses obtained on an item at the same time correlate with each other. Kappa is used to measure the level of agreements between two or more raters, or two trials (Becker, 1999; Dawson & Trapp, 2001). Dawson & Trapp (2001) explain that for the Kappa to be calculated, the observation must be "yes" or "no" and be a "nominal" measure.

The questions were grouped into six sections but the Cronbach's Apha was not calculated for the first section which was for demographic information. The reason was that the researcher expected no difference between trials on this section. The Cronbach's Apha was then calculated separately on the remaining five sections and the results were as follows: The Cronbach's Apha coefficient of 0.612 was obtained for the 2nd section. The third section gave a Cronbach's Apha coefficient of 0.854. The Cronbach's Apha of 0.751 was obtained for the 4th section. In the fifth sections a Cronbach's Apha of 0.678 was obtained and the Cronbach's Apha of 0.881 was obtained in the last section. In general the average Cronbach's Apha of 0.7552 was obtained which indicate that the tool was reliable, considering that 0.70 or higher is the cut-off value for a tool being acceptable in social sciences studies (Dawson & Trapp, 2001; Santos, 1999).

Kappa Statistic was also calculated on questions which had “yes”, “no” or “not sure” responses and a “nominal” measure. The agreements were not computed for four questions (8.51%) out of 47 because the variable values were not symmetrical. Five questions (10.64%) questions showed no agreement. Among 38 questions which showed a level of agreement, 27 (57.446%) had an acceptable agreement which was above 0.5 and only 11 (23.4%) showed a low agreement. According to Dawson & Trapp (2001) these findings indicate that there was an acceptable level of agreement between the two trials.

3.11 Translation of the questionnaire

The questionnaire was translated from English to Kiswahili (Appendix F), the national language in Tanzania by an official translator working in linguistic department at the University of Dar es salaam. Two health professional “experts” in the field who understood both languages well translated the same questionnaire from Kiswahili version back to English. The original English questionnaire and the back-translated version were compared and found to be similar. This means that nothing was lost in the process of translation. The two had the same content and meaning.

3.12 Study procedure

A letter requesting for permission from the ministry of health in Tanzania directed to Muheza Designated District Hospital (Appendix G), together with a copy of the research proposal, were given to the Medical Superintendent hospital to seek for permission to carryout the

research. The Medical Superintendent endorsed the permission verbally. Since the principal researcher is an employee of the same hospital, the Medical Superintendent also wrote a letter to the Medical Superintendents of the other four selected districts hospitals to introduce the researcher and to request for permission for data collection (Appendix H). Then a letter of introduction and a copy of the research proposal were also given to all of the four Medical Superintendents of the hospitals. All the officers endorsed the research exercise on the introduction letter (Appendix I, J, K, and L).

Before data collection commenced, the principal researcher held a meeting with four research assistants in order to train them on how to administer the questionnaire. The four research assistants were only used in Muheza hospital because of the large number of patients attending the hypertensive clinic. In the other four hospitals, only two research assistants were used since the number of hypertensive patients in the general medical clinic of those hospitals were less, compare to hypertensive clinic in Muheza hospital. All the four research assistants were qualified medical personnel, two were nurses and the remaining two were experienced assistant nurses. During the data collection exercise, the doctor in charge of the clinic introduced the principal researcher to each hypertensive patient individually as soon as they completed discussing the medical issues. Then the principal researcher took the patients from the doctor's office to a nearby office for a short conversation concerning the study. The conversation included the explanation of the study purpose and requesting the patient to participate in the study. Those who accepted were asked to sign a consent form (Appendix M, O), but the majority of them provided verbal informed consent due to the cultural respect of health professionals prevalent in the area. Thereafter, the researcher accompanied the

patients to a designated office and introduced the patients to one of the research assistant. The patient was then given the questionnaire to complete. Those patients who were not able to read and write were assisted by the research assistant or the principal researcher to complete the questionnaire. The questionnaires were collected immediately after completion.

3.13 Data analysis

3.13.1 Methods used in data analysis

The data was captured using the Microsoft Excel Package. In analyzing the data, both the descriptive and inferential statistics analysis was carried out. The SPSS version 13 and the Statistical Analysis System (SAS) version 9.1 were employed in the analysis.

3.13.1.1 Descriptive statistical analysis

In descriptive analysis, the Microsoft Excel Package and SPSS were used. All responses pertaining to variables were first classified as either nominal, ordinal or scale data categories. The categories were then transformed into numerical codes and entered into the Microsoft Excel Sheets and then the file was exported to SPSS. Although most of the descriptive statistics were carried out within the SPSS programme, both packages (Microsoft Excel and SPSS) were used to ascertain the frequencies in order to construct tables and figures.

3.13.1.2Inferential statistic analysis

In view of the non-normality of the distribution of the variables after running a frequency distribution curve, the nonparametric tests were used to compare knowledge scores and the socio-demographic characteristics. In the SPSS Software, Kruskal-Wallis test was used to identify the relationship between the overall knowledge of stroke (see *Table 9*) and the socio-demographic characteristics. The Kruskal-Wallis test was also used to determine the relationship between the knowledge of stroke sections separately and the socio-demographic characteristics. The knowledge of stroke sections included general knowledge, knowledge of the risk factors, and knowledge of the signs and symptoms of stroke (see appendix D). Then, SAS was used to establish the relationship between and within the knowledge of stroke sections and the socio-demographic groups. In the SAS Software, nonparametric tests (Kruskal-Wallis test) were used to compare knowledge scores for the groups defined by age and education as these variables had more than two levels. Then the Pairwise comparison of the groups was done using Dunn's method as a follow-up to the Kruskal-Wallis tests to determine the relationship within the levels in a group. Pairwise comparisons are only relevant when there are three or more levels in a group. The Wilcoxon Rank sum tests were used for the gender and occupation type of data as these variables have only two levels. In view of the large number of tests done, results were considered significant only if the p-value was less than 0.01. P-values between 0.01 and 0.05 might be considered to be of marginal significance (Madsen, personal communication, June 17, 2006).

3.14 Ethical considerations

Permission to conduct the research was obtained from the Research and Higher Degrees and the Senate committees of the University of the Western Cape (UWC) (Appendix N) as well as the Ministry of Health (MOH) in Tanzania (Appendix G), prior to conducting the study. Because the principal researcher is an employee of Muheza DDH, the Medical Superintendent of Muheza introduced the researcher to the other four selected district hospital (Appendix H) superintendents and permission was granted by the management of the hospitals (Appendix I, J, K, L). The study participants engaged through informed consent and they were requested to participate voluntarily (Appendix M, O). The purpose of the study was explained to the participants and they were told of the right to withdraw from the study at any point they so wished. Confidentiality of information was maintained and anonymity was ensured.

CHAPTER FOUR: RESULTS

4.0 Introduction

This chapter presents the results of the study. The researcher starts by describing the overall study population according to the Districts of the Tanga Region in relation to the hospitals involved in the present study. The chapter then continues to describe the socio-demographic characteristics of the participants. The variables described include age, gender, marital status, level of education, number of children in the household, employment status and availability and cost of transport. The participants' knowledge of stroke is presented under sub- sections; the general knowledge of stroke, the knowledge of risk factors of stroke and the knowledge of signs and symptoms of stroke. Finally the relationship between socio-demographic factors and knowledge of stroke is presented.

4.1 Participants' residence in relation to hospital attended

A total of 256 participants were conveniently recruited to participate in the present study survey. *Table 1* illustrates the participants' district of residence and the number of participants who attended the different hospitals. The survey included participants from six out of seven Districts of the Tanga region. The majority of participants were from Muheza District (N = 92, 35.9%). The smallest group (N = 7, 2.7%) of participants were from Tanga District. The Muheza district hospital also had the largest number of participants attending the hypertensive clinics (N = 132, 51.6%).

Table 1: Participants' residence in relation to hospital attended

District of residence	Frequency N (%)	District Hospital attended	Frequency N (%)
Muheza	92 (36.0)	Muheza	132 (51.6)
Korogwe	45 (17.6)	Korogwe	41 (16.6)
Lushoto	31 (12.1)	Lushoto	24 (9.4)
Handeni	41 (16.0)	Handeni	27 (10.5)
Pangani	40 (15.6)	Pangani	32 (12.5)
Tanga	7 (2.7)		
Total	**256 (100)**		**256 (100)**

4.2 Socio-demographic characteristics of the participants

Table 2 presents a summary of the socio-demographic characteristics of the participants. The results indicate that the study sample consisted of more females (N = 157, 61.3%) than males (N = 99, 38.7%). The mean age of the participants was 50.77 years (SD. 14.454), with ages from 25-90 years. The majority of the respondents were in the age category between 35-44 years (N = 84, 32.8%). A large number of participants were married (N = 164, 64.1%). Approximately 41% of the participants had a primary school level of education (N = 104, 40.6%). The study also showed that out of 256 participants only 82 (32.0%) were employed.

