FACTORS ASSOCIATED WITH TREATMENT OUTCOMES OF STROKE PATIENTS ADMITTED IN SELECTED HEALTH CARE FACILITIES OF KAKAMEGA COUNTY, KENYA

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A Thesis Submitted in Partial Fulfilment of the Requirements for the Award of the Degree of Masters of Science in Advanced Nursing Practice (Medical-Surgical Nursing) of Masinde Muliro University of Science and Technology

November, 2024

DECLARATION

This thesis is entirely original with just the cited sources and supporting documentation, and it hasn't been submitted for credit toward a degree or other honors anywhere.

…….……... ……..…….

Simiyu Enos Walela

HNR/G/01-54524/2017

CERTIFICATION

The signatory attests to having read and hereby recommends Masinde Muliro University of Science and Technology's thesis for approval "**Factors Associated with Treatment Outcomes of Stroke Patients Admitted in Selected Health Care Facilities of Kakamega County, Kenya."**

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DEDICATION

This thesis is dedicated to my parents, George and Judith Simiyu.

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To begin with, Dr. Tecla Sum and Mrs. Sharon Kosgey of Masinde Muliro University of Science and Technology's Department of Paramedical Sciences and Department of Clinical Nursing and Health Informatics, for their assistance with the development of my thesis, the gathering of data, and the writing of the thesis.

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ABSTRACT

A stroke, often referred to as a cerebral vascular accident, is a focused neurological impairment with a fast start that is thought to have a vascular origin. It causes loss of consciousness and/or death because it alters the blood flow to the brain. Stroke is becoming more common, and stroke survivors are more at risk from long-term consequences. Health and social care systems are in danger of being overburdened by the weight of dependency brought on by this impairment, the possible loss of earning power, the need for more social assistance, and extended hospital stays. The purpose of the research was to evaluate factors related to the treatment results of stroke patients who were admitted to certain medical institutions in Kenya's Kakamega County. A cross-sectional research approach was used. Data was gathered between January 2021 and January 2022 after approval. From Kakamega County's level four and level five hospitals, 153 patients with full medical records and a confirmed stroke diagnosis were gathered. Fischer's formula was used to calculate the sample size. To find level four and level five hospitals, the research used a cluster sampling approach. Using a purposeful sampling strategy, stroke patients are chosen for admission. A self-administered questionnaire was used to gather information on demographics, important medical histories, clinical presentations, stroke management, in-hospital incidents, and treatment results at a few chosen medical institutions in Kakamega County, Kenya. The Statistical Package for Social Sciences (SPSS) version 27.0 was used to input, clean, verify, and analyze data before it was placed into a computer database. It is anticipated that the data from this research will be used to create guidelines for clinical treatment of stroke in order to improve the quality of care given to stroke patients, improve their outcomes, and lessen the difficulties that come with the condition. This research contained 153 patient instances that were unreadable. The mean age of the patients was 57±13.7 years, and 111 (72.5%) of them were male. 112 (73.2%) of the 153 stroke patients had an ischemic stroke at presentation. The most often prescribed medications for ischemic stroke patients were aspirin and statins (78.6%), whereas enalapril was used to manage excessive blood pressure in around 43% of stroke patients. 36 (23.5%) of the 61 (40%) stroke patients who had poor treatment results passed away in the hospital. Poor treatment outcomes were strongly correlated with. Nearly half of the stroke patients had poor treatment results, and overall, stroke patient care was subpar. Patient outcomes may be improved by using thrombolytic treatment, developing suitable risk factor prevention strategies (such as lowering blood pressure), and reducing avoidable complications such aspiration pneumonia.

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LIST OF ABBREVIATIONS AND ACRONYMS

AF - Atrial Fibrillation

CVA - Cerebrovascular Accident

DALYS - Disability Adjusted Life Years

DM - Diabetes Mellitus

EMSS - Emergency Services Within Stroke System

HTN - Hypertension

PPS - Probability Proportional to Size

OPERATIONALIZATION OF KEY TERMS

Adherence- this is how the health care providers have been able to comply with the instructions outlined in the clinical practice .

Clinical Practice guideline- A guide used by health care providers on the instructions in management of stroke

Health care provider's factors- These are characteristics of health care providers associated with outcome of stroke, include: Knowledge and attitude, problem identification, goal setting, reinforcement, supportive educative nursing program

Health care providers- Consultants, medical officers, clinical officers, and nurses, providing care to patients with stroke.

Health care System-. These include: Availability of stroke units, process of triage, referral system (availability of ambulance), diagnostic procedures and availability of specialists

Level of Adherence-Extend to which health care providers have followed the guideline during practice.

Management- Set practice guidelines used by health care providers in provision of medical care to patients with stroke. This will also include clinical end points; physical, social and role functioning of the patient

Patient's factors- Characteristics of the patient associated with outcomes of stroke such as age, gender, education level, occupation, health seeking behaviour, Income, alcohol, obesity and hypertension.

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter contains the following: the issue statement, background information, main objective, research goals, research questions, and study rationale,

1.2 Background to the Study

According to the World Federation of Neurology (2018), a stroke, also known as a cerebrovascular accident, is a fast growing indicator of a focused disruption of brain function thought to have a vascular origin. It results in unconsciousness or perhaps death since the blood flow to the brain is interrupted.

A 2018 World Stroke Organization study states that 17 million individuals worldwide have a stroke annually. One-third of this population dies, one-third becomes crippled, and one-third recovers. One stroke occurs every three minutes, making it the third leading cause of death in wealthy nations like the US and the UK. Heart disease and cancer are the only two major causes of mortality (Muiruri, 2018).

In the UK, there are one million stroke survivors. Over 50% of stroke patients have stroke-related illnesses, which result in severe and complicated physical, mental, and emotional problems that need lifelong care and assistance (Katabira, 2011). Stroke-related deficiencies may impact a person's health, literacy, and capacity to respond to complicated information. These deficits include diminished mental skills, aphasia, visual and cognitive issues, and disorientation (Nayak et al., 2015).

All stages of the process, from admission to release, must follow benchmarked timelines since stroke is a clinical emergency that has to be treated right away (Johnson et al., 2016). According to the American Heart Association (2018), 19% of stroke

patients arrive within the "golden time" for stroke treatment, which is within three hours following the beginning of symptoms. The following are typical stroke warning signs: unconsciousness, loss of cognition, loss of verbal or written self-expression, unilateral or bilateral painless blindness, numbness or dead feeling on one side of the body, painless weakening on one side of the body, and inability to write. (2018, NINDS). Stroke outcomes are improved and complications are avoided with early identification and prompt treatment (Nayak et al., 2015).

In a comprehensive literature review to assess the burden and profile of stroke, the WHO African region reported an annual incidence rate of up to 316 strokes per 100,000, a stroke prevalence rate of 315 strokes per 100,000, and a mortality rate of up to 84% (Muiruri, 2018). Stroke is more deadly than HIV and AIDS, TB, and malaria combined in developing nations (Bhowmik, Abbas, Saifuddin, Islam, Habib, & Rahman, 2016).

Thirty-day mortality ranged from 33 to 35%, according to a review of three hospital-based urban stroke registrations in South Africa (two from South Africa and one from Zimbabwe) (Connor et al., 2007). Information concerning stroke's detrimental impact on health may be found in African research. For example, the Democratic Republic of the Congo had a 19.3% inpatient stroke death rate by day 30, followed by Ghana (43.2%), Tanzania (33.3%), and Cameroon (23.2%). In South Africa, the 6-month stroke death rate was 23%. Treatment delays after a stroke occurrence were linked to worse post-stroke survival rates (Kummarg, Sindhu & Muengtaweepongsa, 2018). In Kenya, strokes accounted for 4.25% of all fatalities, or 11976 deaths (World Federation of Neurology, 2018). In Kenya, there are over 16,000 stroke cases annually, with 80% being ischemic and 20% being hemorrhagic (Gichana, 2015). The speed at which rehabilitation starts determines a person's long-term results. Restoring blood

flow to the afflicted part of the brain as soon as possible—that is, during the first three hours after the stroke starts—is the aim of therapy for people who have had an ischemic stroke. It won't assist to begin therapy or surgery more than 12 hours after a stroke since irreparable damage would have been done to the brain (Gichana, 2015). According to a 2009–2015 research survey, the prevalence of stroke in Kakamega County was 39.6% (Bonita et al., 2015). The Ministry of Health's stroke registration shows that the number of stroke patients at Kakamega County Referral Hospital increased from 1200 in 2015 to 2100 in 2018. Ten percent of these individuals recovered completely, thirty percent had impairments, and sixty percent died. The hospital mortality audit research linked this result to postponed stroke patient care after a stroke event. The purpose of this research is to evaluate the treatment results and contributing variables for stroke patients admitted to certain hospitals in Kakamega County, Kenya. 1.3 Problem StatementPeople who have had a stroke are more likely to suffer from long-term consequences, and the number of strokes is increasing (Connor et al., 2017). Every minute, two million brain cells die worldwide after a stroke, impairing the function of the affected area of the brain (Johnson et al., 2016). Memory, movement, and communication are all part of this ability (National Stroke Association 2015 Stroke 101 information page). The health and social care systems are threatened by the burden of reliance brought on by this impairment, the possible loss of earning capacity, the need for more social assistance, and extended hospital stays (Chino, 2018).

Based on the accuracy of the GCS score, most medical professionals performed poorly in identifying and treating neurological problems in acute stroke patients (Hien and Chae 2011). In a cross-sectional survey of 94 healthcare professionals in Vietnam, Hien and Chae (2011) found that inadequate practice in the assessment and

management of neurological problems for a patient with stroke using a standard scale has a significant impact on the quality of care for patients who present with stroke in the hospital.

Information concerning stroke's detrimental impact on health may be found in African research. For example, the 6-month stroke death rate in South Africa was 23%, whereas the inpatient stroke mortality by day 30 was 19.3% in the Democratic Republic of the Congo, 43.2% in Ghana, 33.3% in Tanzania, and 23.2% in Cameroon (Kummarg, Sindhu & Muengtaweepongsa, 2018). Furthermore, delaying treatment after a stroke occurrence was linked to worse post-stroke survival rates, according to Kummarg, Sindhu, and Muengtaweepongsa (2018). This burden of stroke has not spared Kenya. According to a hospital study, 3042 strokes occurred for every 100,000 persons (Muiruri, 2018). The Ministry of Health's stroke registration shows that the number of stroke patients at Kakamega County Referral Hospital increased from 1200 in 2015 to 2100 in 2018. Inappropriate triage, delayed diagnosis, delayed treatment initiation, and delayed transfer of stroke patients to an inpatient environment that satisfies stroke care criteria have all been linked to this outcome (Louise et al., 2017). In order to provide a consistent approach to treating stroke in response to unfavorable outcomes after a stroke occurrence, the Emergency Medicine Kenya Foundation collaborated with the Kenya Ministry of Health to produce the stroke treatment guidelines (Emergency Medicine Kenya Foundation, 2018).

