FACTORS ASSOCIATED WITH PRESENTATION OF STROKE AT THE EMERGENCY DEPARTEMENT MUHIMBILI NATIONAL HOSPITAL.

Winnifrida Wilbard Msangi, MD

Mmed (Emergency Medicine)

Muhimbili University of Health and Allied Sciences

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By:

Winnifrida Wilbard Msangi

A dissertation submitted in partial fulfillment of the requirements for the Degree of Master of Medicine (Emergency Medicine) of the Muhimbili University of Health and Allied Sciences

October, 2021

CERTIFICATION

The undersigned certify that they have read and herby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled **"Factors associated with presentation of stroke at the Emergency Department Muhimbili National Hospital"** in (partial) fulfillment of the requirements for the degree of Masters of Medicine (Emergency Medicine) of the Muhimbili University of Health and Allied Sciences.

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Dr. Hendry R. Sawe

(Supervisor)

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Date

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Dr. Said S. Kilindimo

(Co-supervisor)

_____

Date

DECLARATION OF COPYRIGHT.

I, Winnifrida Wilbard Msangi, declare that this is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature ……Date ……

ACKNOWLEDGMENT

I most importantly glorify and thank God for his blessings, and for giving me good health and most importantly perseverance during the entire 3years of my master's program and during the dissertation phase.

Sending gratitude and love to my Angel Mother and Father, for being there for me throughout my master's program and for always encouraging me and pushing me to do better each day.

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DEDICATION

To my Beautiful Mother Beatrice Msangi and my Loving Dad Wilbard Msangi.

ABSTRACT

Background: Stroke is among the most common causes of mortality and the leading cause of adult long-term disability. Early recognition and provision of appropriate interventions have been shown to improve the outcomes in most high-income countries.

Aim: To determine factors associated with presentation among suspected stroke patients presenting to the emergency department, Muhimbili National Hospital.

Methods: This was a prospective cross-sectional study with consecutive recruitment of all adults with suspected stroke presenting to the Emergency department of Muhimbili National Hospital for 3 months. Patients were identified using the ROSIER Scale i.e patients who had at least 1 point in the Rosier scale were recruited documented referral diagnosis of stroke, or evidence of stroke on the CT Head or MRI Brain. Care givers were interviewed about their knowledge of stroke symptoms and pathway from onset of symptoms until presentation to the EMD. Patient's clinical details were obtained from the hospital.

Descriptive statistics (Median and Interquartile Range) were calculated, student's T Test and Mann Whitney were used to compare continuous variables. Odds ratios were calculated as a measure of association between exposure and outcome.

Results: Among 350 patients presenting to the emergency department with suspected stroke, we recruited 324 (92.3%) patients of which 166(51.2%) were male and overall median age was 63Years (IQR 53-73 Years.). 305 (94.2%) patients presented to the EMD later than the recommended time window for thrombolysis (4.5Hours) and 5.9% of patients presented within 5Hours.

Care givers who had poor knowledge on stroke symptoms had a higher likelihood of late presentation to the EMD (OR 2.48, 95% C.I 1.29 – 4.79). Similarly, patients who were referred from outside facilities were more likely to present late to the EMD (OR 8.09, 95% C.I 3.63 – 18.02). And patients residing outside Dar es Salaam were 3.5 times more likely to present late to the EMD (O.R 3.56, 95% C.I 1.24 – 10.18)

Conclusion: Majority of patients with acute stroke present to the EMD of a national hospital later than the recommended time for thrombolysis. Knowledge was found to be significant factor for delay. Other significant factors for delay were Referral Status and Residency.

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LIST OF ABBREVIATION

AMS	Altered Mental Status
CVA	Cerebrovascular accident
ED	Emergency Department
EMD	Emergency medicine department
GCS	Glasgow coma scale
HIC	High income countries
ICU	Intensive care unit
IRB	Institutional Review board
LIC	Low income countries
LMIC	Low and middle income countries
LOC	Loss of Consciousness
MNH	Muhimbili National Hospital
MOI	Muhimbili Orthopedics Institute
MUHAS	Muhimbili University of Health and Allied Sciences
NIHSS	National Institute of Health Stroke score
rtPA	recombinant tissue plasminogen activator
SBP	Systolic Blood pressure
SPSS	Statistical package for the social sciences
SSA	Sub Saharan Africa
WHO	World health organization

DEFINITION OF KEY TERMS

Delay in seeking care for stroke : patients presenting to any facility after stroke symptoms beyond 4.5hrs (time is calculated from the last time patient was seen normal).(1)

Emergency care: Means the provision of initial resuscitation, stabilization, and treatment to acutely ill patients, and delivery of those patients to the best available definitive care, regardless of their ability to pay.

Emergency department: Is the department in the hospital which is responsible for providing the immediate care for patients with different medical or non-medical complaints such as surgical or trauma presenting in the department with or without a referral from other facilities.