Table 2: Socio-demographic characteristics of the participants

Variable measured	Frequency N (%)
Participants gender	
Male	99 (38.7)
Female	157 (61.3)
Age (years)	
25-34	26 (10.2)
35-44	84 (32.8)
45-54	49 (19.1)
55-64	46 (18.0)
65-74	28 (10.9)
75-84	21 (8.2)
85 and above	2 (0.8)
Marital status	
Married	164 (64.1)
Never married	14 (5.5)
Separated	20 (7.8)
Divorced	17 (6.6)
Widowed	41 (16.6)
Level of education	
Never attend school	59 (23.0)
Primary school	104 (40.6)
Vocation school	19 (7.4)
Secondary school	27 (10.5)
College	47 (18.5)
Employment status	
Employed	82 (32.0)
Not employed	174 (68.0)

4.3 Participants' general knowledge of stroke

Table 3 illustrates the participants' general knowledge of stroke and their knowledge of the definition of stroke. The results revealed that 215 (84%) of participants have heard about stroke. Further, 113 (52.1%) define stroke as paralysis of the whole body, followed by those who define stroke as due to local beliefs (N = 42, 19.4%). The responses, e.g. bewitched, curse, seen or meeting with a ghost especially during the night etc, to the open-ended question twelve (see appendix C) were grouped and named as local beliefs. More than 60% indicated that stroke occurs in the brain (N = 156, 60.9%). Approximately 48% of the participants responded that stroke is the same as heart attack (N = 122, 47.7%). There was a large number of participants who were not sure of what exactly are the causes of stroke (N = 104, 40.6%). For the question on how preventable stroke is, the majority of the respondents were not sure if stroke can be prevented (N = 75, 29.3%).

Table 3: Knowledge of definition and general knowledge of stroke

Variable measured	Frequency N (%)
What is stroke?	
Blood vessels disease	18 (8.3)
Paralysis of one side of the body	40 (18.4)
Paralysis of the whole body	113 (52.1)
Arm, leg and facial paralysis	1 (0.5)
Beliefs	42 (19.4)
Problems due to high blood pressure	1 (0.5)
Heart disease	1 (0.5)
Brain damage	1 (0.5)
Does stroke occur in the brain?	
Yes	156 (60.9)
No	31 (12.1)
Not sure	69 (27.0)
Other organ	
Body paralysis	2 (5.3)
Arm, leg and mouth	25 (65.5)
Arm and mouth	10 (26.3)
Nerves	1 (0.4)
Does stroke occur in the heart?	
Yes	142 (55.5)
No	39 (15.2)
Not sure	75 (29.3)
Is a stroke the same as heart attack?	
Yes	122 (47.7)
No	40 (15.6)
Not sure	94 (36.7)
Which of the following best describe how preventable stroke is?	
Not preventable at all	47 (18.4)
Slightly preventable	27 (10.5)
Moderately preventable	72 (28.1)
Totally preventable	35 (13.7)
Not sure	75 (29.3)

4.4 Participants' knowledge of the risk factors of stroke

Figure 1 presents the participants' response on questions asking about the risk factors of stroke.

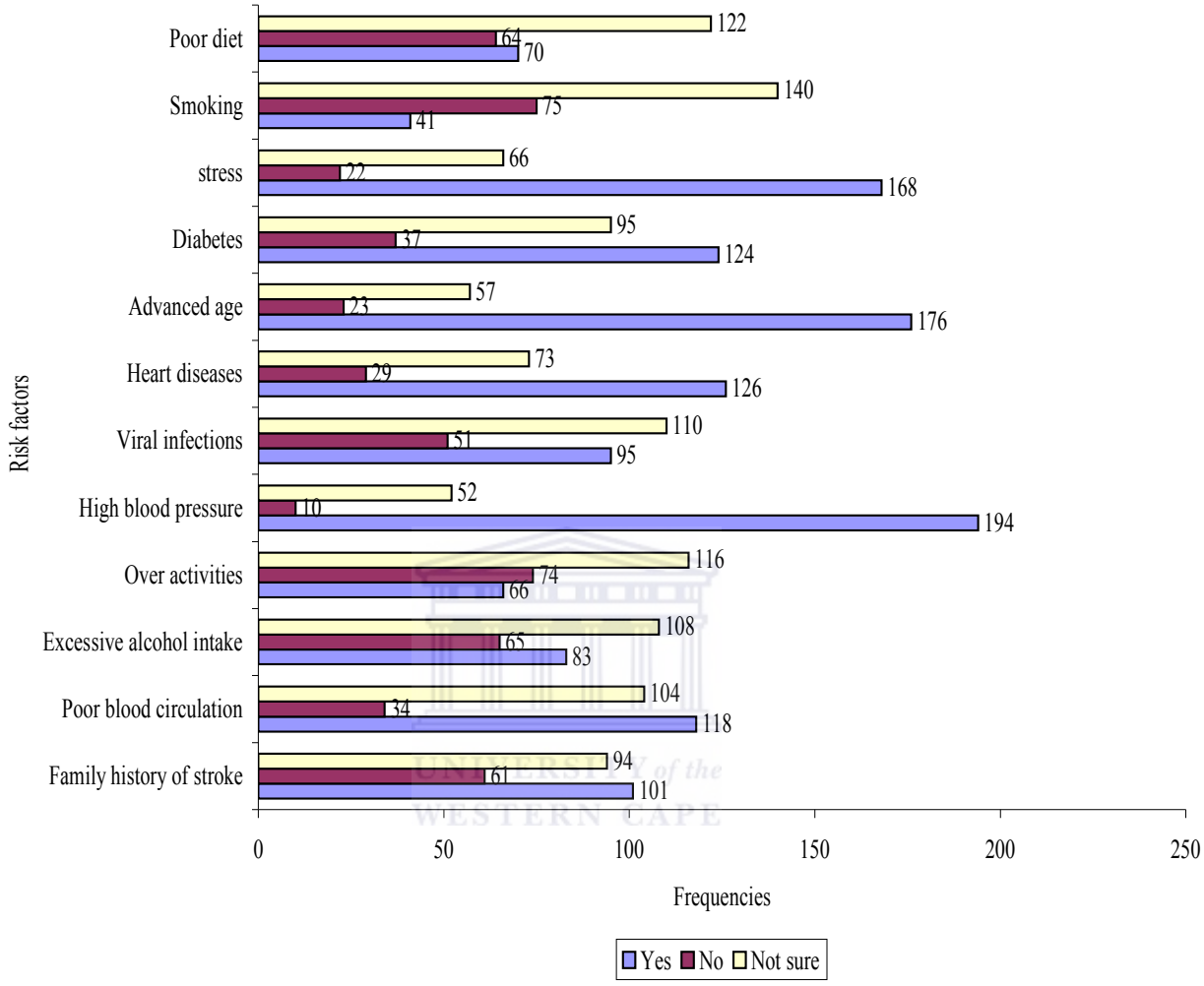

Figure 1: Risk factors for stroke

High blood pressure was the most recognized risk factor of stroke with 194 (75.8%) of the participants identifying it, followed by advanced age (n = 176, 68.8%), stress (n = 168,

65.6%) and heart diseases (n = 162, 63.3%). "Yes" responses on the other risks were below 50%. The participants also mentioned overweight and beliefs as other risk factors of stroke.

4.5 Participants' knowledge of the signs of stroke

Figure 2 presents the participants' responses on their knowledge of the signs of stroke.