The practice of stroke care is far from being systematic and consistent at all levels, even in the face of evidence-based recommendations for stroke therapy. Furthermore, many stroke patients fail to meet their therapeutic objectives. Thus, the purpose of this research is to evaluate the variables related to the treatment results of stroke patients

after they are admitted to certain hospitals in Kakamega County, Kenya.

1.4 Primary Goals

to evaluate the variables linked to the treatment results of stroke patients who are admitted to certain medical institutions in Kenya's Kakamega County.

1.4.1 Particular Goals

i. To identify the risk variables for stroke patients admitted to certain medical institutions in Kenya's Kakamega County

ii. To evaluate the impact that treatment plans have on the outcomes of stroke patients admitted to certain medical institutions in Kakamega County, Kenya

iii. To assess the treatment results of stroke patients admitted to certain medical institutions in Kenya's Kakamega County

1.5 Research Inquiry

i. Which risk factors are relevant to stroke patients who are admitted to certain hospitals in Kakamega County, Kenya?

ii. What kind of treatment are stroke patients receiving at certain hospitals in Kakamega County, Kenya?

iii. What is the treatment outcome for stroke patients admitted to certain hospitals in Kakamega County, Kenya?

1.6 Rationale for the Research

According to Johnson et al. (2016), stroke is a potentially lethal condition that has to be treated quickly. There are recommended timelines for each step, from admission to discharge. This research provides basic knowledge to assist medical practitioners learn how to effectively treat strokes. Additionally, it provides useful treatment strategies for stroke patients in clinical settings and enhances scientific knowledge of stroke care. This research also provided the latest criteria for the clinical strategy in the case of a

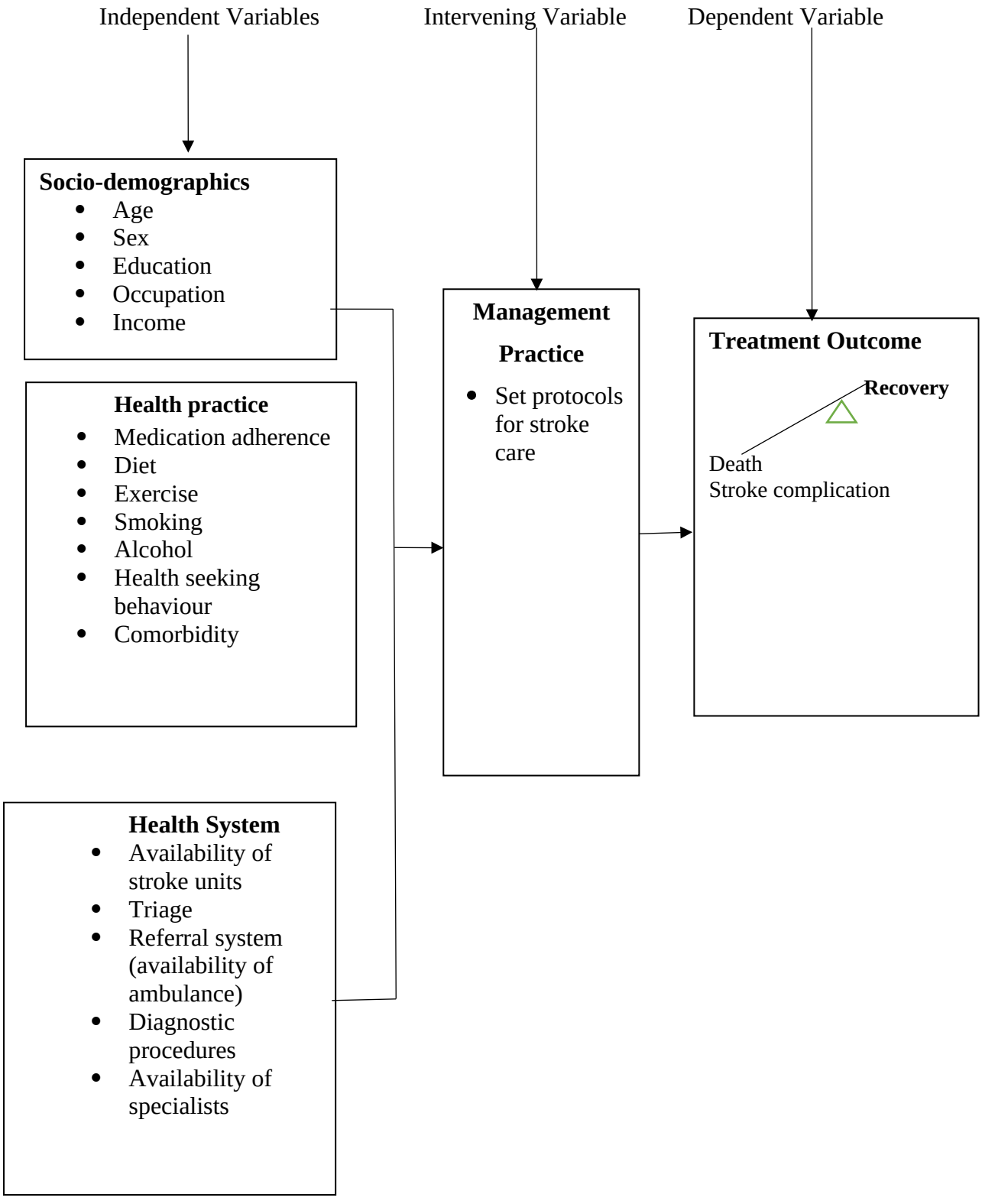
stroke, along with a comprehensive set of recommendations. In addition to discussing emergency and urgent treatment plans in the case of a stroke, the research will assess the quality of stroke care offered by different providers. Following evidence-based guidelines and quickly putting the most effective treatment methods into practice will provide patients the greatest outcomes (Nayak, Husain, Lande, Kawle, Kabra, Taori, 2015). The study's findings will also assist medical professionals in determining which evidence-based tactics are suitable for improving quality of life and in creating regulations that will advance the best practices for stroke treatment. Additionally, no studies have been conducted on the factors associated with the outcomes of therapy for stroke patients admitted to specific hospitals in Kakamega County, Kenya.

1.7 The Study's Limitations

Although the county is home to many medical facilities and providers, the study was limited to a few chosen institutions; as a result, the findings cannot be applied to a broad population.

absence of follow-up to forecast stroke patients' long-term results after discharge. In order to ascertain the long-term results, this hospital-based research did not follow up with patients after they were released. Selection bias could have been introduced by the handy sampling technique employed to choose the medical institutions. Furthermore, stroke management performance and stroke outcome were included as indicators of the caregivers' real performance; other dependent variables pertaining to stroke management performance should be included in future research.

1.8 Conceptual Framework



Source: Islam, (2017)

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

A review of the research on stroke risk factors, stroke outcome factors, pharmaceutical therapy techniques, and their impact on stroke patient outcomes and complications is included in this chapter..

2.2 Burden of Stroke

World Stroke Organization (2018), 17 million people worldwide suffer a stroke event year. A third of this amount dies, another third becomes crippled, and a third recovers. Stroke is the third leading cause of death in affluent nations like the United States and the United Kingdom, taking a life every three minutes. Only heart disease and cancer are more common causes of death (Muiruri, 2018). According to Katabira (2011), the cost of stroke was predicted to be 29.0 billion euros in France and 49.4 billion dollars in the United States in 2002. In the United Kingdom, there are one million stroke survivors. According to Davis and Lockhart (2016), stroke-related disorders affect over half of stroke victims, resulting in complicated and profound physical, cognitive, and emotional problems that require lifetime care and assistance. A person's health literacy and capacity to act on complicated information might be impacted by stroke-related impairments include visual and cognitive issues, aphasia, disorientation, and diminished mental ability. The impacted person will struggle greatly with reading and writing, transportation, mobility, and social interactions as a result of these impairments (Davis & Lockhart, 2016). The incidence of stroke has been high, with a reported prevalence rate of 315/100,000 and a death rate of up to 84%, according to a comprehensive literature review that looked at the burden of stroke various WHO African areas. Muiruri (2018). In impoverished nations, stroke

kills more people than HIV and AIDS, TB, and malaria put together. Thirty-day fatalities ranged from 33 to 35%, according to a survey of three hospital-based urban stroke registers in South Africa (two from South Africa and one from Zimbabwe). Compared to middle- and low-income nations, developed countries had significantly less disability-adjusted life years (DALYs) due to the burden of stroke (Katabira, 2011).

In Kenya, 11976 people died from strokes, accounting for 4.25% of all fatalities (World Federation of Neurology, 2018). The population's age-adjusted death rate was 66.90 per 100,000. According to the in-hospital stroke audit, the mean age at which a stroke occurs is 61 years, and the stroke prevalence is 3042/100000 admissions. Eight percent of the stroke cases in the study were hemorrhagic, but the majority (85%) were ischemic (Davis & Lockhart, 2016).

According to Bonita et al. (2015), a study survey on stroke that was carried out in Kakamega County from 2009 to 2015 revealed a prevalence rate of 39.6%. categorized the causes of stroke as cardiovascular diseases, metabolic variables, social determinants, and behavioral risk factors. Patients with hypertension had a noticeably greater percentage of strokes. Haemorrhagic stroke accounted for 26.7% of stroke cases, whereas ischemic stroke made up the largest number (60.2%).

2.3 Pathophysiology and Aetiology of stroke

There are numerous risk factors and causes of stroke. The pathophysiology of stroke is divided into two categories: ischemic stroke and hemorrhagic stroke. The ischemic form of stroke is caused by arteries becoming blocked due to a slow accumulation of plaque, fatty deposits, or blood clots (Bibi, 2017). This occlusion could be caused by emboli from the aortic arch, intracranial or extracranial arteries. Arrhythmias, bacterial and non-bacterial endocarditis, cardiomyopathies, ischemic heart disease, and Valvar

heart disease are among the conditions that cause the majority of emboli to originate from the heart (Bibi, 2017). A hemorrhagic stroke occurs when a blood artery bursts, causing brain hemorrhage. According to Katabira (2011), hypertension is the primary risk factor for artery rupture, which results in hemorrhagic stroke. Vasculitis, cerebral aneurysms, and arteriovenous malformation brought on by anticoagulant usage are additional causes of blood vessel rupture. The World Federation of Neurology (2018) states that diabetes, smoking, high blood pressure, high cholesterol, and co-morbidities such HIV/AIDS, sickle cell disease, and cerebral malaria are known risk factors for stroke. In awareness of the burden of stroke, the WHO has established some initiatives to lower the incidence of stroke. The global strategy for health, physical activity and health, the WHO Framework Convention on Tobacco Control, and the sustainable health financial framework are some of these tactics (Deplanque, Bordet, 2018).)