Hemorrhagic Stroke: occurs when a blood vessel ruptures into the surrounding brain tissue.(2)

Ischemic stroke: This is caused by an occlusion of an artery to a region of the brain. (2)

ROSIER SCALE (Recognition of stroke in the emergency department)

ROSIER: is a 7 item stroke tool that incorporates the FAST elements (Facial weakness, Arm weakness, and speech disturbances and Time) plus leg weakness and visual field deficit. These symptoms are indicative of stroke and if present each receives a score of 1. A score of 1 and above is suggestive of stroke. The score also includes assessment of LOC or syncope and seizure activity which reduce the likelihood of a stroke and if present receive a score of -1.(3)

Stroke: refers to an acute neurological impairment that follows interruption in blood supply in a specific area of the brain.(2)

CHAPTER ONE

1 INTRODUCTION

1.1 Background

Worldwide stroke is the second leading cause of death and the third leading cause of disability. According to WHO, it is estimated that 15 million people annually suffer a stroke; of these 5 million will die and another 5 million are left permanently disabled, placing a burden on family and community. (4) Globally 70% of strokes and 87% of all stroke-related deaths and disability adjusted life years occur in low and middle income countries.(4,5)

However detailed data from patients presenting with stroke in these settings are lacking especially with regards to quality and implementation of stroke focused hospital care. Dedicated stroke units and stroke registries are nearly absent and uniform follow up throughout hospital stay and beyond discharge is infrequent in SSA.(5) . However, as the medical systems in LMICs' develop, these countries will be capable of delivering effective stroke therapy (thrombolysis) if patients arrive within the therapeutic window.

STROKE also called "cerebrovascular accident (cva) is a general term. It refers to an acute neurological impairment that follows interruption in blood supply to a specific region of the brain. The WHO'S definition of Stroke - 'rapidly developing clinical signs of focal disturbance of cerebral function, lasting more than 24hrs or leading to death with no apparent cause other than of vascular origin' will be used.

Stroke can be due to bleeding in the brain (Hemorrhage) or an acute blockage of an artery feeding an area of the brain (Ischemia)

For Acute Ischemic stroke, which accounts for about 80% of all strokes worldwide, outcomes, can be improved if patients reach medical care in a timely fashion. Intravenous thrombolysis with recombinant tissue plasminogen activator (rtPA) administered within 4.5hrs of symptoms onset is safe, effective and the standard treatment in terms of cost benefit and reduction of long term disability. For an anterior circulation acute ischemic stroke, thrombectomy is indicated within 16hrs of onset of symptoms.(1)

Despite readily available stroke centers with thrombolysis and thrombectomy expertise in high income countries, patients even in these countries rarely arrive within the time window for this treatment. One study showed that only 2% to 7% of all acute stroke patients currently receive treatment. (6) In LMIC's it is known that patients tend to present to hospitals for medical care very late in their disease. (7) We do not have much data on why patients present late, however the few studies done suggest lack of knowledge for the warning signs of the disease they are presenting with, financial constraints and belief in cultural/traditional healers are the most frequent causes of the delay in seeking care in general.(7)

Most of the stroke patients present to the emergency department MNH as referrals. They have presented first to a hospital nearer to them, but are referred because they need a brain CT scan and the outlying hospital does not have this service. However the delay from arrival to that hospital to MNH, and the time it takes for them to get a CT scan, is usually beyond the time line for thrombolytic. This raises the question of whether the referral is useful.

This study will examine the sequence of events that occur prior to patients arriving at MNH with a stroke, and determine factors associated with delay including demographics, financial situation, living situation and their knowledge on stroke symptoms.

1.2 PROBLEM STATEMENT

Worldwide stroke is the second leading cause of death and the third leading cause of disability.(4) Until recently nothing much could be done after an acute stroke especially in low income countries. For an acute ischemic stroke which accounts for about 80% of all strokes, intravenous thrombolysis by tissue plasminogen activator administered within 4.5hrs of symptoms has been shown to decrease long term disability.(1)
In most settings and most importantly in low income countries patients rarely present within the time window for thrombolysis. While currently few centers in SSA can provide thrombolysis and thrombectomy these interventions are useless if patients are not arriving to the hospital within the time required. At MNH, despite the availability of intravenous thrombolysis, patients rarely benefit from this treatment as they tend to present late to the emergency department. Very few patients come within the time window for this treatment.(8) This could be due to lack of recognition that they are having a stroke, delay in seeking appropriate care, or delay in referrals from peripheral hospital to a stroke center.

Furthermore, most patients are referred from peripheral hospitals to MNH for a CT scan of the head. However the time taken for them to get a CT scan is usually beyond the time window for treatment. Hence the question of whether referring patients to MNH for this reason is beneficial.

In Tanzania however, to date no study has been done to look at the timeliness of arrival of patients with stroke to the hospital or whether knowledge of stroke symptoms and recognizing that they need to seek care is a contributing factor to their delay

1.3 RATIONALE

Many studies have been done in High income countries looking at recognition of stroke symptoms among stroke patients and care givers, and association with seeking care within the time frame to receive intravenous thrombolysis. Most of them found out that knowledge of stroke by itself is not an independent factor for seeking care; instead factors like delay in getting to the stroke centers, delay in getting a CT scan before the time window, or failure of treating physician making a decision were contributing factors to delay among stroke patients.

This study hypothesizes that stroke knowledge and referral patterns are among the reasons patients present late to MNH where CT scans and Thrombolysis are readily available. Hence, this study will help in determining knowledge of stroke symptoms among the general population and associating this level of knowledge they have with timeliness to presentation to the hospital. It also aims to look at the relation of the referral pattern and presentation within the time window for thrombolytic treatment.