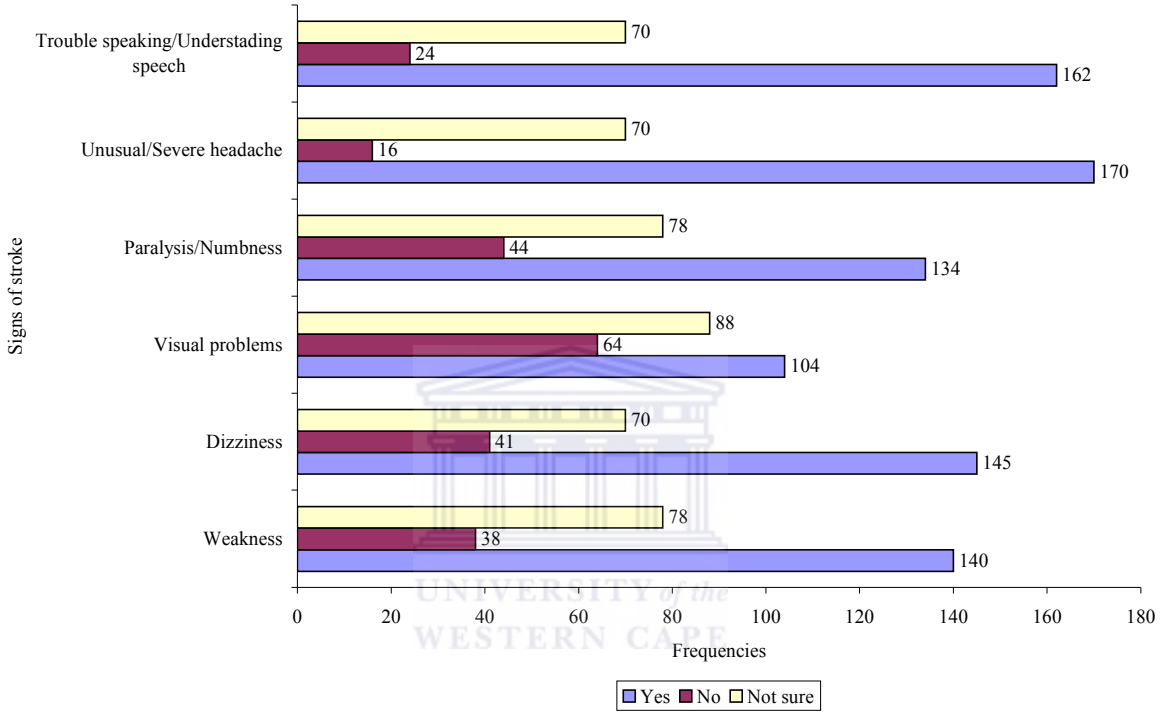

Figure 2: Signs of stroke

Overall, the "yes" responses were above 50% for all indicated signs of stroke, except visual problems (n = 104, 40.6%). The specific responses, from highest to lowest were; unusual/severe headache 66.4% (n = 170), trouble speaking or understanding speech 63.3% (n = 162), dizziness 56%, weakness 54%, and paralysis or numbness 52.3%. This clearly shows that the most recognised signs of stoke were unusual/severe headache and trouble

speaking or understanding speech. Loss of memory, tiredness, high fever, high blood pressure, and confusion were mentioned by participants as the other signs of stroke.

4.6 Participants' knowledge of the symptoms of stroke

Figure 3 illustrates the participants' responses on knowledge of the symptoms of stroke.

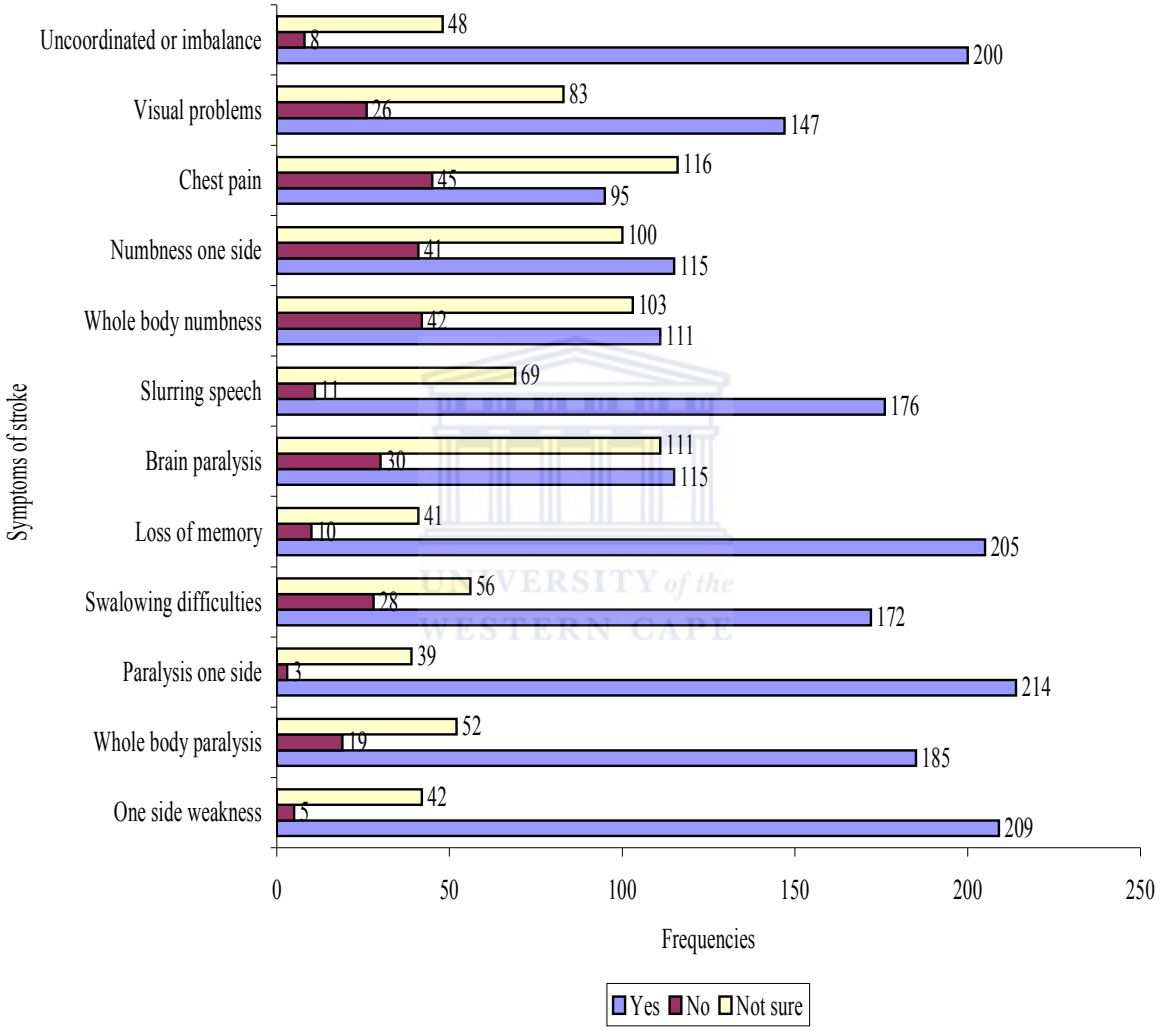

Figure 3: Knowledge of the symptoms of stroke

The most recognized symptoms of stroke were; paralysis of one side of the body (n = 214, 83.6%), weakness in one side of the body (n = 209, 81.6%) and loss of memory (n = 205, 80.2%). The participants also responded “yes” to the decoy symptoms of paralysis of the whole body (n = 185, 72.3%), brain paralysis (n = 115, 44.9%) and numbness, tingling sensation all over the body (n = 111, 43.4%). The decoy symptoms were included to assess and account for the possibility that persons would answer "yes" to all items in a series of closed-ended questions. Some of the participants also mentioned urine incontinence, body tiredness, mouth deviation and spastic joints as other symptoms of stroke.

4.7 The participants’ overall level of knowledge of stroke

The participants knowledge of stroke was assessed as indicated in the scored questionnaire (see appendix E). The scores were ranked into “high”, “moderate” and “low” levels of knowledge. *Table 4* and *Figure 4* illustrate the participants’ scores and percentages on this variable. The participants scored “low” in all of the different sections assessed as follows: general knowledge of stroke (N = 203, 79.3%), knowledge of the risk factors of stroke (N = 127, 49.6%), knowledge of signs and symptoms N = 111, (43.4%) and N = 108, (42.2%) respectively. The overall average of level of knowledge of stroke shows that out of all the 256 participants, 49.2% scored low. The overall scored percent was calculated by adding the scores in all of the knowledge sections to get a grand total, then the grand total was divided by 109 (maximum possible score) (see appendix E) to get percentages. Thereafter, the percentages were categorized into low, moderate and high scores.

Table 4: Participants' scores on overall knowledge of stroke

Variable measured	Frequency N (%)
General questions about knowledge of stroke	
high	2 (0.8)
moderate	51 (19.9)
low	203 (79.3)
Knowledge of risk factors of stroke	
high	47 (18.4)
moderate	82 (32.0)
low	127 (49.6)
Knowledge of signs of stroke	
high	70 (27.3)
moderate	75 (29.3)
low	111 (43.4)
Knowledge of symptoms of stroke	
high	75 (29.3)
moderate	73 (28.5)
low	108 (42.2)

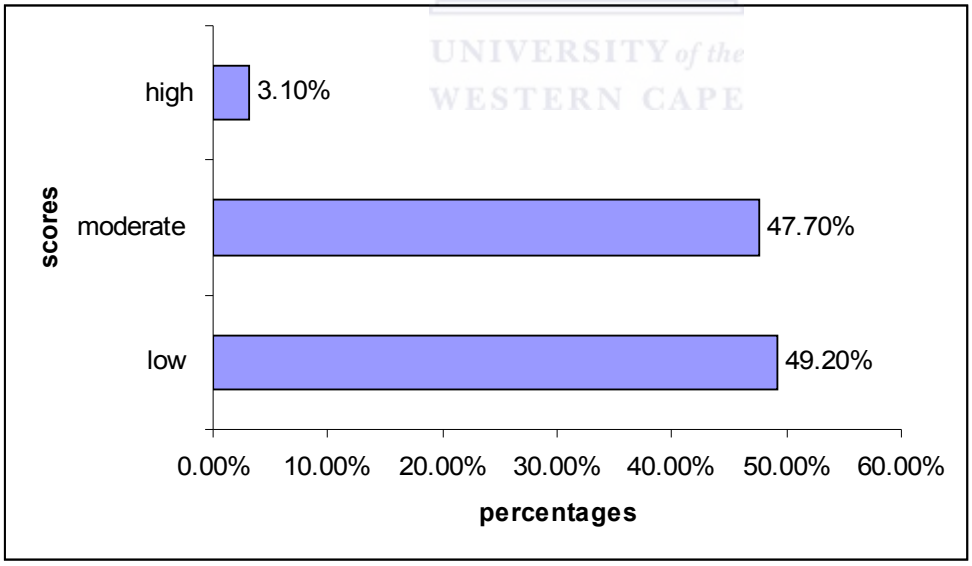

Figure 4: Overall score on knowledge of stroke

4.8 Participants' sources of knowledge of stroke

Figure 5 illustrates the sources of information where the participants received knowledge of stroke.