2.4 Types of strokes

Stroke (CVA) is classified as either ischemic or hemorrhagic, which defines its pathogenesis. Teasell, Hussein, McClure, and Meyer (2014) state that ischemic stroke is brought on by arteries being clogged as a result of a gradual buildup of blood clots, fatty deposits, or plaque. This obstruction may be caused by emboli from intracranial or extracranial arteries or the aortic arch. Arrhythmias, bacterial and non-bacterial endocarditis, cardiomyopathies, ischemic heart disease, and Valvar heart disease are among the disorders that cause the majority of emboli to begin in the heart (Teasell et al., 2015). When a blood artery breaks, the brain bleeds, resulting in a hemorrhagic stroke. Teasell et al. (2015) state that the main risk factor for arterial rupture, which leads to hemorrhagic stroke, is hypertension.

2.5 Stroke risk factors

The following are risk factors associated with outcomes of stroke. They include: age, gender, education level, occupation, health seeking behavior, Income, alcohol, obesity and hypertension

Age

Stroke is significantly influenced by age. Since most strokes happen to people 55 and older, being older is a significant risk factor for stroke (Norris & Hachinski, 2011). The average age of stroke in five developing nations was 64.2 years old (Truelsen et al., 2015). Compared to wealthy nations, the average age at which a stroke occurs was fifteen years lower in developing nations (Emmanue, L. 2017).The average age of stroke in a Nairobi hospital study was sixty-one (Gichana, 2015).

Gender

Biological sex groups are given different duties and obligations. Different employment for men and women is defined by gender conventions and assumptions, which exposes individuals to work-related health hazards (Gichana, 2015). Due to risk factors associated with their jobs, men are more likely than women to have a stroke (Gichana, 2015). According to studies, men are more likely to have strokes due to higher prevalences of risk factors like smoking and alcohol consumption. Additionally, men work in tough and severely demanding environments, which leads to unhealthy behaviors like smoking and drinking alcohol (WHO 2018).

Occupation

Occupation reflects income. It has high influence on health outcome because of opportunities such as easy access to better health care, residential facilities and access to education**.** Some occupations are highly stressing that predisposes to someone being

involved in some risky behaviours such as alcohol and smoking. Other occupations are health protective**,** thus not allowed to smoke and take alcohol (Stroke Foundation, 2017).

Health seeking behaviour

The health seeking behaviours is usually reflected by the value citizens' place on health. Myths and beliefs play a key role in the health seeking behaviours of a person. A comparison study indicated more stroke incidences in urban areas compared to the rural areas. This was associated to the health seeking behaviours. Many individuals in the urban centres were seeking medical attention in private pharmacies and hence delaying care (Gichana, 2015). In the study, taking herbal medicine, visiting traditional healers and missing scheduled appointments delayed initiation of treatment

Income

Income is an indicator of socio-economic wellbeing that measures the wealth that one has. It has a dose response associated with a range of circumstances that indirectly or directly affects health. It is a measure of someone's living standard. Income has an effect on health through the following mechanisms: allows access to better quality material resources such as food low in cholesterol, access to services that improve health directly, access to glucometers and blood pressure machines for self-monitoring at home, good housing in place with provisions for physical activities (Johnson et al, 2016). In a systemic review of 19 studies conducted in 10 countries of SSA up to 70 percent of stroke patients had low-income background (Johnson et al, 2016). Study in Mombasa showed that poorest people possessed risk factors profile compared to those who were privileged (Baalwa, J., *et al.*, 2016).

Alcohol

Excessive consumption of alcohol increases cardiac output and heart rate due to increased sympathetic nerve activity. Alcohol also results to cell membrane alteration allowing more calcium to enter the cell which results to inhibition of sodium intake. High alcohol concentration has been shown to constrict blood vessels (Emmanue, 2017). The world health report estimates that alcohol caused 4% of the disease burden (WHO, 2018).

Obesity

BMI≥30.0 KGS /M2 is obese, while 25-29.99 kg/m2 is overweight and that of 18.0-24.99 kgs/m2 is normal (WHO 2017). Obesity increases the risk for high blood pressure, diabetes, stroke and high blood cholesterol. Once considered a problem in developed countries, obesity is on the rise in developing countries (WHO 2017). Four million of the Kenyan population is obese (KDHS, 2018). Being obese and overweight increases risk of stroke (Stroke association, 2015). Obesity has a significant effect on stroke directly or through predisposing conditions such as diabetes and hypertension leading to stroke (Stroke association, 2015).

Hypertension

It is the lethal risk factor for stroke (Norris & Hachinski, 2011). Hypertension is persistent elevated systolic BP≥140mmHg or and diastolic BP≥90mmHg. Control and awareness of Hypertension are extremely low in Africa contributing to a burden of stroke (Baalwa, J., *et al.,* 2016). Well controlled blood pressure reduces incidences of stroke (Truelsen *et al.,* 2015). Control of high blood pressure can reduce stroke by 40%. Delayed diagnosis of HTN in developing countries has led to higher incidences of stroke (Baalwa, J., *et al.,* 2016).

Previous history of stroke

Recurrence of stroke after suffering from stroke has varied widely between 4% to 21% at one year and 11% to 54% at five years in different studies (Katabira,2011).

2.6 Health care provider's factors associated with outcomes of stroke

Necessary skills and knowledge are required by health care providers to manage stroke patients. Provider's knowledge is key in assessment, management and evaluation of stroke parameters such as blood pressure, respiration, temperature, hydration, nutrition and blood glucose for better stroke outcome (Summers *et al.,* 2009). Nurses need knowledge and information on cardiac monitoring, diagnostic tests, cognitive assessment and education of patient (Summers *et al.,* 2014).

Health care providers contributes greatly in prevention of potential complications of stroke in the hospital by increasing and developing expertise in management of stroke (Lindsay *et al.,* 2008) Evidence-based practice on management of stroke plays a great role in better stroke outcome (Drury *et al.,* 2016)

A study conducted by Drury *et al.*, (2016) revealed that nurses attending conferences, higher education level, job satisfaction, in-service education and working in a specialty area demonstrated excellent knowledge in management of stroke patients.

A cross-sectional descriptive study in 2011 among 94 Vietnamese nurses to examine nurse's knowledge and skills regarding accuracy of GCS. Nighty percent of the nurses had basic knowledge about GCS but, 52.1% nurses incorrectly answered the question related to GCS (Hien and Chae in 2011). A similar study by Ehwarieme and Anardo (2016) in one teaching hospital in Nigeria indicated that 41 % nurses had good knowledge on clinical application of GCS.

According to O'Farrel and Zou (2018) in an evaluation of 66 health care providers on Knowledge, attitude and skills and Neurological Scale in a hospital-based study in London, attitude is key in examination and management of stroke patients. This was a study to evaluate the effect of three months' workshop on neurological Scale. Findings revealed positive attitude are important to manifest into their knowledge on Canadian neurological scale to change in practice (Hafsteinsdottir *et al.*, 2013).

An experimental study by (Hamrin 2006) in a hospital set up in Sweden to test the attitude of nurses towards in-service education on clinical activation of stroke revealed positive correlation between nurses' attitude and implementation of standard guideline. Studies reveals various organizational factors that prevents health care providers from developing positive attitude towards their work. These factors include; work load, lack of resources and unfavorable learning environment, limited time, inadequate knowledge and performance about guidelines, and social value and belief (Hamrin, 2016).

Across-sectional study carried out in Western Canada among 583 health care workers to describe factors associated with care of stroke patients indicated burnout, unit level characteristics, job satisfaction, physical and mental health, and facility characteristics as the major factors (Rahman et al. 2016). Rahman et al. (2016) also revealed that psychosocial factors are the good predictors of work-related fatigue for the health care providers taking care of stroke patients.

Nielsen, Carsen & Kjellberg, (2013) revealed that Danish General practitioner perceived standard guideline as an integrated part of their everyday practice, had the knowledge and high confidence in guidelines. He found other factors affecting the use of guidelines, for instance, no time to update the guidelines, time-consuming, disagreement with the guidelines, guideline contrary to patient's preferences and economic incentives.

Hoesing (2016) found that a significant challenge for implementing clinical practice guidelines (CPGs) was at an organizational level. He noted that individuals charged with guideline development voiced that lengthy standard list, while inspirational, are not feasible to follow in their entirety. He found physical related factors that included physician's lack of familiarity with guidelines, lack of awareness about guidelines availability, lack of agreement about the guideline, lack of auto – effectiveness. He noted that the physicians did not trust their ability to implement the CPGs because of stress, burn-out, difficulty in updating the care due to time and resources available.

2.7 Health system factors associated with outcomes of stroke

A fundamental human right is health, as stated in the 2010 Constitution. The provision of health care for the populace is the duty of the government. According to WHO (2018), equitable prepayments and population-level resource pooling are fundamental

tenets of universal health coverage. Lack of health insurance and the distribution of insufficient resources for the management and prevention of afflicted patients have influenced patients' health-seeking behaviors (Gichana, 2015). There is very little stroke patient diagnosis, prophylaxis, and clinical care in Sub-Saharan Africa (Gichana, 2015). Lack of neurologists, functional stroke units, CT/MRI equipment, and high medical expenses have all contributed to the increased burden of stroke in SSA (Gichana, 2015).

The health system can have a direct impact on stroke management by encouraging cross-sectoral action to enhance health. For instance, health care finance models to lower the cost of medical care, transportation regulations, and the reintegration of sick individuals into chronically ill programs (Stroke Foundation, 2017).

Adequate budgetary allocation must be made in order to accomplish the aforementioned goals. The Abuja Declaration suggests giving the Ministry of Health 15% of the budget. Stroke prevention, health surveillance, promotion, and evaluation are currently underfunded (WHO, 2018). In order to address the growing number of stroke cases, the health infrastructure must be improved, and community awareness must be raised through health education (Wilson & Ashcraft, 2019).

By enhancing the health information system, the health system may better assess and track stroke-related mortality and morbidity as well as exposure to risk factors (Wilson & Ashcraft, 2019). In Tanzania, high primary health coverage resulted in fewer strokes (Walker et al., 2010). Health care professionals are encouraged to freely and clearly explain the hazards to the public (WHO, 2018).

The reduction of stroke events is a result of primary prevention of risk factors. Additionally, the outcomes of patients who present with stroke are improved when stroke units are available to all stroke patients (Truelsen and Bonita, 2015).

Aspirin is the secondary preventive measure for people with ischemic stroke recurrence, while CT and MRI scans are the primary technologies used for stroke diagnosis. Limited access to health treatments has been linked to high stroke patient fatality rates in underdeveloped nations (Gichana, 2015).