1.4 CONCEPTUAL FRAME WORK

Time to seeking care for stroke can be influenced by a variety of factors. Knowledge of stroke symptoms has been thought to be important, although this is not always borne out in other studies. Other potential factors might be age (feeling one is too young for a stroke, or too old to seek care), marital status (is someone else present to recognize the stroke symptoms) financial status and socioeconomic status, (willingness to seek care when it comes at a cost, or belief in other forms of medical care). The severity of stroke may affect recognition and willingness to seek care. The level and distance of the initial facility the patient sought care from will affect how quickly the stroke is recognized and how quickly the patient receives a scan.

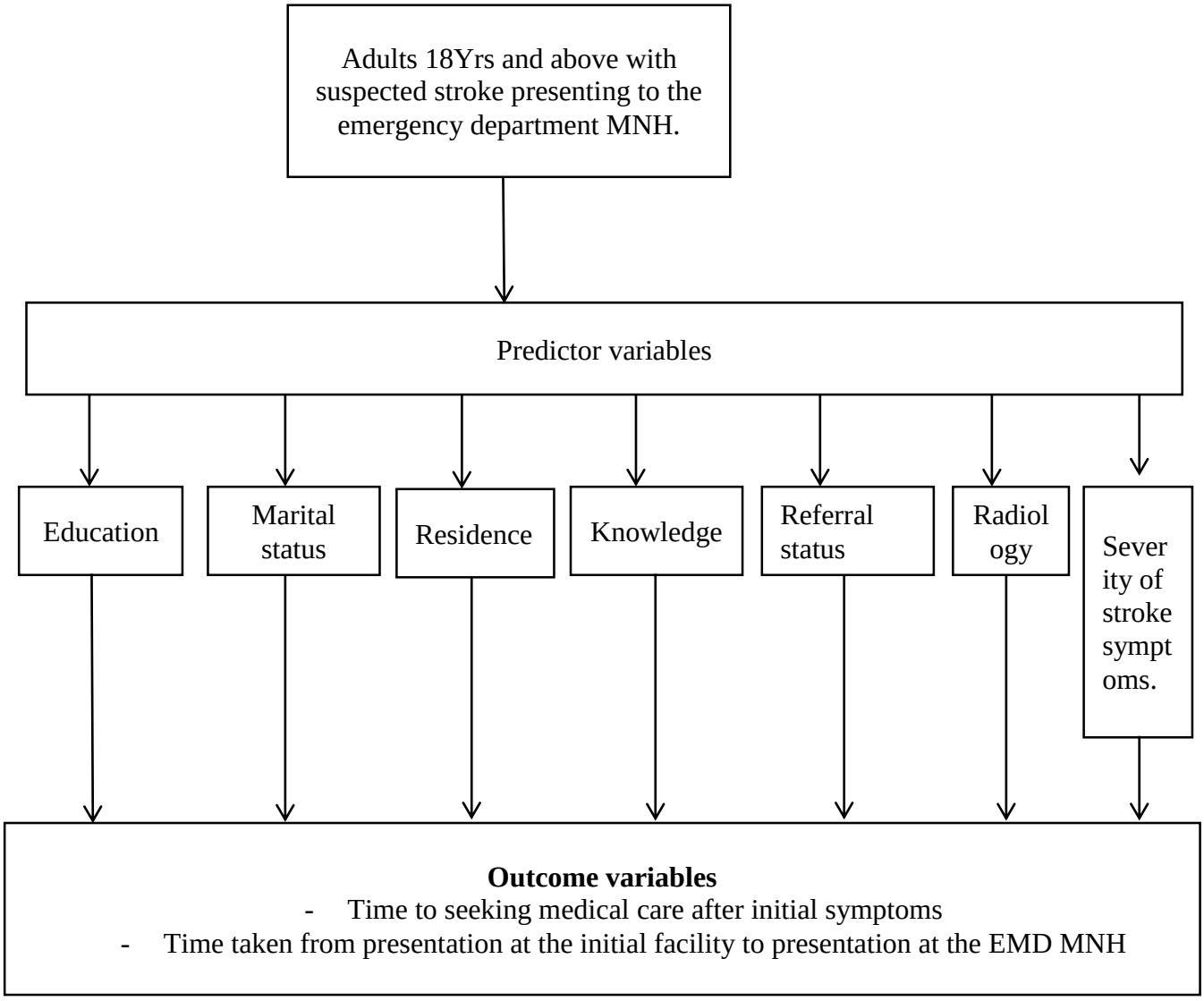

Figure 1: Conceptual Framework of Stroke pathway

1.5 RESEARCH QUESTION

What are the factors associated with presentation of stroke at the EMD, MNH?

1.6 OBJECTIVES

1.6.1 Broad objective.

To determine factors associated with presentation of stroke at the EMD, MNH.

1.6.2 Specific Objectives

1. To determine prevalence of stroke among patients presenting to the EMD-MNH
2. To determine time interval from onset of stroke symptoms to presentation at the EMD among patients with suspected stroke presenting to the EMD-MNH
3. To determine factors associated with delayed presentation among patients with suspected stroke patients presenting to the EMD-MNH.
4. To determine final disposition from the EMD among suspected stroke patients presenting to the EMD-MNH.