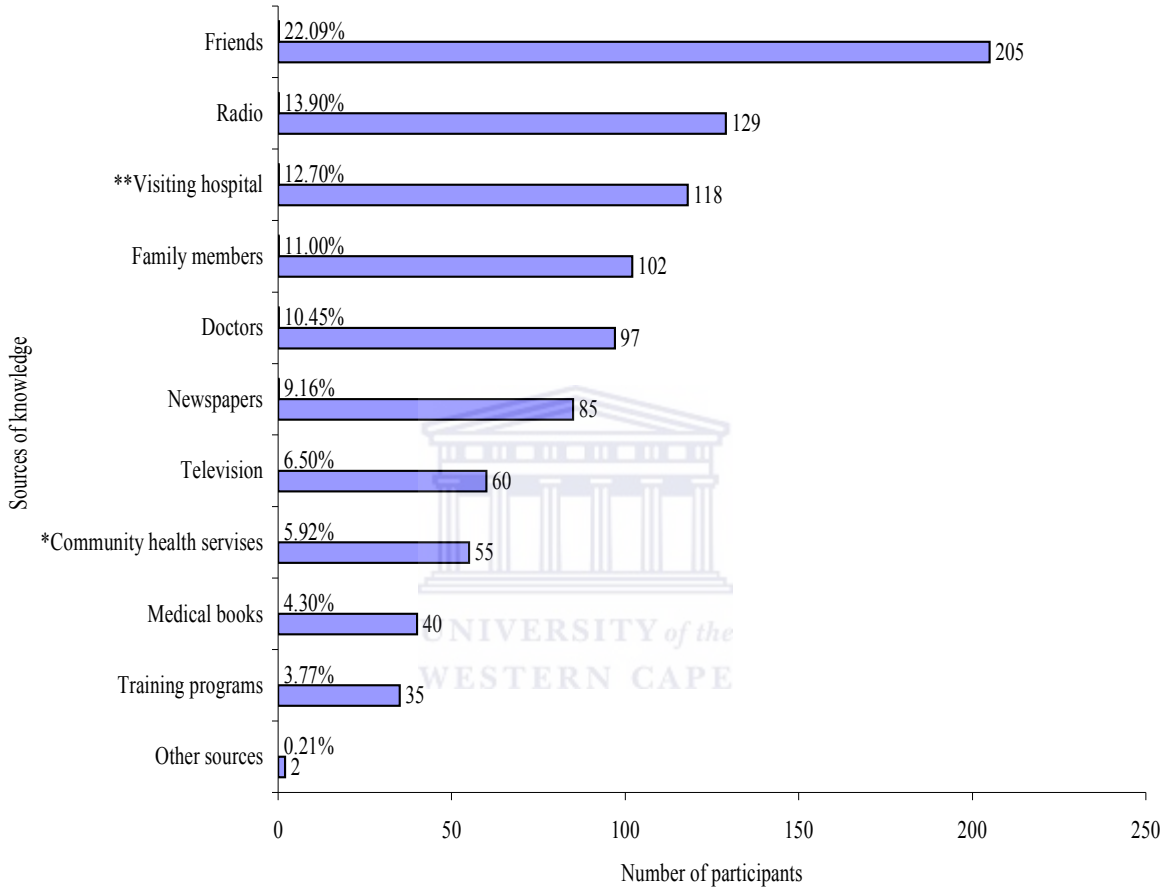

Figure 5: Sources of knowledge of stroke

1

[1] * means community health education for example education session conducted through outreach program.
** means health education given within the hospital for example a medical professional conducting teaching session before clinics starts.

From the results obtained on the question of where the participants got their knowledge about stroke, the majority of the majority indicated that they received it from friends (n = 205, 22.09%), while only 97 (10.45%) participants got their knowledge of stroke from doctors. A small 2% reported seeing a stroke patient as their source of knowledge about stroke. Surprisingly, on the question whether the patients have been told by a doctor or nurse that they were at risk of getting stroke, only 73 (28.5%) of the participants responded positively.

4.9 General knowledge of stroke in relation to socio- demographic characteristics

Table 5 illustrates the participants' general knowledge of stroke in relation to various socio-demographic characteristics (see also *Table 3*). The majority of the participants had a low score on general knowledge of stroke. The association between the general knowledge of stroke and socio-demographics was established. The findings indicated that there was no significant association between general knowledge of stroke and socio-demographic characteristics. The participants' general knowledge of stroke was also compared within the different socio-demographic groups.

Table 5: General knowledge of stroke in relation to socio- demographic characteristics

Socio-demographic factors	scores			
	High N (%)	**Moderate** N (%)	**Low** N (%)	**p-value**
Gender (n = 256)				
Male (n = 99)	0 (0.0)	18 (18.2)	81 (81.8)	[0.405]
Female (n = 157)	2 (1.3)	33 (21.0)	122 (77.7)	
Age (n = 256)				
25-50 (n = 138)	1 (0.7)	30 (21.7)	107 (77.5)	
51- 65 (n = 73)	0 (0.0)	17 (23.3)	56 (76.7)	[0.244]
66-90 (n = 45)	1 (2.2)	4 (8.9)	40 (88.9)	
Marital status (n = 256)				
Married (n = 164)	1 (0.6)	31 (18.9)	132 (80.5)	
Never married (n = 14)	0 (0.0)	3 (21.4)	11 (78.8)	
Separated not divorced (n = 20)	0 (0.0)	3 (15.0)	17 (85.0)	[0.112]
Divorced (n = 17)	0 (0.0)	1 (5.9)	16 (94.1)	
Widowed (n = 41)	1 (2.4)	13 (31.7)	27 (65.9)	
Level of education (n = 256)				
Never attended school (n = 59)	0 (0.0)	8 (13.6)	51 (86.4)	
Primary school (n = 104)	2 (1.9)	20 (19.2)	82 (78.8)	
Vocation school (n = 19)	0 (0.0)	3 (15.8)	16 (84.2)	[0.419]
Secondary school (n = 27)	0 (0.0)	7 (25.9)	20 (74.1)	
College (n = 47)	0 (0.0)	13 (27.7)	34 (72.3)	
Employment status (n = 256)				
Employed (n = 82)	0 (0.0)	21 (25.6)	61 (74.4)	[0.203]
Non employed (n = 174)	2 (1.1)	30 (41.2)	142 (81.6)	
Occupation (n = 82)				
Health related (n = 24)	0 (0.0)	6 (28.6)	18 (75.0)	[0.936]
Other related (n = 58)	0 (0.0)	15 (24.6)	43 (74.1)	

4.10 Knowledge of the risk factors of stroke in relation to socio-demographic characteristics

Table 6 demonstrates the participants' scores on knowledge of the risk factors of stroke and the relationship between socio-demographic characteristics and knowledge of the risk factors of stroke. The majority of the participants had a low score on knowledge of the risk factors of stroke. The association between participants' knowledge of the risk factors of stroke and the socio-demographic characteristics was established. A statistically significant association was established between knowledge of the risk factors of stroke and the participants'; age, level of education, and employment status ($p = 0.000$), and also marital status $p = 0.017$. The participants' knowledge of the risk factors of stroke was also compared within the different socio-demographic groups. A significant association was found within the age group one (25-50) when compared with group two (51-64) and age group three (66-90) ($p = 0.000$); those who never attended school when compared with those who had primary school, vocational, secondary school, and college level of education ($p = 0.000$), the primary school when compared with college level of education ($p = 0.000$).