Physical load, time-on-task, technology, and work resources have a substantial impact on the care of patients who present with stroke, according to a survey designed to uncover institutional factors among 429 health care workers from New York (Hanna et al. 2016). In order to ensure that stroke patients receive high-quality care, the study also found that more personnel and material resources are required. Stress levels would decrease if there were a sufficient number of qualified healthcare professionals employed (Hanna et al., 2016).

Aiken, Sermeus, and van den Heede (2012) reported that the results of an international survey conducted in European countries in 2012 indicated that better job satisfaction and quality care for stroke patients were linked to a better work environment and less workload. According to Drury et al. (2016), institutional obstacles to improved stroke management techniques include a lack of resources and time constraints. The study also demonstrated that stroke management competency is influenced by organizational environment, leadership skills, conviction in evidence-based practice, readiness for change, and stroke education programs.

Policies, hospital services, and the physical environment were identified as potential impediments to effectively managing stroke patients in a study on factors impacting healthcare personnel' stroke management practices in hospitals (O'Halloran, Hickson, & Worrall, 2008). The study also showed that by altering the healthcare system, stroke education and training for medical professionals improves the results for stroke patients. According to Simmons-Mackie et al. (2007), educating healthcare professionals on stroke management can lead to them offering above-average services. Lack of protocols and evaluation tools, as well as a lack of training, are among the obstacles to effectively managing patients who present with stroke, according to a cross-sectional survey conducted on nurses working in stroke units in the United Kingdom (Pierot et al., 2018).

2.8 Management of Stroke

In recent years, there have been attempts to improve the way that strokes are managed. First, a multidisciplinary approach driven by protocols to improve the quality of life for stroke patients; second, the use of thrombolysis for ischemic stroke; and third, the creation of national guidelines to help standardize protocols for stroke care (Nayak et al., 2015). To facilitate timely referral to a stroke unit, a thorough and rapid screening is conducted if a person is suspected of suffering a TIA or stroke (Pierot, Szikora, Hirsch, Baxter, Miyachi, Mahadevan, 2018). According to Hoesing (2016), a stroke unit is a section or location within a hospital where strokes are managed by a multidisciplinary team with expertise in stroke care. Research has demonstrated that stroke unit care reduces the frequency of stroke-related deaths and disabilities when compared to standard care in general wards (Hoesing, 2016). Positive patient outcomes have also been linked to stroke units (Nayak et al., 2015).

In Kenya, there are hardly any stroke units. In the absence of stroke units, hospitals are advised to follow the guidelines for stroke unit care by implementing an acute stroke care pathway (Nayak et al., 2015).

The purpose of standard guidelines is to give health care providers the most recent information to assist them give patients the best care possible (Barth et al., 2015). By standardizing clinical treatment, a stroke care protocol offers a way to improve care and assesses the implementation of therapies through timely compliance evaluation (Nayak et al., 2015).

Key components of TIA and emergency department care guidelines offer evidence-based stroke treatment within 72 hours of the beginning of stroke warning signals. Nil by mouth until bedside swallow screen within 24 hours from stroke warning signs, physiologic monitoring including checking blood glucose levels, neurostatus, hydration status, blood pressure, and temperature, rapid stroke screening using the ROSIER screening tool, ABCD assessment, CT, urgent MRI, and fibrinolytic therapy as soon as possible are these six essential components. In order to assess and quickly identify patients who qualify for fibrinolytic therapy, intravenous rt-PA, intra-arterial thrombolytic, investigational procedures, and surgical interventions, EMSS has put in place a stroke care strategy.

The following variables affect whether the patient will gain from these treatments: The patient's age and medical history, the time since the stroke symptoms started, Ct-scan results, stroke subtype, stroke severity, and stroke subtype. The global stroke action plan framework provides guidelines for the in-hospital time framework, which enables prompt management and evaluation of stroke patients. Among these recommendations are the following: 80% of eligible stroke patients should be brought to the hospital and treated within 60 minutes of the onset of the stroke clinical warning signs; emergency department arrival to initial physical evaluation <10 minutes; emergency department

arrival to CT-scan initiation <25 minutes; and emergency department arrival to stroke team notification <15 minutes. The following factors determine the stroke chain's survival and recovery: Early identification of stroke warning signals, timely assessment and treatment of the patient, precise treatment decision-making, and patient monitoring (American Heart Association, 2018). To get the best care when you arrive at the hospital, you should do the following: Determine when clinical signs and symptoms first appear, vital signs, ABCs, Conduct neurological assessments, identify strokes, and run diagnostic tests. commencement of particular treatments (American Heart Association, 2018).

The care policy statement for the Emergency Medical Services within Stroke System (EMSS) outlines the metrics used to assess the caliber of prehospital stroke care. The policy statement states that stroke patients should be sent to the best available level of care as soon as possible, that the EMSS response time should be less than eight minutes (the amount of time that passes between the dispatching entity receiving the call and an ambulance that is properly staffed and equipped arriving on the scene), that the turnout time should be less than one minute (from the time the call is received to the unit in route), and that the time between receiving the call and dispatching the response should be less than ninety seconds (ASA, 2017). Medications used to treat strokes include:

IV Alteplase

Patients being treated for ischemic stroke within three hours from the onset of signs should receive 0.9 mg/kg iv alteplase with initial dextrose 10 % given as bolus for not less than 1 minute (Gowen, Henagan, McFadden, 2009). This has demonstrated the efficacy and the safety when administered within three hours from the onset of stroke

warning signs (AHA, 2018). Age, Severity, Blood pressure and Blood glucose are factors that determine eligibility for iv Alteplase. For Age, to be eligible for this type of treatment, patients must be less or equal to 18 years. Studies have shown that elderly people can equally benefit from administration of iv alteplase within 3 hours from onset of clinical signs (Pierot, *et al.,* 2018).

Precautions should be taken when administering this treatment due to increased risk of hemorrhagic transformation (Gowen *et al.,*2009). There are still huge clinical benefits of iv alteplase despite the risk of hemorrhagic transformation (Pierot, *et al.,* 2018). When administering iv alteplase, control of BP should be put into consideration by use of antihypertensive agents, this means that doctors should assess the stability of BP before considering administration of the drug. This drug should be given to patients with initial glucose levels of more than 50 mg/dL.

IV Thrombolytics and Son thrombolysis

Safety of iv thrombolytic and son thrombolysis agents are still unproven thus there administration is done inside clinical trial (Gowen *et al.,* 2009). The initial administration of these agents is beneficial for keenly selected patients with ischemic stroke within 6 hours duration from onset of clinical warning signs caused by MCA occlusions (American Heart Association, 2018). Consideration of mechanical thrombectomy over thrombolytics have been embraced (Pierot *et al.,* 2018). This treatment is majorly administered to patients contraindicated to the use of iv alteplase (AHA, 2018).

Antiplatelet Treatment

Aspirin administration is considered in patient who have suffered acute ischemic stroke between 24 to 48 hrs. from onset clinical warning signs. In an event that iv

alteplase has been given, administration of aspirin should be delayed till 24 hours elapses but should be considered in the condition which the benefits of administering iv alteplase outweighs its risk (American Heart Association, 2018).

The benefits and safety of aspirin in stroke management were determined by 2 large clinical trials administering doses between 160 and 300 mg. (Gowen *et al.*,2009). According to the study, nasogastric or rectal administration is appropriate. Few studies exist on utilization of alternative antiplatelet agents in the treatment of acute ischemic stroke. Patients contraindicated to aspirin may benefit from alternative antiplatelet agents (Pierot, *et al.,* 2018).

A study in Seoul, South Korea, of ischemic stroke patients found no increased risk of hemorrhage with early initiation of anticoagulant or antiplatelet therapy less than 24 hours after iv alteplase.

Anticoagulation

Urgent anticoagulation is done with the aim of preventing early recurrent stroke, improving outcomes of acute ischemic stroke or halting neurological worsening (Gowen *et al.*,2009).

Acute ischemic stroke guidelines confirm the lack of benefit of urgent anticoagulation. An additional study, determined the efficacy of lower molecular weight heparin in comparison with aspirin in preventing early neurological deterioration in an unblinded randomized control study (American Heart Association, 2018). There was a statistically significant difference in early neurological deterioration at 10 days after admission of heparine 3.95% versus aspirin 11.82%.

2.9 Complications of Stroke

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The purpose of standard guidelines is to give health care providers the most recent information to assist them give patients the best care possible (Barth et al., 2015). By standardizing clinical treatment, a stroke care protocol offers a way to improve care and assesses the implementation of therapies through timely compliance evaluation (Nayak et al., 2015).

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2.11 Research Gaps

Stroke studies have been conducted in several parts of the World; these studies have focused on the socio determinants of stroke, types of strokes, and the risk factors of stroke.. These calls for a study focusing on treatment outcomes of stroke and the associated factors.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Summary

This chapter contains the methodology used in the research. Included are the target population, study location, research design, sample size, sampling techniques, data collection method, and data analysis.

3.2 Research Design

A quantitative analytical cross-sectional research design was used to examine the effects of pharmacological treatment techniques, patient characteristics, health system factors, and healthcare personnel on the outcomes of stroke patients at a few selected medical institutions in Kakamega County, Kenya.

3.3 Field of Study

Lumakanda County Hospital, Butere County Hospital, Malava County Hospital, and Kakamega CGH are the level 4 and level 5 institutions in Kakamega County where the research was carried out. Kakamega County Teaching and Referral Hospital is a teaching and referral facility located in Kakamega County. It is located in the Bukhungu ward of Kakamega County's Shirere sublocation inside Lurambi Sub County. The hospital is one kilometer away from the central business district. It is a level 5 hospital. Butere County Hospital is located near Butere Girls' High School in Butere Sub-County.It is a level 4 facility. Malava County Hospital is a level 4 facility situated in Malava Sub County, next to the Malava-Webuye highway. Lumakanda County Hospital is a level 4 institution situated in Lugari Sub County, close to the Webuye-Eldoret route. Bungoma and Trans Nzoia Counties to the north, Uasin Gishu to the northeast, Vihiga County to the south, Busia and Siaya Counties to the west, and Nandi County to the east are the counties that abut Kakamega County. The county's

diverse population comes from a variety of ethnic origins. The county is primarily composed of the following: Marama (from Butere district), Wanga (from Mumias and Matungu district), Tachoni (from the Lugari and Malava region), Isukha (from the eastern part of Kakamega), Idakho (from the southern part of Kakamega), Kabras (from the northern part of Kakamega), Batsotso (from the western part of Kakamega), and Banyala (from the northwest of Kakamega region). The county also receives patients from neighboring villages in Nandi, Bungoma, Vihiga, Siaya, Trans-Nzoia, Uasin Gishu, and Busia. Kakamega County health facilities have been categorized into four cluster levels: dispensaries (level 2), county hospitals (level 4), sub-county hospitals (level 3), and county referral hospitals (level 5). (Kakamega county data, 2015).