CHAPTER TWO

2 LITERATURE REVIEW

2.1 Incidence and proportions of stroke: (Burden)

Worldwide Cerebrovascular accidents (stroke) are the second leading cause of death and the second leading cause of disability. Globally 70% of strokes and 87% of both stroke related deaths and disability adjusted years occur in low and middle income countries.(4) According to CDC/American stroke association stroke facts - Stroke kills about 140,000 Americans each year, accounting for1 out of every 20deaths in that country. Someone in USA has a stroke every 40seconds and every 40 minutes someone dies of stroke. About 87% of all strokes in the US are ischemic strokes. (9)

However the picture is different in Africa, a study done by Mayowa O. Olowabi et al looking at the burden of stroke in AFRICA,- showed that the proportions of hemorrhagic stroke in Africa ranges from 29% to 57% in comparison with 16-20% in North America. (5) In the INTERSTROKE study. Hemorrhagic stroke was 34% in Africa and 9% in high income countries. (10)

In Tanzania, unpublished prospective study done by Bhupinder et al, in 2016, on 181 patients who met the inclusion criteria found that the proportions of stroke among adults presenting to the EMD-MNH is less than 2% with no detectable difference in proportions among Ischemic and Hemorrhagic stroke. The 30 day mortality was 33% and the authors concluded there was no clear relationship between availability of a CT scan and overall clinical progression of patients**.**

Francis Levira et all, looked at Mortality of Neurological disorders in Tanzania in May 2019 in a retrospective study done looking to estimate mortality of Neurological disorders in all ages and found out that of the 261 neurological deaths, the leading causes were CVA (33%) showing the burden of stroke in Tanzania. And among those who died of cerebrovascular disease, stroke was the leading cause of death constituting of 92% of all reported cerebrovascular deaths.(11)

2.2 Management of stroke

For eligible patients with acute ischemic stroke, intravenous rtPA is the first line therapy, provided it is initiated within 4.5 hrs. of symptom onset or the time last known to be well (at neurological baseline). Because the benefit of rtPA is time dependent, it is critical for patients to seek care as quickly as possible. Mechanical thrombectomy is indicated for patients with acute ischemic stroke due to a large artery occlusion in the anterior circulation who can be treated within 24hrs of symptom onset or the time last known to be well.(12) A review done by Salwa El Tawil and Keith., published in clinical medicine journal in 2017, noted that reperfusion by intravenous thrombolysis/thrombectomy significantly improves functional outcomes after stroke but benefits for modalities is highly time specific.(13)

Jonathan Emberson et al did a meta-analysis to look at effect of treatment delay, age and stroke severity on effects of intravenous thrombolysis for an acute ischemic stroke and found out that intravenous thrombolysis within 3hrs of onset resulted in a good outcome for 32.9% of patients who received alteplase Vs. 23.1% who received control.(14)Alan Byer et all determined early outcomes and safety of stroke thrombolysis in South Africa. They found out that of the studied patients who received thrombolysis 67% achieved significant neurological improvement. 53.8% of patients were discharged home and by discharge 40.5% were functionally independent.(15)

Unfortunately no study has been done to determine the benefits of thrombolysis in Tanzania as patients never present to the hospital within the time window, it is unclear if this is due to lack of availability or delay in reaching the emergency setting. And thrombectomy is currently unavailable in Tanzania.(8)

2.3 Delay in presentation hence failure to administer thrombolytic

While intravenous thrombolysis has been shown to improve outcome in stroke patients and is the only evidence based specific treatment for acute ischemic stroke other than thrombectomy which has become available. It needs to be applied as soon as possible after the onset of symptoms.(12)

A review done by A. Ragoschke et all in 2014 published in international journal of stroke looking at the Translation of ‘’Time is Brain’’ into clinical practice pointed out that there is significant delay in patients being at the stroke centers for thrombolysis within the time window. He points out despite the readily available stroke centers, only 2% to 7% of all acute stroke patients currently receive thrombolysis treatment.(6) In 2016, a retrospective study of prospectively collected data in stroke registry looking at reasons and evolution of non-thrombolysis in acute ischemic stroke, a study published in 2016, revealed that among the most common reasons for non-thrombolysis were admission delays which accounted for 66.3%.(7)

A study done by Bep boode et al looking to estimate the number of stroke patients eligible for thrombolytic treatment if delay could be avoided found out that the actual percentage of stroke patients treated with rtPA is small (varying from 1-5%). And that 35% of patients presented too late to be eligible for thrombolytic therapy either due to patient or doctor delay.(16)

Jonathan Emberson et all did a meta-analysis to look at effect of treatment delay, age and stroke severity on effects of intravenous thrombolysis for an acute ischemic stroke and found out that intravenous thrombolysis within 3hrs resulted in a good outcome for 32.9% of patients who received alteplase Vs. 23.1% who received control, and delay for more than 4.5 hrs. resulted in a good outcome for 32.6% patients who received alteplase vs. 30.6% who received control. Showing that earlier treatment was associated with greater proportional benefits.(14)