Table 6: Knowledge of the risk factors of stroke in relation to socio-demographic characteristics

Socio-demographic factors	scores			
	High N (%)	**Moderate** N (%)	**Low** N (%)	**p-value**
Gender (n = 256)				
Male (n = 99)	20 (20.2)	38 (38.4)	41 (41.4)	[0.068]
Female (n = 157)	27 (17.2)	44 (28)	86 (54.8)	
Age (n = 256)				
25-50 (n = 138)	38 (27.5)	48 (34.8)	52 (37.7)	
51- 65 (n = 73)	6 (8.2)	21 (28.8)	46 (63.0)	[0.000]
66-90 (n = 45)	3 (6.7)	13 (28.8)	29 (64.4)	
Marital status (n = 256)				
Married (n = 164)	33 (20.1)	50 (30.5)	81 (49.4)	
Never married (n = 14)	2 (14.3)	8 (57.1)	4 (28.6)	
Separated not divorced (n = 20)	5 (25.0)	11 (55.0)	4 (20.0)	[0.017]
Divorced (n = 17)	3 (17.6)	3 (17.6)	11 (64.7)	
Widowed (n = 41)	4 (9.8)	10 (24.4)	27 (65.9)	
Level of education (n = 256)				
Never attended school (n = 59)	2 (3.4)	7 (11.9)	50 (84.7)	
Primary school (n = 104)	19 (18.3)	35 (33.7)	50 (48.1)	
Vocation school (n = 19)	5 (26.3)	7 (36.8)	7 (36.8)	[0.000]
Secondary school (n = 27)	6 (22.2)	15 (55.6)	6 (22.2)	
College (n = 47)	15 (31.9)	18 (38.3)	14 (29.8)	
Employment status (n = 256)				
Employed (n = 82)	29 (35.4)	31 (37.8)	22 (26.8)	[0.000]
Non employed (n = 174)	18 (10.4)	51 (29.3)	105 (60.3)	
Occupation (n = 82)				
Health related (n = 24)	8 (33.3)	11 (45.8)	3 (12.5)	[0.799]
Other related (n = 58)	21 (36.2)	20 (34.5)	16 (27.6)	

4.11 Knowledge of the signs of stroke in relation to socio- demographic characteristics

The majority of the participants had low scores on knowledge of the signs of stroke. The association between the knowledge of the signs of stroke and socio-demographic characteristics was established. *Table 7* illustrates the participants' scores on knowledge of the signs of stroke and the relationship between the knowledge of the signs of stroke and the socio-demographic characteristics. A significant association was found between the knowledge of the signs of stroke and the participants' education, employment, and occupation ($p = 0.000$), the socio-demographic age ($p = 0.004$), and marital status ($p = 0.040$). The participants' knowledge of the signs of stroke was also compared within the socio-demographic groups. A significant association was found between age group and age group three ($p = 0.001$), never attended school and those who attended primary school ($p = 0.006$), between those who never attended school and those who attended secondary school and college ($p = 0.000$), between those who attended primary school and those who attended secondary school (0.005), and between those who attended primary school when compared with college level of educated participants ($p = 0.000$).

Table 7: Knowledge of the signs of stroke in relation to socio-demographic characteristics

Socio-demographic factors	scores			
	High N (%)	**Moderate** N (%)	**Low** N (%)	**p-value**
Gender (n = 256)				
Male (n = 99)	31 (31.3)	30 (30.3)	38 (38.4)	[0.168]
Female (n = 157)	39 (24.8)	45 (28.7)	73 (46.5)	
Age (n = 256)				
25-50 (n = 138)	43 (31.2)	48 (34.8)	47 (34.1)	
51- 65 (n = 73)	18 (24.7)	21 (28.8)	34 (46.6)	[0.004]
66-90 (n = 45)	9 (20.0)	6 (13.3)	30 (66.7)	
Marital status (n = 256)				
Married (n = 164)	49 (29.9)	43 (26.2)	72 (43.9)	
Never married (n = 14)	7 (50.0)	5 (35.7)	2 (14.3)	
Separated not divorced (n = 20)	5 (25.0)	9 (45.0)	6 (30.0)	[0.040]
Divorced (n = 17)	3 (17.6)	4 (23.6)	10 (58.8)	
Widowed (n = 41)	6 (14.6)	14 (34.1)	21 (51.2)	
Level of education (n = 256)				
Never attended school (n = 59)	8 (13.6)	14 (23.4)	37 (62.7)	
Primary school (n = 104)	25 (24.0)	30 (28.8)	49 (47.1)	
Vocation school (n = 19)	9 (47.4)	7 (36.8)	3 (15.8)	[0.000]
Secondary school (n = 27)	7 (25.9)	7 (25.9)	13 (48.2)	
College (n = 47)	21 (44.7)	17 (36.2)	9 (19.1)	
Employment status (n = 256)				
Employed (n = 82)	36 (43.9)	24 (29.3)	22 (26.8)	[0.000]
Non employed (n = 174)	34 (19.5)	51 (29.3)	89 (51.1)	
Occupation (n = 82)				
Health related (n = 24)	19 (79.2)	4 (16.9)	1 (4.2)	[0.000]
Other related (n = 58)	17 (29.3)	20 (34.5)	21 (36.2)	

4.12 Knowledge of the symptoms of stroke in relation to socio-demographic characteristics

Table 8 presents the participants' scores on knowledge of the symptoms of stroke and the relationship between the knowledge of the signs of stroke and the socio-demographic characteristics. Majority of the participants score low on symptoms of stroke. The relationship between the knowledge of the symptoms of stroke and the socio-demographic characteristics was established. Significant association was found between the knowledge of the symptoms of stroke and the participants' level of education (p = 0.000) and employment status (p = 0.014). The participants' knowledge of the symptoms of stroke was also compared within the socio-demographic groups. A significant association was found between those who had never attended school and those who had primary school level of education, between those with secondary school and those with college level of education (p = 0.000), and between those who had never attended school when compared with those who had college level of education (p = 0.001).

Table 8: Knowledge of the symptoms of stroke in relation to socio- demographic characteristics

Socio-demographic factors	**scores**						
	High		**Moderate**		**Low**		**p-value**
	N	(%)	N	(%)	N	(%)	

Gender	**(n = 256)**				
Male	(n = 99)	34 (34.3)	30 (30.3)	35 (35.4)	[0.069]
Female	(n = 157)	41 (26.1)	43 (27.4)	73 (46.5)	
Age	**(n = 256)**				
25-50	(n = 138)	45 (32.6)	45 (32.6)	48 (34.8)	
51- 65	(n = 73)	15 (20.5)	23 (31.5)	35 (47.9)	[0.072]
66-90	(n = 45)	15 (33.3)	5 (11.1)	25 (55.6)	
Marital status	**(n = 256)**				
Married	(n = 164)	53 (32.3)	48 (29.3)	63 (38.4)	
Never married	(n = 14)	6 (42.9)	5 (35.7)	3 (21.4)	
Separated not divorced	(n = 20)	4 (20.0)	8 (40.0)	8 (40.0)	[0.059]
Divorced	(n = 17)	4 (23.6)	3 (17.6)	10 (58.8)	
Widowed	(n = 41)	8 (19.5)	9 (22.0)	24 (58.5)	
Level of education	**(n = 256)**				
Never attended school	(n = 59)	9 (15.3)	8 (13.6)	42 (71.2)	
Primary school	(n = 104)	36 (34.6)	27 (26.0)	41 (39.4)	
Vocation school	(n = 19)	10 (52.6)	5 (26.3)	4 (21.1)	[0.000]
Secondary school	(n = 27)	6 (22.2)	11 (40.7)	10 (37.1)	
College	(n = 47)	14 (29.8)	22 (46.8)	11 (23.4)	
Employment status	**(n = 256)**				
Employed	(n = 82)	27 (32.9)	32 (39.1)	23 (28.0)	[0.014]
Non employed	(n = 174)	48 (27.6)	41 (23.6)	85 (48.8)	
Occupation	**(n = 82)**				
Health related	(n = 24)	9 (37.7)	12 (50.0)	3 (12.5)	[0.142]
Other related	(n = 58)	18 (31.0)	20 (34.5)	20 (34.5)	

4.13 Overall knowledge of stroke in relation to socio- demographic characteristics

The relationship between the participants' level of knowledge and the socio-demographic characteristics was calculated (see *Table 9*). There was a significant relationship between participants' level of knowledge of stroke and occupation (p = 0.037) and marital status (p =

0.011). The remaining socio-demographic characteristics including age, level of education, and employment displayed a highly significant association (p = 0.000) with participants' level of knowledge of stroke.