3.4 The intended audience

The World Health Organization (WHO) defines a stroke as a quickly developing symptom of localized or global impairment of brain functions that lasts longer than 24 hours (or results in death) and has no apparent cause other than vascular origin. This description served as the basis for the diagnosis. This category covered all adult stroke patients over the age of 18 who had either a confirmed diagnosis of stroke using CT scan or a clinical diagnosis of stroke using neuroimaging.

3.5 Criteria for Inclusion and Exclusion

3.5.1 Inclusion Criteria The research included patients who were admitted to the medical ward of the chosen hospital between January 2021 and January 2022, had full medical records, and had a confirmed diagnosis of stroke.

3.5.2 Exclusion Criteria This study excluded patients with a diagnosis of transient ischemic attack or hematoma, as well as stroke cases with incomplete medical records (not including a patient demographic, left against medical advice, and unidentified

stroke sub-type clinically or by neuro-imaging).

3.6 Example Method

To classify the medical institutions according to their tiers of care, the research used a cluster sampling approach. Hospitals (levels 5 and 4), health centers (level 3), and dispensaries (level 2) are the four cluster levels into which Kakamega County's medical facilities have been divided. The level five and level four health institutions were chosen using a purposeful sampling method. The hospitals were selected due to their low requirements for managing and admitting stroke patients.

3.7 Calculating the sample size

(z2pq)/δ2 = n

When the population is more than 10,000, where n is the desired sample size 50% p = 0.5 q = 1-p δ = the error of margin, taken as 0.05 z = Standard Normal Deviation, which was equivalent to 1.96, representing the 95% confidence interval p = Prevalence of the problem under research. changing the aforementioned numbers in the formula.

Consequently, n = 1.962 x 0.5 x 0.5/0.052 n = 384

Less than 10,000 people were the intended audience. The formula was used to modify the sample size.

nf = n/ [1+ (n/N)] In cases when the population was fewer than 10,000, the desired sample size is denoted by f.

When the population was more than 10,000, the sample size was determined to be 384. N is the average monthly number of stroke patients hospitalized. Therefore, nf = n/1 + (n/N) = . 384 n/1 + (384/209) = 139

Non-responses were taken into account using 10% of the sample.

To account for individuals who choose not to participate in the research, 10% of 139

sample size is equal to 14. There were 139 + 14 = 153 people in the sample. The sample size distribution across the hospitals chosen by PPS is as follows: Butere has an average of 73 stroke patients admitted each month, Lumakanda has 43, Malava has 55, and Kakamega CGH has 146. As a result, the sample size distribution across the chosen hospitals was calculated as follows: Butere 73/384x153 = 29 and Kakamega CGH 146/384x153 = 85 55/384x153=22 is Malava Lumakanda 43/384x153 = 17.

Table 3.1 shows the research participants' proportionate allocation by hospital. Hospitals and the target populationCGH KakamegaPatients of Butere Malave Lumakanda: 85, 29, 22, 17.

3.8 Development of Instruments

Following a survey of relevant literature in related domains, a modification of the data gathering tool was created. To gather data from the medical records of qualified patients, a semi-structured questionnaire was developed. Five areas make up the data collecting tool: management, clinical presentations, important medical histories, in-hospital occurrences, and demographic information. Two nurses who had undergone specific training collected the information. To make sure the data collecting tool's contents aligned with hospital standard practice, they were cross-checked against patient medical documents. A preliminary test was conducted prior to starting data collection on 10% of the sample population, and any necessary adjustments were made in light of the findings.

1.9 Information Gathering

3.9.1 Questionnaire with Structure

Two certified nurses were trained to assist with data collection. To gather data from the medical records of stroke patients admitted to the hospital, a structured questionnaire was developed. The data collection tool consists of five parts: demographics, significant medical history, clinical presentations, management, in-hospital events, and treatment results. An observational checklist was used to cross-check the data collection instrument in compliance with normal hospital practice. The discharge treatment result was classified as either a good treatment outcome or a bad treatment outcome based on the treating physician's discharge summary notes or a record of physical disability assessment using the modified Rankin scale, as directed by the treating physician (mRs). A favorable treatment outcome or improvement was considered to have occurred if a patient had a record of mRs 2 at the beginning of the study or was discharged without a significant handicap (i.e., able to conduct all pre-stroke activities without help from others). If a patient passed away during therapy (mRs score of 6) or was released with moderate to severe impairment (bedridden, incontinent, requiring constant care, or an mRs score of 3–5), it was deemed that the patient had a poor treatment result. The length of a hospital stay was calculated as the interval between hospital admission and hospital discharge or death.

3.9.2 Checklist for Observations

Key components of the stroke standard guideline as reported by healthcare practitioners were evaluated using a checklist. A list of required tests performed upon stroke patients' admission was part of the checklist.

3.10 The instrument's validity

To verify the validity and reliability of the data collecting tools, a pre-test was administered to 14 patients at Vihiga County Referral Hospital. A pilot research was

conducted at Vihiga County Referral Hospital prior to the real data collection. The hospital was picked because its layout is comparable to that of the other hospitals that were considered. The pre-test's objective was to ascertain if the questionnaires needed to be altered. Additionally, to determine if the study questions might be addressed by the data gathering instruments. All relevant modifications were made to the data collecting tools after pretesting before they were used in the main research.

3.11 The instrument's dependability

If a measuring device yields consistent data, it is considered dependable. This was made possible by standardizing the circumstances under which the data is collected, such as minimizing the influence of outside factors like weariness. The stability element was enhanced as a result.

3.12 Data Management At the conclusion of each subject-researcher interaction, the obtained data was verified for completeness. Microsoft Access database STATA version 27.0 was used to download the data that was gathered every day and every evening. In the event that the database failed, paper record forms were utilized as a backup. A computer with a password that only the researcher knew and storage in locked cabinets ensured the security of the data gathered.

3.13 Analysis of Data

The data was analyzed using version 27 of the statistical software for social science (SPSS). Descriptive statistics including proportions, means, and standard deviations were used to characterize the clinical outcomes and sociodemographic factors among stroke subtypes. Continuous variables were compared using the t-test, while categorical variables were compared using the chi-square test or Fisher's exact test. Variables having a binary logistic regression analysis p-value of less than 0.25 were chosen for multivariate analysis. To identify independent determinants of poor clinical

outcomes in the hospital, the researchers used multivariable logistic regression. Predictors were found to be statistically significant if their probability value was less than 0.05 and their confidence interval did not include 1.

3.14 Information Sharing

Copies of the study results were handed to the Kakamega County government's Health Team and submitted to Masinde Muliro University of Science and Technology.

3.15 Moral Deliberation

The Institutional Research and Ethics Committee (IERC) of Masinde Muliro University provided ethical clearance and consent for the project. Permission to gather data was requested from the National Commission of Science, Technology, and Innovation (NACOSTI) and the Kakamega County administration.

An informed permission form was completed by each participant, and participation in the research was entirely voluntary. Patient data was kept private and used only for the research. A computer with a password that only the researcher knew and storage in locked cabinets ensured the security of the data gathered. Prior to the study, a letter of approval from the university's ethical review board and the participating healthcare institutions was obtained in order to conduct research..

CHAPTER FOUR

RESULTS

4.1 Summary

The following headings are used to arrange the results that are presented in this chapter.

4.2 Sociobehavioral traits and risk variables in stroke patients

Of the 153 stroke patients who participated in the study, men made up the majority (71.5%). The average age of the patients was 56.3±12.7 years. More than half of the patients, 64 (57%), were from rural areas, and one in five smoked. Alcohol consumption was more common among those who experienced hemorrhagic stroke than ischemic stroke. The most commonly identified risk factor for co-morbid diseases among the stroke cases under study was hypertension (40.8%). Additional prevalent risk factors included diabetes mellitus in 33 (21.2%), atrial fibrillation in 34 (21.9%), and a history of heart failure in 30 (19.3%) of individuals with a diagnosis. According to Table 4.1, the co-morbid conditions with the lowest prevalence rates were coronary heart disease (11%), a history of stroke (9%), and chronic renal disease (4%).

Table 4.1: Risk factors and socio-behavioral characteristics among stroke patients among stroke patients admitted at selected health care facilities of Kakamega county, Kenya

Variables	Ischemic (n = 112)	Hemorrhagic		
Age (in years) ‡	57.2±11.5	53.6±13.6	56.3±12.2	0.128
Sex (male), n (%)	79 (70.4)	30 (74.6)	110 (71.5)	0.607
Residence (rural)	64 (57.0)	21 (52.7)	86 (55.9)	0.681
Smoking, n (%)	17 (14.9)	10(25.8)	29 (18.6)	0.172
Alcohol, n (%)	15(11.4)	12 (29.7)	27 (17.3)	0.009†
Co-morbid conditions				
Hypertension, n (%)	41 (36.5)	21 (52.7)	65 (40.8)	0.072
Diabetes, n (%)	20 (17.8)	12 (30.7)	33 (21.2)	0.087
AF, n (%)	23 (20.4)	10(25.8)	34 (21.9)	0.406
Pervious stroke, n (%)	7 (6.1)	2	9 (5.5)	0.615*
Heart failure, n (%)	22 (18.6)	8 (20.9)	30(19.3)	0.734
CAD, n (%)	8 (2.0)	5	12	0.734
CKD, n (%)	6 (5.3)	6 (14.6)	14 (8.8)	0.110*

4.3 Treatment regimen Among Stroke Patients

During hospitalization, the most commonly prescribed antiplatelet and lip-lowering medications were aspirin and atorvastatin, approximately 43% of the patients in the study. A small number of patients with hemorrhagic stroke (n = 5) received antiplatelets in addition to the anticoagulants. Enalapril was the most frequently prescribed antihypertensive medication among stroke patients, with about 42 percent receiving it. The second most commonly prescribed medication was hydrochlorothiazide, which was given to approximately 26% of stroke patients. Three-fifths of hospitalized stroke patients received antibiotics (ceftriaxone and metronidazole) for the management of stroke complications and comorbid conditions.

Antibiotics were used to treat aspiration pneumonia and other hospital-acquired infections, which accounted for 34.3% of all hospitalized stroke patients. Similarly, 13.4% of hospitalized stroke patients were given phenytoin, 23% were given anti-pain medication, and 21% were given diabetic medication. No stroke patient received tPA at the hospital because the drug was not available.