2.4 Barriers to Thrombolysis

Many studies have been done both in high and low income countries to look at reasons as to why thrombolysis is not performed as often as it needs to be especially in low income countries. One study by Boper et all found out that percentage of patients with an acute ischemic stroke who actually get thrombolysis is as low as 1-5%. The most important barrier is delay in presentation to the hospital, patients present beyond the time window either due to lack of knowledge of their symptoms, not considering stroke symptoms as an emergency etc.(17)

Joseph Kwan et all did a systematic review of barriers to Thrombolysis for acute stroke and found out that the most important pre hospital factor was the patent's poor knowledge of stroke which delayed their urgent request for medical help. He also noted some in hospital barriers such as delay in getting an initial medical assessment, delay in getting a CT SCAN ,and even delay in transferring the patients to the neurology centre as barriers for delay in thrombolysing the patients(7) A study from Melbourne Australia examined factors for delay and found out that 68% of patients presented within 12Hrs and 85% within 24Hrs of symptom onset. The two factors that contributed most to the delayed onset was patient indecision (3hrs) and Physician delay (10hrs). This emphasizes the need for continued physician education about the importance of rapid evaluation and treatment of stroke patients. Other than the known pre hospital delays, Ragoschke et all also noted that a complex diagnostic workup including neurological examinations, imaging studies and labs that are necessary to exclude haemorrhage or other contraindications to rtPA further delay the narrow time window hence failure to get the treatment.(6)

In Developing countries, Kavian et all found out that among factors for delay in thrombolysis for acute stroke patients, none recognition of stroke warning signs by patients at risk, families, and the general public and even health care workers was among the most important barriers for thrombolysis in developing countries. There are also cultural and religious barriers that impede early presentation, even when stroke is recognized, half of the patients do not go to the hospital or see a doctor, thus consideration of heath behaviour is also an important factor.(17)

A Study done in Zimbabwe by Ferayi et all to look at factors associated with hospital arrival after the onset of stroke symptoms found out that lack of readily available money to pay for hospital fee at the time of stroke was the most significant factor influencing delay to present to the hospital. He also found out that going to clinics or other institutions that do not have stroke management abilities only to be referred further delays arrival to the appropriate hospital.(18)

Unfortunately no study is done in Tanzania to look at barriers for thrombolysis in Tanzania. Among the aims of this study is to shed some light on the barriers for thrombolysis in Tanzania.

2.5 Public knowledge associated with early presentation

Some studies show that among factors influencing stroke patients to present early (within the time window) to the hospital after an acute stroke, knowledge of the symptoms he/she is experiencing is among the important one.

A study done in Duke university by Mark J Alberts et all looked at the effects of public and professional education in reducing the delay in presentation and referral of stroke patients where they aimed to determine if an intensive focused program of public and professional education reduced the time delay and found out that after educational efforts more than 85% of patients presented to their facility within 24Hrs of symptom onset in comparison to <40% before the program.(19) However, data from the "American get with the guideline stroke registry" showed that despite considerable attempts to improve stroke management (e.g. by public education programs) delays in time to hospital admission did not improve.

Some studies have pointed out that patients may know that they are having a stroke but fail to recognize stroke is an emergency and that they need to seek care immediately. Farayi et al from Zimbabwe found out in his study that of the participants, only less than half (33%) were able to recognize symptoms of stroke. And 50% of his participants knew stroke as a serious illness(18)

CHAPTER THREE

3 METHODOLOGY

3.1 STUDY DESIGN

This was a prospective cross-sectional study of all adult patients (aged 18yrs and above) with acute suspected stroke presenting to the Emergency Department (EMD) of Muhimbili National Hospital (MNH).

3.2 STUDY AREA

This study was conducted at the Emergency Department-Muhimbili National hospital. Emergency Department (EMD) of the Muhimbili National Hospital (MNH) is an entry point for most of the patients presenting to Muhimbili National hospital.

The EMD was inaugurated in January 2010 and is the first public full capacity emergency department in the country, having emergency physicians available in the department for 24hrs everyday including weekends to serve and to treat critically ill patients, conduct research in emergency medicine and train emergency care providers all over the country. As a tertiary referral hospital, most of the patients seen at EMD are referred from different regional or district hospitals and primary care have been commenced before referrals, as well as self-referral from home.

The EMD is staffed by emergency physicians, Residents, Registrars, Intern doctors, Nurses and health attendants plus other non-health care workers. EMD-MNH is made up of Triage area, Treatment areas where priority and Queue patients are treated, and Resuscitation areas where Emergency patients with immediate life-threatening conditions are treated. About 150-200 patients are attended at the emergency department in 24Hhrs and an average of 50patients is seen at the Resuscitation areas.

Suspected stroke patients are usually referred in to EMD-MNH from peripheral hospitals for brain CT scan, most patients that are sent here will not have a CT done, and patients are then seen at the EMD, where most will be seen at the Resuscitation rooms depending on the severity of their symptoms, CT scan brain will be done and patients will be channeled in to the respective wards depending on the type of stroke. Ischemic strokes will be sent to Neurology ward, and hemorrhages sent to Neurosurgical ward.

The Neurology ward at the MNH is one that is designated and capable of managing stroke patients.

3.3 TARGET POPULATION

All adults with suspected stroke who presented to the emergency units of tertiary hospitals in Tanzania.