Table 9: Overall knowledge of stroke in relation to socio- demographic characteristics

Socio-demographic factors		Overall **scores**			
		High N (%)	**Moderate** N (%)	**Low** N (%)	**p-value**
Gender	**(n = 256)**				
Male	(n = 99)	4 (4.04)	55 (55.56)	40 (40.4)	[0.129]

Female (n = 157)	4 (2.55)	74 (47.13)	79 (50.32)	
Age (n = 256)				
25-50 (n = 138)	7 (5.07)	84 (60.87)	47 (34.06)	
51- 65 (n = 73)	1 (1.37)	32 (43.84)	40 (54.79)	[0.000]
66-90 (n = 45)	0 (0.00)	13 (28.89)	32 (71.11)	
Marital status (n = 256)				
Married (n = 164)	6 (3.66)	81 (49.39)	77 (49.95)	
Never married (n = 14)	1 (7.14)	12 (85.72)	1 (7.14)	
Separated not divorced (n = 20)	0 (0.00)	14 (70)	6 (30)	[0.011]
Divorced (n = 17)	0 (0.00)	8 (47.06)	9 (52.94)	
Widowed (n = 41)	1 (2.44)	14 (34.15)	26 (63.41)	
Level of education (n = 256)				
Never attended school (n = 59)	0 (0.00)	9 (15.25)	50 (84.75)	
Primary school (n = 104)	2 (1.92)	54 (51.92)	48 (46.16)	
Vocation school (n = 19)	2 (10.53)	13 (68.42)	4 (21.05)	[0.000]
Secondary school (n = 27)	1 (3.70)	18 (66.67)	8 (29.63)	
College (n = 47)	3 (6.38)	35 (74.47)	9 (19.15)	
Employment status (n = 256)				
Employed (n = 82)	5 (6.10)	61 (74.39)	16 (19.51)	[0.000]
Non employed (n = 174)	3 (1.72)	68 (39.08)	103 (59.20)	
Occupation (n = 82)				
Health related (n = 24)	2 (8.33)	20 (83.33)	2 (8.34)	[0.037]
Other related (n = 58)	3 (5.17)	41 (70.69)	14 (24.14)	

4.14 Summary of the Results

This chapter presented the findings of this study. In the population sample, females (61.3%) outnumber the male (38.7%) participants. Among the five selected district hospitals, the majority of the participants (51.6%) were from Muheza designated district hospital. The participant's age was ranged from 25 to 90 years with the mean age of 50.77 (standard deviation 14.454). The majority of the participants were between ages 35 and 44 years. Most

participants had attained primary level of education. The majority of the participants were not employed.

The majority of the participants indicated friends as their source of knowledge about stroke. Only a few (10.45%) indicated doctors as their source of knowledge of stroke. Although the study indicates that the majority of the participants said that they were generally aware about stroke, only one participant (0.5%) correctly defined stroke. In addition, the study also revealed that the majority of the participants were not able to differentiate between stroke and heart attack.

Overall, the level of knowledge of stroke among the participants, including general knowledge of stroke, knowledge of the risk factors, signs and symptoms of stroke, was found to be low. The participant's age, education level, employment, and occupation were found to be significantly associated with overall knowledge of stroke.

CHAPTER FIVE: DISCUSSION

5.0 Introduction

This study aimed to determine the knowledge of stroke amongst hypertensive patients in Tanga Region, Tanzania. The chapter focuses on the main findings of the current research. The findings will be discussed in relation to the aim and objectives of the study and are explained where possible in relation to similar studies to develop inferences.

5.1 Socio-demographic characteristics of the participants

The results presented in Chapter four indicate that the study sample consisted of more females than males. Although the overall prevalence of hypertension worldwide was reported to be almost similar between females (26·1%) and males (26·6%) (Kearney, Whelton, Reynolds et al., 2005), a higher prevalence of hypertension in females has been reported in rural India (6.8% women 3.4% men) and Poland (72.5% women, 68.9% in men) (Kearney, Whelton, Reynolds et al., 2004). Similar findings were also reported in studies relating to hypertension in other regions in Tanzania such as Kilimanjaro, Mara, and Morogoro (Swai, McLarty, Kitange et al., 1993), and in Dar es salaam (Bovet, Ross, Gervasoni et al., 2002). In these studies, the overall prevalence of hypertension was also higher in women than in men.

The present study also had more female than male participants. These results correlate with public-based studies by Reeves, Hogan, & Rafferty (2002), Travis, Flemming, Brown et al. (2003), Greenlund, Neff, Zheng et al. (2003) and Blades, Oser, Dietrich et al. (2005), all done in the United States, on knowledge of the risk factors, signs, and symptoms of stroke

among people in the community. In these studies there were more females participants than males. The results are also consistent with an institutional based study in German (Weltermann, Homann, Rogalewski et al., 2000) on stroke knowledge among stroke support group members where 54% of the subjects were females. It however differed from other hospital-based studies conducted in India (Pandian, Kalra, Jaison et al., 2006; Pandian, Jaison, Sukhbinder et al., 2005), which also investigated knowledge of risk factors, warning signs, and symptoms of stroke. In these studies males were more represented than females. The reason for a higher prevalence of hypertension among females than among males in the current study could be attributed to prevailing lifestyles in the study region. Apart from subsistence farming that most of the women in Tanga region are involved in, and which involves some form of physical exercise, most of the other activities that women are involved in, such as domestic tasks including child care and care for the elderly and the sick, do not involve adequate physical activity, compared to males who are involved in physical work and strenuous activities including fishing, building houses, cut and sell fire-woods, making and selling charcoal and all sot of work which could help in sustaining daily living costs. This means that the women in Tanga live relatively more sedentary lives than their male counterparts.

The disparity could also be attributed to the fact that female population was higher than male population in the study sample. This could further be attributed to a higher attendance by women at the hospitals where the sample was taken. The counter observation where prevalence of hypertension among the male participants is lower that that of the females could be attributed to the fact that among the communities living in the Tanga region, males

are the bread winners and so they engage in a lot of exercise as they go about working to earn for their families' upkeep. Further, this disparity could be attributed to the fact that there are more females (843.121) than males (793,159) in the Tanga region of Tanzania (Tanzanian population census, 2002b).

The majority of the participants in the present study were less than 44 years old. These findings are consistent with other recent hospital-based studies such as Pandian, Kalra, Jaison et al. (2006) and Pandian, Jaison, Sukhbinder et al. (2005), both in India, a developing country, where the age of most participants was less than 45 years. Studies have revealed that the average age for individuals who suffer a stroke is also younger in developing countries when compared to the case developed countries. In studies done in the developed countries, the majority of the participants were aged higher than 65 years (Hollander, Koudstaal, Bots et al., 2003 in Rotterdam, Netherlands; and Bonita, Solomon, & Broad, 1997 in Auckland, New Zealand). In these studies, advanced age was a strong predictor of stroke. In Sub-Saharan Africa, stroke and stroke risk factors are presenting in young participants less than 25 years old (Walker, Rolfe, Kelly et al., 2003 and Garbusinski, van der Sande, Bartholome et al., 2005 in Gambia; and Connor, 2004 in South Africa). These correlate with Lemogoum, Degaute & Bovet, (2005) and Feigin, Lawes, Bennett & Anderson (2003) which report that stroke occurs at much earlier ages in Sub-Saharan Africa. The reason for this is probably because of the low life expectancy and rapidly changing lifestyles in Sub-Saharan Africa (Feigin, Lawes, Bennett & Anderson, 2003).

A factor that could also contribute to stroke in younger patients is HIV/AIDS. The population-based study by Cole, Pinto, Hebel et al. (2004) in central Maryland and Washington on acquired immunodeficiency syndrome and the risk of stroke found that HIV/AIDS is strongly associated with stroke cases among young adults 15 to 44 years of age. Tanzania Commission for AIDS (2005) reported HIV/AIDS as the major cause of illness and death among Tanzanian adults, and its prevalence was estimated to be 7% of the adult population between 15-49 years. Therefore, HIV/AIDS could also be associated with stroke at young age in Sub-Saharan Africa and, in the context of this study, Tanzania and the Tanga region. Although HIV/AIDS could be an important factor relating to stroke in younger people in developing countries, the results of the present study suggest that hypertension is also a contributing factor.

The level of education for the majority of the participants in the present study was low. Out of the total participants, 40.6% had only attained primary level education, followed by those who had never attended school (23%). This is in contrary to the findings of similar studies in other areas such as Pandian, Jaison, Sukhbinder et al. (2005) in India, Yoon, Heller, Levi et al. (2001b) in Australia and Samsa, Cohen, Goldstein et al. (1997) in United States. Authors of these studies reported that majority of participants in their respective studies had secondary and college level of education. The low level of education reported by participants in the current study could be attributed to the fact that they could not afford school fees due to the high level of poverty among the majority of the people in Tanzania and especially the study area of Tanga and other neighbouring coastal areas (Wedgwood, 2005; Kashembe,

2002). Due to gender inequalities in education, Swainson, (2000) reported that females in Tanzania do not have equal opportunity for education as males do.

5.2 Participants knowledge of stroke

5.2.1 General knowledge of stroke

General knowledge of stroke was related to the definition of stroke, the organ in the body affected by stroke, participants' knowledge regarding the cause of stroke, and the difference between stroke and heart attack. Majority of the participants defined stroke as the paralysis of the whole body (52.1%), followed by those who thought that stroke was due to local beliefs (19.4%). This shows a serious lack of knowledge about what a stroke is. Tradition values and local beliefs have also been reported in other studies (Walker et al., 1999, 2003) in Tanzania and Gambia. In these studies the participants mentioned that they manage stroke using the local herbs. It is essential that this perception is changed as the fact that the tradition values and beliefs might prevent stroke victims from accessing timely and appropriate management of stroke.