Table 4.2: Treatment regimen among stroke patients admitted at selected health care facilities of Kakamega county, Kenya

Medication		**Ischemic (n = 113)**	**Hemorrhagic**	**Total**
Aspirin and statins	Aspirin and Atrovastatin	61 (54)	6 (15)	66 (42.7)
		15 (13.3)	0(0)	15 (9.4)
		16(14.3)	0(0)	9 (5.5)
Total	89 (79.6)		4(10)	94 (59.8)
ACEIs	Enalapril	49 (43.6)	15 (38.0)	65 (42.1)
	Captopril	2(1.8)	5(12.5)	6(3.9)
Beta-blockers	Metoprolol	16 (15.2)	6(15)	23 (14.6)
	Atenolol	3(2.7)	1(2.5)	4(2.6)
	Propranolol	1(0.9)	0(0)	3(2.0)
Diuretics	Hydroclorthiazide	27 (45.0)	12 (30.7)	40 (25.8)
	Furosemide	5(4.4)	3(7.5)	9 (4.2)
	Mannitol	14 (10.6)	10 (25.8)	23 (14.6)
	Spirinolactone	5(4.4)	0(0)	5(3.3)
CCBs	Nefidipine	3(2.7)	8(20)	8(5.2)
	Amilodipine	5(4.4)	2(5)	5(3.3)
	Phenytoin	11 (9.7)	9(23.4)	21 (13.4)
	Phenobarbitone	3(2.7)	5(12.5)	9 (5.5)
	Warfarin	16 (11.5)	1(2.5)	18 (11.4)
Miscillaneous	Antibiotics	31 (27.6)	21 (52.7)	53 (34.3)
	Antipains	7(6.2)	15 (38.0)	34 (21.9)
	Antacids	12 (10.6)	9(23.4)	22 (14.0)
	Antidiabetes	24 (21.3)	8(20)	33 (21.2)
	Antipsychotics	3(2.7)	1(2.5)	5(3.3)
	Antidepressants	2(1.8)	0(0)	2(1.3)

4.3.1 Complications among Stroke Patients

Of the stroke patients, 83 (54.21%) experienced hemiparesis or hemiplegia, which was more than half. After that, 62 (40.5%) of them experienced aphasia, and 60% (39%), had headaches. Hemiparesis was more common in patients who experienced an ischemic stroke than in those who experienced a hemorrhagic stroke ($p = 0.008$). Compared to non-hemorrhagic stroke patients, hemorrhagic stroke patients were more likely to have headaches ($p = 0.010$) and be less conscious ($p = 0.006$).

Aspiration pneumonia was a frequent complication that occurred during hospitalization in stroke patients. About 30% of stroke patients get aspiration pneumonia. The most frequent neurological consequence, brain edema (increased intracranial pressure), occurred in almost 19% of the patients who were examined. Another neurological effect that was observed during hospitalization was seizures. Thirteen percent of stroke victims experienced seizures. When compared to ischemic stroke, the researchers discovered that aspiration pneumonia and brain edema were linked to hemorrhagic stroke (p-value = 0.001 for aspiration pneumonia and 0.024 for brain edema, respectively). It was discovered that there was no meaningful correlation between the various types of stroke and other outcomes such heart failure, deep vein thrombosis, seizures, or hospital-acquired infections. The average hospital stay lasted between 10 and 14 days.

Table 4.3 Complications among stroke patients admitted at selected health care facilities of Kakamega County, Kenya

Variables, n (%)	Ischemic	Hemorrhagic	Total	p-value
Clinical presentations				
Hemiparesis	67 (59.6)	14 (35.6)	82(53.2)	0.008
Headache	36 (32.0)	22 (55.1)	59(38.2)	0.010
Aphasia	39 (34)	17 (42.9)	57(36.9)	0.355
Loss of consciousness	23 (20.4)	17 (42.9)	41(26.5)	0.006
Urinary incontinence	26 (23.1)	09 (23.4)	36 (23.2)	0.832
Quadriplegia	23 (20.4)	10 (25.8)	24 (21.9)	0.481
Others *	28 (24.9)	13 (30.4)	42(27.1)	0.314
Complications, n (%)				
Aspiration pneumonia	27 (24.0)	17 (42.9)	45 (29.1)	0.024
Brain edema	8 (7.0)	19 (47.8)	28 (18.0)	<0.001
Seizure	15 (13.3)	5 (8.7)	19 (12.0)	0.593
HAI	6 (5.3)	4 (11.3)	11 (6.8)	0.306
DVT	8 (7.0)	5 (13.6)	14 (8.8)	0.231
Hospital stay (days)‡	12.6±9.5	13.8±11.2	13.0±10.0	0.525

4.4 Treatment Outcomes among stroke patients

4.4.1 Modified Rankin Score used as outcome variable

In order to assess patient outcomes, Modified Rankin Score was used with a scale running from 0 – 6

Moderate and moderately severe disability was scored as 3 while severe disability and death retained the same scores of 5 and 6 respectively. The mean Modified Rankin Score was calculated after adding all the scores and calculating mean score. The mean Modified Rankin Score was 1.93 ± 1.58 with a range of 0.0 – 7.0. A score of 0 – 2 was considered as good outcome while a score of > 2.0 was poor outcome.

The results showed that out of 153 stroke patients, approximately 117 (76.5 percent) were able to be discharged alive from the hospital, whereas 36 (23.5 percent) died while in the hospital. Twenty-five patients (21.4 percent) were released with a significant handicap compared to the group of patients who were alive when they were discharged. Overall, 61 of the patients had unsatisfactory treatment results, but 92 of them (60%) had significant improvement and no severe disabilities when they were released from the hospital after treatment.

On the basis of the results of bivariate logistic regression analysis, variables with a p-value less than 0.25 were regarded as candidates for multivariate logistic regression analysis. As a result, the final multivariate logistic regression included sociodemographic characteristics (age, gender, and place of residence), smoking, alcohol consumption, key medical history (hypertension, diabetes, atrial fibrillation, heart failure, and stroke), stroke subtypes, and length of hospital stay. Having a history of heart failure, diabetes that caused a loss of consciousness, and aspiration pneumonia were all linked to poor treatment outcomes in a multivariable analysis. Being over the age of 65 was also linked to poor treatment outcomes.

Table 4.4: Predictors of Treatment Outcomes Among Stroke Patients admitted at selected facilities of Kakamega county, Kenya

Variables	**Treatment**		**COR (95% CI)**	**p-value**	**AOR (95% CI)**	**p-value**
	Good (92)	**Poor (61)**				
Age			1.037 (1.011–1.066)	0.006	1.034 (1.003 1.069)	0.031*
Smoking	13	15	1.97 (0.885–4.43)	0.096	0.678 (0.24–1.92)	0.465
Hemorrhagic	17	22	2.48 (1.199–5.165	0.014	1.41(536–3.77)	0.479
Hypertension	26	36	3.70 (1.88–7.34)	<0.001	2.26(1.001–5.13)	0.050
Diabetes	14	18	2.31 (1.07–5.04)	0.033	2.22 (0.87–5.66)	0.095
Atrial	15	18	1.70 (0.79–3.68)	0.174	1.09(0.38–3.11)	0.879
Heart failure	15	24	3.58 (1.57–8.21)	0.002	4.25 (1.58–11.48)	0.004*

Loss of15		25	3.52 (1.68–7.40)	0.001	3.04 (1.25–7.44)	0.014*
Aspiration	11	33	8.39 (3.81–18.50)	<0.001	5.93 (2.46–14.32)	<0.001*
Hospital	45	38	1.76 (0.913–3.44)	0.091	1.41 (0.59–3.34)	0.428

4.4.2 Relationship between patient socio-demographic, health seeking, treatment factors and outcomes

As patients were paired with health care providers who took part in the study, a Modified Rankin Score of 0 – 2 was considered as good outcome while a score of > 2.0 was poor outcome. Table 4.5 shows relationship between patient socio-demographic characteristics, health seeking behaviour and treatment regime and patient outcome. Only one independent variable was statistically significantly associated with a negative outcome. Males were 80% less likely to have had a successful discharge outcome (OR: 0.2; 95% CI: 0.1 – 0.6; p = 0.002). There was an almost borderline significant association between where patient sought medical care and successful treatment outcome. Those who sought treatment in hospitals were 5.5 times more likely to have had positive treatment outcome (p = 0.08). Again, though not statistically significant patients aged upto 60 years and those married were 1.3 (p = 0.5) and 1.5 (p = 0.4) times higher odds of experiencing successful outcome.

Table 4.5: Relationship between patient socio-demographic, health seeking, treatment regime factors and outcomes

Independent variable	**Categories**	**n**	Modified Rankin Score on discharge		**OR**	**95% CI**	**P value**
			≤2	> 2			

Gender	Male	90	5.6	94.4	0.2	0.1	–	**0.002**
	Female	74	21.6	78.4		0.6		
Age group in years	≤ 60	53	15.1	84.9	1.3	0.5	–	0.5
	> 60	111	11.7	88.3		3.5		
Marital status	Married	104	14.4	85.6	1.5	0.6	–	0.4
	Others	60	10.0	90.0		4.1		
Level of education	None / Primary	83	13.2	86.8	1.1	0.4	–	0.9
						2.7		
	Secondary and above	81	12.4	87.6				
Occupation	Unemployed	92	14.1	85.9	1.3	0.5	–	0.6
	Employed	72	11.1	88.9		3.4		
Where seeks medical care	Hospital	132	15.2	84.8	5.5	0.7	–	0.08*
	Other	32	3.1	96.9		42.9		
Involved in lifestyle activities e.g. smoking	Yes	20	10.0	90.0	0.7	0.2	–	1.0*
	No	144	13.2	86.8		3.4		
On antiplatelet drugs	Yes	30	16.7	83.3	1.5	0.5	–	0.5*
	No	134	11.9	88.1		4.4		
On anticoagulants	Yes	53	9.4	90.6	0.6	0.2	–	0.4

						1.8		
	No	111	14.4	85.6				
On IV Thrombolytic and SON Thrombolysis	Yes	58	10.3	89.7	0.7	0.3 – 1.9		0.5
	No	106	14.2	85.8				

**Fishers Exact Test*

Table 4.5 presents results on the audit of key elements of stroke standard guideline as documented by health care providers who took part in the study. Facilities providing care for stroke patients should be involved in quality improvement that includes regular audits and feedback. A first step in implementing a clinical practice guideline is to gain an understanding of clinical practice. Results based on the areas audited in this particular study could assist in this process.

The findings show that out of the 18 areas audited, only 8 were documented with varying proportions, the highest being CT-Scan (92.1%) followed by oxygen saturation (89%) and FBC (71.9%), UEC (71.9%), hydration status (61.6%) and coagulation screen (51.8%) with the rest having had a either less than half of the respondents having document the parameters. The remaining 10 were not documented at all implying poor documentation system.