3.4 ACCESSIBLE POPULATION

All adults with acute suspected stroke presenting at Emergency medicine department MNH – tertiary Hospital, Dar es Salaam -Tanzania

3.5 STUDY POPULATION

All adults with acute suspected stroke who presented to the Emergency department during the study period who met the inclusion criteria and consent to study.

3.6 SAMPLING DESIGN

Consecutive sampling of patients with suspected stroke presenting to the Emergency department–MNH.

3.7 SUBJECTS

3.7.1 Inclusion criteria

Patients had to meet at least one of the criteria to be included in the study.

1. All adults aged 18 Yrs. or above presenting to the EMD-MNH with suspected stroke that score at least 1 point in the ROSIER scale.
2. Brain CT scan evidence of a recent stroke
3. Patients referred with a referral diagnosis of stroke who meets at least 1 point in the ROSIER scale.

3.7.2 Exclusion criteria

1. Patients with old stroke (previously diagnosed stroke which is not a cause of the current presenting symptom)
2. Trauma patients.

3.7.3 Variables of interest

Predictor variables

- Demographic data (Age, Sex, Marital Status)
- Knowledge of stroke symptoms. (No knowledge, some knowledge, good knowledge)
- Time of onset of symptoms.
- Education level. (Primary, Secondary, University)
- Severity of symptoms (NIHSS SCORE)
- Distance and level of the first health centre they presented to after symptom onset. (Health centre, Regional hospital, tertiary hospital,

Confounding variables

Stroke Mimics. (Hypoglycaemia, Seizures etc.)

Outcome variables

The primary outcome

- Proportion of patients with delayed presentation among suspected stroke patients presenting to the emergency department-MNH.

Secondary outcome

- Time from symptoms onset to presentation to the to the first health centre.
- Time from initial facility to EMD – MNH presentation.
- Predictors of delayed presentation.

3.7.4 Sample Size Estimation

The sample size of this study was estimated based on the proportion of patients who delay to present at the EMD, MNH beyond the time window for thrombolysis. (4.5Hrs) Sample size was estimated from results from a study done in Ethiopia which looked at Stroke event factors among adults patients admitted to a stroke unit. This study revealed that of the studied group of stroke patients, **only 14 patients (12.1%) presented within 4.5Hrs.** Almost half (47.4%) of patients presented within 24Hrs and 22.4% of patients presented beyond 72Hrs

The total no of the patients who presented beyond 4.5hrs i.e. 47.4% + 22.4% was used to estimate the proportion of patients who present beyond the time window for thrombolysis in this study.

Hence a 69.8% proportion was used for calculation of the sample size.

$$N = \frac{Z^2 p (1-p)}{\varepsilon^2}$$

z – Level of confidence (1.96 value obtained from the table of 95% confidence interval)
p – Expected proportion = 69.8% - 0.698
ε = margin of error = 0.05

= 321
Hence the estimated sample size for this study was **321** patients.

PATIENT RECRUITMENT AND DATA COLLECTION

Screening and enrollment:

Patients screening and enrollment was overseen by the principal investigator and research assistants who were available in the emergency department 24hourly, seven days a week to ensure all eligible patients were captured during the study period. Potentially eligible patients were identified using the chief complaint at triage, which is presented on the EMD electronic tracking board (wellsoft). Patients triaged as weakness, slurred speech, AMS, LOC, convulsions, visual disturbances, were screened. Patients were approached by the research assistant or investigator and with the patient's verbal consent a quick ROSIER scale was performed and the referral letter was scanned for the referral diagnosis and the reasons for referral.

For walk in patients, a ROSIER scale was performed on them and they were enrolled accordingly.

Standardized data collection tool

A research assistant was trained prior to the commencement of data collection on which patient he should include, how to perform an interview and collect data, and how to communicate with the patient, family or caregivers in situation where the patient cannot consent. A questionnaire was used to collect data as the patient arrived at ED and the patient consented to participate in the study.

We used a modified standardized questionnaire that assessed knowledge already used in the sub Saharan African settings, some modification done for our settings at Tanzania were made. (5,20)

The standardized data collection form had two parts:

1. **Part I: Baseline assessment of patients**: Demographics, presenting complaints, when did the presenting symptom start, where did the patient go to first to seek care, and when did they refer the patient to a tertiary hospital with capability of stroke management.

2. **Part II: Knowledge on Stroke Symptoms:** A questionnaire was used to assess the knowledge of stroke symptoms among caregivers.

3.8 DATA ANALYSIS

Data entry and analysis was done by using Red cap (Version 6.0.1, Vanderbilt University, Tennessee, USA will be exported into the Excel file (Microsoft corporation, Redmond, WA, USA) and then the data exported to Statistical Package for Social Science (SPSS version 23.0, IBM, Ltd, North Carolina, USA) for analysis.

For continuous variables Descriptive statistics – Median and Interquartile Ranges, OR Mean and Standard Deviation (in normal distribution) were used. For Categorical variables e.g. association of stroke symptoms knowledge and seeking care, chi-square test/T-test was used.

Logistic regression was used to obtain odds ratio for factors associated with delay, and Multivariate analysis was done for the significant factors for delay ($p<0.05$).