Although 60.9% of the participants indicated that stroke occurs in the brain, 55.5% indicated that it occurs in the heart and 47.7% responded that stroke is the same as heart attack. This means that the majority felt that stroke was the same as heart attack. This response was also seen in other studies by Yoon, Heller, Levi et al. (2001b), Reeves, Hogan, & Rafferty 2002, Parahoo, Thompson, Cooper et al. (2003), and Pandian, Jaison, Sukhbinder et al. 2005. In

these studies, participants also had difficulties in differentiating between stroke and heart attack. The local people in the research setting of the present study perceive all heart diseases as a result of hypertension and, therefore, they think these two illnesses are the same.

It is also important that this perception is changed because the emergency treatment for stroke and heart attack differs. Some participants in the study by Wellwood, Denis, & Warlow (1994) in Scotland, responding on the question of the organ where stroke occurs, focused on impairment and disability. This view is consistent with the present study where the majority of the participants (65.5%) associated stroke with paralysis of the arm, leg, or the mouth while 5.3% related stroke with the paralysis of the whole body and 0.4% with nerves paralysis.

The findings in the present study reveal a positive relationship between the general knowledge of stroke and level of education. A hospital-based study in India (Pandian, Kalra, Jaison et al. 2006) and some community-based studies in developed countries (Yoon, Heller, Levi et al., 2001b in Australia; & Parahoo, Thompson, Cooper et al., 2003 in Northern Ireland), found a similar results. These studies also found that participants' level of education was a predictor of knowledge on stroke. Participants with a higher level of education had a greater knowledge of stroke.

5.2.2: Knowledge of the risk factors of stroke

Although the overall knowledge of the risk factor was low, high blood pressure was recognized by (75.8%) of the participants. Similar findings were reported by Pancioli, Broderick, Kothari et al. (1998) in the United States, and Cheung, Li, Mak et al. (1999) in China. These studies also investigated the knowledge of stroke in patients with hypertension. In these studies high blood pressure was highly rated as a risk factor of stroke. The findings are contrary to recent population-based studies by Dokova, Stoeva, Kirov (2005) in Bulgaria, Harwell, Blades, Oser et al. (2005) in Montana, United States, and Yoon, Heller, Levi et al. (2001b) in Australia. In these studies, high blood pressure was identified as a risk for stroke by less than 50% of the respondents. The fact that a lesser percentage of the participants in these studies recognized hypertension as a risk factor for stroke was due to the awareness campaign that focused on smoking and economic burdens affecting diet and other lifestyles at the period of data collection.

High blood pressure was identified as a stroke risk factor in the present study by the majority of the participants, probably because a larger percentage of stroke cases in the area are due to high blood pressure. This has also been reported in other studies by Walker et al. (2000) and Swai et al. (1993) in other Tanzanian regions. These studies revealed that, among the population, hypertension was the main risk factor for stroke and that most deaths resulting from stroke are due to hypertension.

In the current study, a smaller proportion of participants (<50%) identified other risk factors of stroke including diabetes, family history of stroke, smoking, and poor diet. This response was also evident in a study by Wellwood, Denis, & Warlow (1994) in Scotland, which found out that, participants who identified other risk factors for stroke, other than stress, were fewer. In the case of the present study, this kind of response is probably due to the nature of the study, where diabetic patients were not targeted and also the disproportionately larger female representation in the study. In Tanzania, and especially Tanga, females are less involved in smoking than to males. This could be the reason for smoking not being identified as a major risk factor in the present study. Less recognition of risk factors of stroke is essential to be changed as it might contributes to low response on preventive measures including risk-reducing actions and adapting to healthier lifestyles.

The knowledge of the risk factors of stroke was related to age in the present study. The young participants of 25-50 years were more knowledgeable on risk factors of stroke compared to those aged 51-65 and older. This relates with a similar study by Harwell, Blades, Oser et al. (2005) in Montana, United States. In this study, it was reported that respondents aged 45 to 64 years were more likely to identify the established risk factors for stroke compared with those aged 65 years and older.

The same applied to education; that the participants who had college lever of education were more knowledgeable on risk factors than the participants who had lower levels of education. The reason why higher education correlates with higher knowledge of risk of stroke could be that a person with higher education will be exposed to different ways of knowledge searching

compared to a less educated person. Education has been found to influence health through lifestyle behaviours. For example, Gurka, Wolf, Conaway et al. (2006), reported that people with varied educational backgrounds may respond differently to a lifestyle intervention.

5.2.3: Knowledge of the signs and symptoms of stroke

More than 50% of participants recognized most of the warning signs of stroke. This indicates that participants were knowledgeable about warning signs. Dizziness, weakness, and numbness were the signs most frequently identified by the participants. Similarly, these signs were most commonly identified in a study conducted by Pancioli, Broderick, Kothari et al. (1998) and Kothari, Sauerbeck, Jauch et al (1997). A lower proportion of respondents recognized visual problems (40.6%) as a warning sign of stroke. This is in contrast with a population based study in Australia (Yoon, Heller, Levi et al., 2001b) where blurred and double Vision, or loss of vision in an eye, were identified by respondents as the most common warning signs of stroke.

Although the recognition of stroke symptoms by participants was high, the participants were not able to differentiate between the symptoms of stroke and the decoy symptoms. Paralysis of the whole body, brain paralysis and numbness, tingling sensation all over the body were the decoy symptoms (ref p 49). The overall knowledge of the symptoms was therefore low. Similar findings were reported in other hospital-based studies by Pandian, Kalra, Jaison et al. (2006) in Ludhiana, North West India, and Derex, Adeleine, Nighoghossian et al. (2004) in

France. In these studies, knowledge of the symptoms of stroke was reported to be low. The present study has arrived at results contradicting to what has been found in public-based studies in developed countries (Carroll, Hobart, Fox et al., 2004 in England; & Kothari, Sauerbeck, Jauch et al., 1997 in United States), where the knowledge of the symptoms of stroke was reported to be high among the two studied populations.

Higher educational level was a significant predictor of better knowledge of stroke warning signs and symptoms in the present study. This is similar to other studies such Yoon, Heller, Levi et al. (2001b) in Australia, Pancioli, Broderick, Kothari et al. (1998) and Schneider, Pancioli, Khoury et al. (2003), all in the United States. In these studies, the authors reported that lower education and older age, were associated with lower recognition of stroke warning signs.

In the present study, occupation was also associated with knowledge of the signs of stroke. This was consistent with the study by Travis, Flemming, Brown et al. (2003) who reported that being employed as a medical professional was a predictor of better knowledge of stroke. Carroll, Hobart, Fox et al. (2004) also reported that, medically trained nurses were more knowledgeable about stroke than the general population**.**

The high knowledge of the signs of stroke reported among the participants of this study can, therefore, be attributed to the fact that more than a quarter of the employed participants were in health related occupations. Most of them were nurses, nurse assistants, ward attendants and other occupations within the hospital environment.

5.2.4: Overall level of knowledge of stroke

The findings in the present study that 49.20% of the participants scored low in the overall level of knowledge of stroke indicate that there is lack of knowledge among the participants about stroke warning signs, symptoms, risk factors and general knowledge of stroke. There were also similar findings in developed countries about knowledge of stroke among the public (Pancioli, Broderick, Kothari et al., 1998 in the United States and Yoon, Heller, Levi et al., 2001b in Australia). The findings were also consistent with other recent population-based studies in developing countries (Pandian, Kalra, Jaison et al., 2006 and Pandian, Jaison, Sukhbinder et al., 2005, both done in India). In these studies the overall knowledge of stroke among the participants was reported to be low.

Generally in the present study education was highly related to the knowledge of stroke. The findings disclose that there were more female than male participants but male participants were more knowledgeable than females (see *table 9*). These were probably the factors that contributed to the low score in overall knowledge of stroke in the present study. In Tanzania, males have more access to education opportunities than females, a fact which may explain the situation revealed that females are less knowledgeable than males. This fact places females who participated in the study area, and Tanzania in general, in the group of people who are at increased risk of stroke.