Table 4.6: Audit of key elements of stroke standard guideline documented

Characteristics	Categories	n	%
Level of consciousness (LOC) GCS	Yes	164	100.0
	No	0	0.0
Facial droop	Yes	164	100.0
	No	0	0.0
Speech	Yes	164	100.0
	No	0	0.0
Vision	Yes	164	100.0
	No	0	0.0
Blood pressure	Yes	164	100.0
	No	0	0.0
Temperature	Yes	164	100.0
	No	0	0.0
Respiratory rate	Yes	164	100.0
	No	0	0.0
Pulse rate	Yes	164	100.0
	No	0	0.0
Random blood sugar	Yes	164	100.0
	No	0	0.0

Hydration status	Yes	101	61.6
	No	63	38.4
Oxygen saturation	Yes	146	89.0
	No	18	11.0
Coagulation screen	Yes	85	51.8
	No	79	48.2
ESR	Yes	25	15.2
	No	139	84.8
UEC	Yes	118	71.9
	No	46	28.1
FBC	Yes	118	71.9
	No	46	28.1
Lipoprotein profile	Yes	78	47.6
	No	86	52.4
CT-Scan	Yes	151	92.1
	No	13	7.9

Audit on documentation of the indicators of adherence to standard guidelines was assessed by direct observation of patient records after health care provider had

provided patient care. The direct observation was facilitated by use of a checklist to observe the care provider when managing a patient, he/she was paired with and documentation of the same in the corresponding patient records. Yes =1 was scored if the procedure was recorded and no = 0 if not recorded. Each procedure performed was given a score of none 1 while if not performed a score of zero was awarded. Total score on the 17 areas observed were added up and subjected to logistic regression analysis, the outcome being a score of greater than 2 for better life outcome and less than two for worse outcome.

CHAPTER FIVE

TALK

.1 Summary

Evaluation of treatment outcomes and contributing variables for stroke patients referred to certain medical institutions in Kakamega County, Kenya, was the aim of the research. The research was conducted using a cross-sectional methodology. After permission, data was collected from January 2021 to January 2022. 153 patients with full medical records and a confirmed diagnosis of stroke were selected from the level four and level five hospitals in Kakamega County. At a few selected medical facilities in Kakamega County, Kenya, data on demographics, significant medical histories, clinical presentations, stroke care, in-hospital occurrences, and treatment outcomes were gathered using a self-administered questionnaire.

5.2 Stroke patients' sociobehavioral characteristics and risk factors

According to the present study's findings, males were more likely than women to get a stroke. The majority of stroke patients first manifested with ischemic stroke as opposed to hemorrhagic stroke. High blood pressure was the most common risk factor, according to the present research.

The most prevalent kind of stroke identified in this research was ischemic stroke, which is also the most prevalent subtype of stroke overall. This study supports the findings of multiple previous studies that showed ischemic strokes were more common than hemorrhagic strokes in the general population. However, studies conducted in Ethiopia have shown that both stroke subtypes are equally prevalent in the population, with hemorrhagic stroke occurring at a high frequency. This disparity might result from differences in stroke diagnosis (clinical vs neuroimaging), socioeconomic and risk factors at the population level, or a combination of these. In Sub-Saharan Africa, hemorrhagic stroke is on the rise, despite ischemic stroke still being the most frequent kind of stroke presentation. Hemorrhagic stroke is associated with a considerable risk of mortality. In the majority of Sub-Saharan Africa, there are differences in stroke risk

factors (such high blood pressure), environmental variables, research design (community-based vs institutionalized), and clinical diagnosis.

The present study's findings indicate that among stroke survivors, hypertension was the most common concomitant condition (42.2%). This outcome was consistent with prior research showing that hypertension is the most common risk factor for stroke worldwide. 2 Underdiagnosis or poor management of hypertension in stroke patients in Sub-Saharan Africa leads to poor treatment results. An unhealthy lifestyle, a lack of knowledge, and restricted access to healthcare might all contribute to this tendency's persistence. All of these actions may lessen the burden of cerebrovascular illness. Preventing, diagnosing, and treating hypertension as well as raising public awareness of the condition may all help.

People's health-seeking behaviors are often reflected in how much value they put on health. Myths and beliefs have a significant role in how individuals seek medical attention. A comparative study found that stroke rates are greater in urban regions than in rural ones. This was connected to health care-related activities. By obtaining medical treatment at private pharmacies, many individuals in urban areas were postponing care (Gichana, 2015). The research found that utilizing herbal treatments, visiting traditional healers, and missing appointments all postponed the start of therapy. Additionally, a tiny number of individuals consume alcohol or smoke cigarettes, two lifestyle choices that may increase the risk of stroke. 18.2% of respondents smoked cigarettes, according a previous study by Gichana (2015) in KNH. Strokes were later experienced by most smokers.

Most have concomitant conditions such as heart disease, diabetes, or high blood pressure. The fact that so few of them appeared during the 12-hour period after the stroke may have had a detrimental effect on the therapeutic management of their

condition. To evaluate the effects of early vs. delayed admissions, 104 patients were admitted to the neurological department of the Central India Institute of Medical Sciences as early referrals (within 24 hours of the onset of symptoms) and late referrals (after 24 hours from the onset of symptoms). Long-term outcomes were determined for both early and delayed admissions. Both groups' outcomes—death, reliance, coma, disability, treatment load, depression, and recovery—were analyzed. After the study was finished, a comparison was done to determine the hospital's stroke fatality rate over a 12-month period. Analysis showed that compared to delayed admissions, which had a recovery rate of 23%, early admissions had a better prognosis and a greater recovery rate of 90% (Katabira, 2011). Similarly, the dependency ratio was greater for delayed admission (18%) and lower for early admission (6%). Less than one-third of the participants in this research had a BMI below the suggested threshold. Obesity increases the risk of stroke, high blood pressure, diabetes, and high blood cholesterol. Previously believed to be a problem in developed countries, obesity is increasingly more common in poor countries (WHO 2017). In Kenya, four million individuals are obese, according to KDHS (2018). Obesity and excess weight increase the risk of stroke (Stroke association, 2015). Obesity, either directly or indirectly, increases the risk of stroke via risk factors such diabetes and hypertension, according to the Stroke Association (2015).

5.3 Treatment Plans for Stroke Patients

EMSS has implemented a stroke treatment approach to evaluate and promptly identify patients who are eligible for intravenous rt-PA, intra-arterial thrombolytic, fibrinolytic therapy, experimental procedures, and surgical therapies. A patient's potential benefit from these therapies depends on a number of criteria, including the length of time from the beginning of stroke symptoms, the patient's age and medical history, the severity

and subtype of the stroke, the findings of the CT scan, and the stroke subtype. Determining when the patient's clinical signs and symptoms started, taking vital signs and ABCs, performing a neurological evaluation, identifying a stroke, ordering diagnostic tests, and initiating specific treatments are all necessary to provide the best care possible (American Heart Association, 2018).

The use of IV thrombolytic/SON thrombolysis, antiplatelet, and anticoagulant medications did not statistically substantially related with favorable outcomes for stroke patients. None of the three main areas examined were statistically associated with positive treatment outcomes for stroke patients, even though a higher proportion (16.7%) of stroke patients undergoing antiplatelet therapy seemed to be doing better than those not getting the same treatment (11.9%).

Gowen, Henagan, and McFadden (2009) state that 0.9 mg/kg intravenous alteplase should be administered to patients with ischemic stroke within three hours after the onset of symptoms, in addition to an initial 10% dextrose bolus for at least one minute. This has been shown to be safe and beneficial when administered within three hours after the onset of stroke warning signs (AHA, 2018). IV Alteplase eligibility is determined by blood pressure, blood glucose levels, age, and severity. In order to be eligible for this kind of therapy, patients must be less than or equal to 18 years old. Studies have shown that intravenous alteplase may also help elderly people if it is given within three hours of the beginning of clinical symptoms (Pierot et al., 2018). Care should be used while administering this medicine due to the increased risk of hemorrhagic transformation (Gowen et al., 2009). IV alteplase still offers substantial therapeutic advantages in spite of the potential for hemorrhagic alteration (Pierot et al., 2018). When giving intravenous alteplase, doctors should consider the use of antihypertensive drugs; consequently, they should assess blood pressure stability

before giving the drug. This drug should be administered to patients whose baseline blood glucose levels are more than 50 mg/DL. Because the safety of IV thrombolytic and son thrombolysis medications has not yet been proved, they are provided via clinical studies (Gowen et al., 2009). The first dose of these medications is beneficial for carefully selected individuals who had an ischemic stroke within six hours of the onset of clinical warning signs caused by MCA occlusions (American Heart Association, 2018). The superiority of mechanical thrombectomy over thrombolytics has been acknowledged (Pierot et al., 2018). This drug is primarily used to treat patients who are not candidates for intravenous alteplase (AHA, 2018).

Aspirin medication is considered for individuals who have had an acute ischemic stroke during the last 24 to 48 hours. starting with the first clinical warning signs. Though it should be considered if the benefits outweigh the hazards, aspirin administration should be delayed for 24 hours after intravenous alteplase treatment (American Heart Association, 2018).

Aspirin's benefits and safety in treating stroke were shown by two large clinical studies with dosages ranging from 160 to 300 mg. Gowen and associates (2009). According to the research, nasogastric or rectal delivery is appropriate. Not much research has been done on the use of alternative antiplatelet drugs in the treatment of acute ischemic stroke. Patients for whom aspirin is contraindicated may benefit from other antiplatelet drugs (Pierot et al., 2018).

A research on ischemic stroke patients in Seoul, South Korea, found that starting anticoagulant or antiplatelet medication earlier than 24 hours after intravenous alteplase did not increase the risk of bleeding. Urgent anticoagulation is intended to prevent early recurrent stroke, improve acute ischemic stroke outcomes, or halt

neurological deterioration (Gowen et al., 2009). Immediate anticoagulation is unsuccessful, according to guidelines for acute ischemic stroke. To compare the efficacy of decreased molecular weight heparin vs aspirin in preventing early neurological damage, another research carried out an unblinded randomized control trial (American Heart Association, 2018). The early neurological damage brought on by aspirin (11.82%) and heparine (3.95%) differed statistically significantly ten days after admission.

The care of stroke patients is affected by the timing of therapy; the earlier treatment starts, the better for the patient. Although IV tPA is advised for all eligible acute stroke patients who come within 4.5 hours after their last known normal, none of our trial participants received thrombolytic drugs due to a lack of coordinated emergency medical care and a scarcity of tPA. According to the present research, antiplatelet drugs like aspirin and lipid-lowering drugs like statins were the most often prescribed drugs while a patient was in the hospital. According to earlier studies, lipid-lowering and antiplatelet drugs were the most often given drugs for stroke patients who were hospitalized to hospitals. The most common antihypertensive drug prescribed to patients who had suffered an ischemic or hemorrhagic stroke was an ACEI (angiotensin-converting enzyme inhibitor). This is in line with research done in Ethiopia by Fikadu et al. (2011), which found that ACEIs were the most regularly prescribed antihypertensive drugs for stroke patients.