3.9 ETHICAL CONSIDERATION

Ethical clearance to conduct this study was obtained from MUHAS IRB. Approval for data collection was sought from respective authorities at MNH. All eligible adult patients

presenting to the EMD were enrolled after obtaining a signed informed consent from the patient and/or caregiver. In cases where the patient/caregiver was unable to give informed consent, such as when the patients present with altered mentation and the relatives/care givers were not available, patients were recruited and once the relatives arrived and/or patient regained consciousness informed consent was sought then. Acquired records were coded to hide patient's identity and stored in computer with password known by researchers only. The written forms were kept in a safe cabinet accessed by only researchers.

CHAPTER FOUR

4 RESULTS

4.1 Flow diagram of adult suspected stroke patients.

Flow diagram of adult suspected stroke patients.

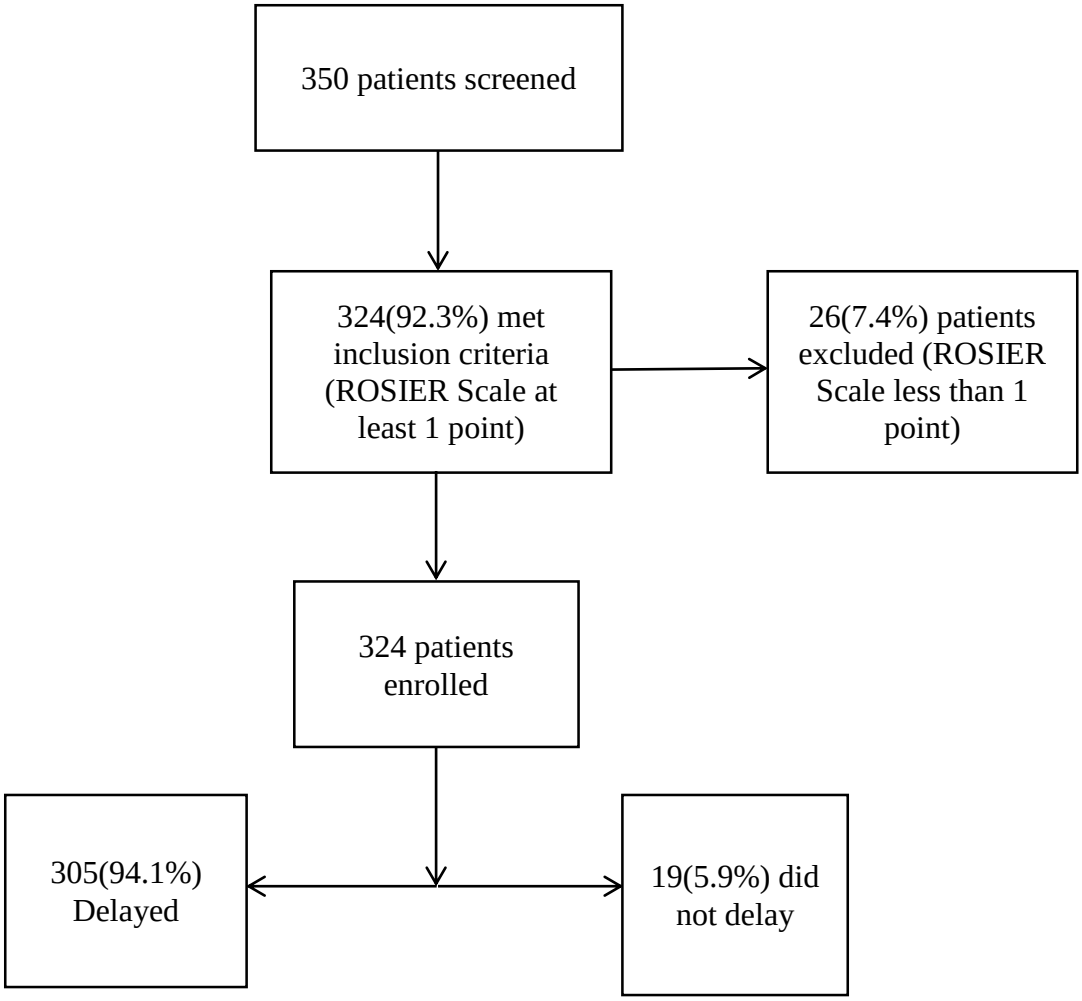

Figure 2: Flow diagram of adult suspected stroke patients

4.2 **Social demographic characteristic of adult suspected stroke patients presenting to the EMD MNH and their caregivers**.

Among 350 patients presenting to the EMD with suspected stroke symptoms, we recruited 324 patients (92.3%) of which 166 (51.2%) were male and overall median age was 63Yrs (IQR 53-73). Of the patient's caregivers more than half had primary school level education 235 (72.5%). 274 patients were referred from other centers and 50 patients got to EMD MNH directly from home (i.e. not referred). 264(81.5%) were from Dar es Salaam and 60 patients (18.5%) were from outside Dar es Salaam.

Table 1: Socio demographic characteristics of adult suspected stroke patients presenting to the EMD MNH and their caregivers.