5.2.5: Sources of knowledge of stroke

The majority of the participants in the present study (22.09%) rely on friends as their primary source of stroke knowledge, followed by radio (13.09%), visiting hospital (12.70%), and doctors (10.45%). This correlates with a study by Yoon, Heller, Levi et al. (2001b) in Australia. In their study the sources of their respondents' knowledge of stroke were: family members 32.2%, television 21.2%, friends 19.8%, magazines 15.7% and newspapers 15.3%. Those who reported to get knowledge of stroke from medical professionals were few; physicians 7.4%, hospital personnel 5.4%. Other studies by Faquhar, Maccoby, Wood et al. (1997) and Kothari, Sauerbeck, Jauch et al. (1997), both in United States, reported that the majority of the respondents mentioned friends and family members as the most common primary source of their stroke knowledge. Although these interpersonal contacts can be a very effective means of disseminating medical information, better and effective communication between patients and physicians could result in patients appreciating the consequences of hypertension in relation to stroke, and the need for its control to avoid future adverse events. The patient and their families could be professionally educated by the physician or medical professional staff regarding ways to modify their stroke risk factors, the symptoms of a stroke, and the appropriate response if they are having the symptoms of a stroke. These findings suggest improving the relationship between patients and health professionals to ensure accurate information about knowledge of stroke, including stroke risk factors, warning signs, and symptoms of stroke. This will lead to appropriate responses and suitable changes of lifestyle behaviours. Furthermore, increasing public awareness of stroke prevention and warning signs and symptoms is crucial, particularly in the at-risk population.

CHAPTER SIX: SUMMARY, CONCLUSION, RECOMMENDATIONS AND LIMITATIONS

6.0 Introduction

As with all research processes, some limitations were identified in this study. This chapter presents the limitations as observed in this study. Recommendations for future actions, including the development of health promotion programmes and future research on knowledge of stroke, are also made, arising from the findings of this study. A summary and conclusions of this study are also presented.

6.1 Summary

Stroke is a major cause of disablement among adult population worldwide. Since the prevalence of stroke is predicted to increase in the near future, the impact of chronic disablement will pose a great challenge to the long-term care and rehabilitation of stroke patients. In this study the general knowledge of stroke, the knowledge of the stroke risk factors, and the knowledge of the warning signs and symptoms of stroke were assessed. The overall aim of the study was to determine the knowledge of stroke among hypertensive patients in Tanga Region in Tanzania. In addition, the study also explored whether demographic characteristics had an influence on participants' level of knowledge of stroke.

The motivation of the study was the fact that lack of knowledge about stroke has been recognized as the limiting factor for early presentation at hospital, delayed immediate initiation of stroke management, and the main causes of dissatisfaction and frustration among stroke patients. However, it was not known to what extent this group of patients in the Tanga region knew about the consequence of hypertension in relation to stroke.

The selected district hospitals in Tanga Region, Tanzania were used as a research setting. A descriptive quantitative design using cross-sectional survey was conducted. All adult patients aged 25 years and above with a known diagnosis of hypertension attending in the selected hospitals for treatment and follow-up, and who voluntary agreed to participate in the study, were recruited. Two hundred and fifty six (256) participants were conveniently selected from all five selected district hospitals. Self-administered questionnaires with both close-ended and a few open-ended questions were used to collect the data. Descriptive and inferential statistical analyses were done to analyze the data using both Statistical Analysis System (SAS) version 9.1 and Statistical Package for Social Scientist (SPSS) version 13.

The average age of the participants was 50.77 years (SD. 14.454), with ages ranging from 25 to 90 years. The females constituted 61.3% of the sample while males were 38.7%. The majority of the participants had primary level of education and (32%) of them were employed. In general the level of knowledge of stroke among the participants was found to be low with (22.09%) of the participants indicating friends as their source of information about stroke. Very few participants (10.45%) indicated health professionals as their source of knowledge of stroke.

The participants' overall knowledge of stroke was significantly associated with age, education level, employment, and participants' occupation. The young participants (25-50 years) were more knowledgeable about stroke than their counterparts. The participants who had college level of education scored higher on knowledge of stroke than participants who had other levels of education. The employed scored higher than unemployed participants on the question of knowledge of stroke. Likewise, participants in health related occupations had more knowledge about stroke than the participants from other occupations.

6.2 Conclusion

Raised awareness through health education and health promotion heavily relies on behaviour change, which means that people should adapt to behaviours or lifestyles that help them maintain an optimal health status. The health belief model suggests that individual must perceive themselves to be at risk of the health threat before taking actions to reduce risk behaviour or engaging in alternative health behaviour. Since knowledge is often a precondition to understanding the need for lifestyle change, the individuals with hypertension need to know that they are at risk of getting a stroke and, consequently, they need to have sufficient knowledge about stroke.

The findings of this study indicate that the overall knowledge of stroke among the hypertensive patients who participated in the study was low. The participants lacked

knowledge relating to general knowledge of stroke, risk factors, signs and symptoms of stroke.

The study discloses the need of a comprehensive health education and health promotion programme targeting patients who are at risk and the community in general. The programme should be based on areas highlighted by the present study including general knowledge of stroke, knowledge of the risk factors, warning signs and symptoms of stroke. Such a programme will be of great benefit to the patients, relatives, and the general society regarding effective treatment and follow-up rehabilitation of stroke patients.

Furthermore the current study reveals that the health care providers need to increase emphasis on patient education and disease prevention strategies. This will establish good interpersonal relationship, facilitate information exchange, and facilitate patient involvement in decision-making.

6.3 Recommendations

The evidence shows that the low level of knowledge on stroke risk factors, warning signs, and symptoms can have a devastating effect on stroke rehabilitation programmes. Therefore, left alone, sufferers with this long-term neurological disability can cost the community enormous amounts of resources, as the most productive population such as the young and productive adults continue to be affected by stroke and stroke related problems.

Therefore, the low level of knowledge of stroke among the participants in the current study suggest that efforts have to be made to educate the public in general and the people who are at high risk, including patients, aged people, and less educated persons, about knowledge of stroke and its consequences. This will enable such people to make more rational decisions about their lives and adopt beneficial health lifestyles that will reduce the harmful effects of stroke and stroke related problems.

The Tanga region administrators, as well as Tanzanian government in general, should be encouraged to take an interest in the problem of stroke and its management and to support the development of education programmes on stroke matters by developing an active planning policy. This should include prevention strategies such as health promotion and health education programmes for chronic diseases including stroke.

The formation of the national health promotion campaign is fundamental in order to provide the focal point for development of comprehensive health promotion services at the different levels in the society including the national, regional, district and community levels.

Health institutions, in collaboration with the national health promotion campaign group, needs to conduct sensitizations workshops which will target health care providers in all settings. In these workshops, medical professionals who are experts in stroke will need to disseminate accurate information on prevention and management of stroke. Community health education about recognising stroke and strategies of appropriate responses will be effectively taught by people who know exactly what stroke is and have experience with

stroke victims. This implies that health care providers are in a better position to design and implement such problems.

Only a few participants in the present study indicated the diseases of lifestyles as the risk factors of stroke. This evidence supports the conduct of population-based interventions aimed at promoting healthy lifestyles in the community. These include reduction in salt intake, tobacco cessation, reduction in alcohol consumption, increase physical activity, controlling of excessive body weight, and reduction of the consumption of saturated fats. Consequently, a comprehensive intervention is necessary as it will facilitate the reduction of the risk factors of stroke effectively. The intervention must reach all segments of the population including healthcare settings, schools, work sites, churches, mosques, community centres, and other public health settings.

The finding by this study that only a few participants in the present study indicated the health professional as a source of their knowledge of stroke suggests that methods used by health care providers to inform patients about stroke risk factors, warning signs, and symptoms of stroke, have to be revised. Health care providers will have to incorporate health education in the stroke management process to ensure accurate information with appropriate responses.

Ensuring the retention of simple and precise information regarding the risk factors of stroke, warning signs, symptoms, and treatment, in both patients and families as they go through rehabilitation programme, may be an effective means of dissemination of this information to the general public.

Stroke patients and their caregivers have enormous experience and knowledge about the problems of long-term care, rehabilitation efforts, and coping strategies. Hence, these groups of people should be the first in emphasizing and sensitizing the community around them on stroke risk factors, warning signs, and symptoms. Furthermore patients, relatives of patients, and medical professionals, as a group, should work together to better inform the public about stroke.

Future studies with a larger sample which will accommodate other patients at risk of stroke, including diabetic and heart diseases, are needed to confirm these findings. Further, community surveys that will include both rural and urban populations are also needed to reveal the knowledge of stroke within the community.

6.4 Limitations

The first limitation in this study is that the sample may not fully reflect the knowledge of stroke among the population who are at risk in the Tanga region because only the hypertensive patients who attended clinics in the selected hospitals during the data collection period were included.

The second apparent limitation is that the current study was a hospital-based study with a small sample size and time limit, and that the survey was carried over a period of only six weeks, with 1-2 weeks period in each hospital. Hence, the results may not exactly

represent the entire hypertensive population of Tanga Region. This limits the findings generalisability.

The third limitation relates to the results obtained during the testing of the reliability of the instruments. The questions that show “low and poor” agreement could have been changed to increase the reliability of the results obtained. However this could not be addressed within the scope of this mini-thesis.

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APPENDICES

APPENDIX A

The map of Africa:

2

[2] The named nations show the Sub Saharan countries. (Worldmap.org)