Poor treatment outcomes were reported in almost 40% of stroke patients who passed away in the hospital or were released with significant damage. This finding was insignificant in comparison to studies conducted in Ethiopia, which found that between 55 and 64 percent of stroke patients had poor treatment outcomes after therapy. This discrepancy may be caused by standard of treatment, in-hospital complications,

clinical vs brain imaging stroke diagnosis, and different research methods.

5.4 Results of Treatment for Stroke Patients

According to this research, poor treatment outcomes were associated with many factors, such as advanced age, altered level of consciousness at admission, concurrent heart failure, and aspiration pneumonia problems. A poor result has also been linked to comorbidities, advanced age, and complications (aspiration pneumonia), according to earlier research. However, a study conducted in Ethiopia by Fikadu et al. discovered that both the duration of hospital stay and educational attainment were independent predictors of subpar treatment outcomes. Several other studies, including those by Alemayehu et al.23 and Gebreyohannes et al.36, found that the only variables substantially linked to poor treatment outcomes were hemorrhagic stroke and increased blood creatinine. This disparity in predictors of poor treatment results might be due to differences in the study's size, follow-up period, risk factors, and other elements.

Following the stroke standard guideline for CVA treatment is essential for healthcare providers to perform at their highest level. An audit investigation on standard guideline adherence was carried out in this research. To assess the audit on recording of the indicators of conformity to standard guidelines, the healthcare professional directly inspected patient records after the patient's treatment. Direct observation was made simpler by using a checklist to keep an eye on the care provider as they handled a patient and document it in the appropriate patient records. The score was No = 0 if the procedure was not documented, and Yes = 1 if it was. Each executed procedure was given a score of one; if not, it was assigned a score of zero. A life result is better if the score is more than two, and worse if the score is less than two. After adding together all of the scores for the 17 areas that were looked at, logistic regression analysis was

performed. Yes/no/not sure questions were used to determine the degree of knowledge. Each accurate solution was worth one point, while each wrong answer was worth zero. Better life outcomes are indicated by a score of at least two, and poorer life outcomes are indicated by a score of less than two. After adding together all of the answers to the twelve knowledge questions, logistic regression analysis was performed. The results showed that participating medical professionals had a good understanding of stroke management. This result is similar to a research conducted in Bangladesh on the behavior of nursing students and their compliance with stroke care standards (Islam, Oh, Lee, & Kim, 2017). Some possible reasons for this participant's intermediate level of awareness include inadequate clinical practice, a lack of training on current stroke care, and the unit managers' lack of dedication to following the stroke guidelines.

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CHAPTER SIX

6.1 Conclusion

Men comprised the bulk of the 153 stroke patients that took part in the research. One in five of the patients smoked, and more than half came from rural regions. Ischemic stroke was the most often encountered subtype in our investigation. When they were admitted, most stroke patients were males in their mid-fifties. Hypertension, or high blood pressure, was one of the most common comorbid disorders identified.

ACEIs were the most often prescribed antihypertensive drugs in patients with both ischemic and hemorrhagic stroke, while aspirin and atorvastatin were the most often prescribed drugs in patients with both forms of stroke.

A large percentage of stroke patients had poor treatment results as a consequence of their disease. It was shown that aspiration pneumonia, heart failure, advanced age, and a lower level of consciousness upon admission were significantly linked to a bad outcome. Patient health might be improved by the use of thrombolytic treatment, the development of appropriate risk factor avoidance strategies, and the reduction of preventable outcomes such aspiration pneumonia.

The stroke Standardized protocols for the management of CVA are essential for the optimal performance of healthcare providers. detailed information on the elements taken into account when determining how medical professionals feel about treating stroke patients. The reliability of each of the 14 items was assessed using the Cronbach Alpha test. The findings' alpha values fall between 0.71 and 0.79, which is considered excellent.

6.2 Recommendation: Medical staff in Kakamega County need to get continual education and training in stroke treatment. By providing them with current information and understanding on stroke treatment, stroke clinical practice standards, and Ministry of Health policy, this will enable doctors to manage strokes more successfully.

• The management of strokes should be a concern for the whole population. This should be accomplished by disseminating the study's results to all relevant stakeholders, including administrators, medical experts, and the general public.

• The county health team should hold yearly clinical conferences and research seminars on stroke care to affect the attitudes and understanding of medical practitioners.

•Every county and county referral hospital should include a stroke unit and a stroke team composed of all medical staff and management, according to a county health team requirement. This team should ensure the availability of stroke drugs, a functional CT scan (finished within 12 hours) for all stroke suspicions, and adherence to the standard clinical recommendations defined by the ladder.

•The county health team should share the mission, vision, objectives, and standard clinical practice standards with all of the county's institutions in order to improve the quality of stroke treatment.

•To identify management shortcomings and provide the required suggestions, the hospital stroke team should regularly audit and analyze stroke-related mortality.

Similar studies should be carried out in the future for hospitals at levels three and below in order to improve primary stroke prevention and modifiable risk factors for stroke.

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APPENDICES

APPENDIX II: OBSERVATION CHECKLIST

APPENDIX III: ROSIER SCALE

APPENDIX IV: APRROVAL FROM DIRECTORATE OF POST GRADUATE STUDIES

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

Tel: 056-30870
Fax: 056-30153
E-mail: directordps@mmust.ac.ke
Website: www.mmust.ac.ke

P.O Box 190
Kakamega – 50100
Kenya

Directorate of Postgraduate Studies

Ref: MMU/COR: 509099

11th Nov, 2019

Simiyu Enos Walela,
HNR/54524/2017,
P.O. Box 190-50100,
KAKAMEGA.

Dear Mr. Walela,

RE: APPROVAL OF PROPOSAL

I am pleased to inform you that the Directorate of Postgraduate Studies has considered and approved your Masters Proposal entitled: ***"Evaluation of Management of Patients Presenting With Stroke in Selected Health Care Facilities of Kakamega County, Kenya"*** and appointed the following as supervisors:

1. Dr. Tecla Sum - SONMAPS, MMUST
2. Mrs Sharon Kosgey - SONMAPS, MMUST

You are required to submit through your supervisor(s) progress reports every three months to the Director of Postgraduate Studies. Such reports should be copied to the following: Chairman, School of Nursing & Midwifery Graduate Studies Committee and Chairman, Department of Nursing Research, Education and Management and Graduate Studies Committee. Kindly adhere to research ethics consideration in conducting research.

It is the policy and regulations of the University that you observe a deadline of two years from the date of registration to complete your master's thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours Sincerely,

Prof. John Obiri
DIRECTOR, DIRECTORATE OF POSTGRADUATE STUDIES

APPENDIX V: APPROVAL LETTER FROM IERC

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
Tel: 056-31375
Fax: 056-30153
E-mail: ierc@mmust.ac.ke
Website: www.mmust.ac.ke
P. O. Box 190-50100
Kakamega, Kenya

Institutional Ethics Review Committee (IERC)

Ref: MMU/COR: 403012 vol2 (73) **Date:** 16th December, 2019

Simiyu Enos Walela
Masinde Muliro University of Science and Technology
P.O. Box 190-50100
KAKAMEGA

Dear Mr. Walela

RE: Evaluation of management of patients presenting with stroke in selected health care facilities of Kakamega County, Kenya -MMUST/IERC/102 /19

Thank you for submitting your proposal entitled as above for initial review. This is to inform you that the committee conducted the initial review and approved (with minor revisions) the above Referenced application for one year.

This approval is valid from **16th December, 2019 through to 16th December, 2020.** Please note that authorization to conduct this study will automatically expire on **16th December, 2020**. If you plan to continue with data collection or analysis beyond this date please submit an application for continuing approval to the MMUST IERC by **16th November, 2020.**

Approval for continuation of the study will be subject to submission and review of an annual report that must reach the MMUST IERC secretariat by **16th November, 2020**. You are required to submit any amendments to this protocol and any other information pertinent to human participation in this study to MMUST IERC prior to implementation.

Please note that any unanticipated problems or adverse effects/events resulting from the conduct of this study must be reported to **MMUST IERC**. Also note that you are required to seek for research permit from **NACOSTI** prior to the initiation of the study.

Yours faithfully,

Dr. Gordon Nguka (PhD)
Chairman, Institutional Ethics Review Committee

Copy to:
- The Secretary, National Bio-Ethics Committee
- Vice Chancellor
- DVC (PR&I)
- DVC (A & F)

APPENDIX VI: APPROVAL LETTER FROM COUNTY GOVERNMENT OF KAKAMEGA

REPUBLIC OF KENYA
COUNTY GOVERNMENT OF KAKAMEGA

DEPARTMENT OF HEALTH SERVICES

Telephone: 056 31125
E-mail: pdmswestern@gmail.com
Website : www.kakamega.go.ke
When replying please quote

THE COUNTY DIRECTOR
P O BOX 2309- 50100
KAKAMEGA

Ref : CGK/MOH/CDH/1/9/441

DATE:14th FEBRUARY, 2020

To

Mr. Enos Walela Adm No. HNR/54524/2017
Masinde Muliro University of Science and Technology
School of Nursing,
P. O. Box 190-50100
Kakamega.

RE: RESEARCH AUTHORIZATION – EVALUATION OF MANAGEMENT OF PATIENTSPRESENTING WITH STROKE IN SELECT HEALTH CARE FACILITIES of KAKAMEGA COUNTY,KENYA

Your request to conduct research in Kakamega County is hereby approved by the County Department of Health Services for the period up to **12th November, 2020**. This is following an ethical authorization letter **MMU/COR:509099** from the IREC, directorate of postgraduate studies **Masinde Muliro University od Science and Technology** dated 11th November,2019 and subsequently **NACOSTI/P/20/3555** dated **13th February, 2020.**

You are instructed to remain within the confines of the research protocol as has been underscored in the ethical approvals. You are expected to submit an executive summary report within 90 days upon completion of the study to the County Research, Monitoring and Evaluation Co-ordinator, Department of Health Services, Kakamega County.

By a copy of this, the officers from relevant offices including the County TB and Leprosy Co-ordinator, are requested to accord you all the necessary support for

Thank you

Dr. John Tolo Boston Otieno.
County Research, Monitoring and Evaluation Co-ordinator,

APPENDIX VII: APPROVAL LETTER FROM NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **128833**

Date of Issue: **13/February/2020**

RESEARCH LICENSE

This is to Certify that Mr.. ENOS SIMIYU WALELA of Masinde Muliro University of Science and Technology, has been licensed to conduct research in Kakamega on the topic: EVALUATION OF MANAGEMENT OF PATIENTS PRESENTING WITH STROKE IN SELECTED HEALTH CARE FACILITIES OF KAKAMEGA COUNTY, KENYA for the period ending : 13/February/2021.

License No: **NACOSTI/P/20/3555**

128833

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

APPENDIX VIII: **A MAP OF KAKAMEGA COUNTY**