Variable		Frequency (n)	Percent (%)
Informants			
	Patient's family member	324	100
Age group (years)	≤ 60	144	44.4
	>60	180	55.6
Median age (IQR) (years)		63 (53-73)	
Comorbidities	Hypertension	250	77.1
	DM	30	9.3
	Others	44	13.6
Sex	Male	166	51.2
	Female	158	48.8
Marital status	Married	249	76.9
	Divorced	5	1.5
	Single	20	6.2
	Widow/Widower	50	15.4
Level of Education	University education	14	4.3
	A – level secondary education	9	2.8
	O – level secondary education	28	8.6
	Primary education	235	72.5
	No formal education	38	11.7
Religion	Christian	161	49.8
	Muslim	160	49.5
	None	2	0.6
Residence	Dar es salaam	264	81.5
	Outside Dar es salaam	60	18.5
Reason for referral	CT Brain	274	84.6%
	Others	50	15.4%

4.3 Clinical characteristics of adult suspected stroke patients presenting to the EMD-MNH.

Of the 324 suspected stroke patients enrolled 258(79.6%) presented with hemiparesis. 290 patients did CT at the ED, of the patients who had imaging (CT Brain), 174(60%) had ischemic stroke, 75(25.9%) had hemorrhagic stroke, and 41(14.1%) had other findings. 34 (10.5%) patients did not do imaging at the EMD.

Table 2: Clinical characteristics of adult suspected stroke patients presenting to the EMD-MNH.

Variable		Frequency	Percentage (%)
Mouth deviation	Yes	101	31.2
	No	223	68.8
Hemiparesis	Yes	258	79.6
	No	66	20.4
Slurred Speech	Yes	247	76.2
	No	77	23.8
Pupils	Equal	310	96.0
	Unequal	13	4.0
Rosier score	1 and above	324 of 350	92.3
CT Scan finding	Ischemic	174	60.0
	Hemorrhagic	75	25.9
	Others	41	14.1
Not done CT at the EMD		34	10.5

**Key – Others =normal CT brain/Brain atrophy

4.4 Prevalence of stroke among patients presenting to the EMD MNH.

During the study period, total number of patients who presented to the EMD, MNH was 31,653. Of the total patients, suspected stroke patients who met inclusion criteria according to the ROSIER Scale during the study period were 324patients.

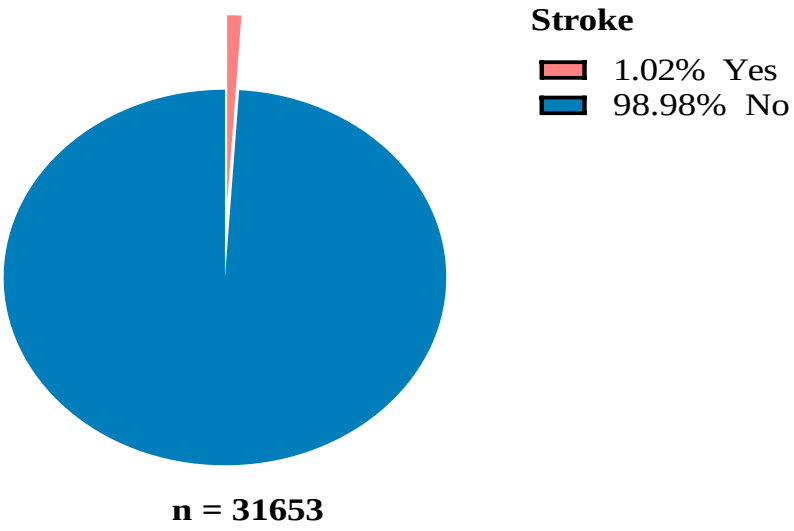

Figure 3: Prevalence of adult suspected stroke patients who met the Rosier Scale Inclusion criteria during the study period.

4.5 Time interval from onset of stroke symptoms to presentation at the EMD MNH

Of the studied patients 124(38.4%) sought care within 5Hrs of symptom onset 113(35%) patients sought care within 5-12hrs of symptom onset, 33(10.2%) sought care within 12-24hrs after symptom onset and 53(16.4%) sought care more than 24Hrs after symptom onset.

Most patients presented to either a regional hospital or health center after symptom onset while 33(10.2%) of the patients came to the EMD, directly from home i.e. not referred. No patient reported to have gone to a dispensary to seek care.

Only 19 (5.9%) patients got to the EMD within 5Hrs of symptom onset.
Total time spent from onset of symptoms to presentation at the EMD MNH was >24Hrs for most patients i.e 194 patients (59.9%). A lower proportion of patients 87 (26.9.%)

had a total time of around 12-24 Hrs and 24patients (7.4%) presented to MNH around 5-12Hrs from symptom onset.

Table 3: Time interval from onset of stroke symptoms to presentation at the EMD MNH

Variables	Frequency (n)	Percent (%)
Time from onset of symptoms to presentation to the EMD MNH		
Within 5 hour	19	5.9
5 – 12 hours	24	7.4
12-24 hours	87	26.9
>24 hours	194	59.9
When did the patients seek medical care		
Within 5 hours	124	38.4
5 – 12hours	113	35.0
12-24hours	33	10.2
>24 hours	53	16.4
Where did the patients go first to seek care		
Health center	108	33.3
District hospital	44	13.6
Regional hospital	116	35.8
Zonal hospital	2	0.6
Tertiary hospital	3	0.9
Patient came to EMD from home	33	10.2
Private hospital	18	5.6

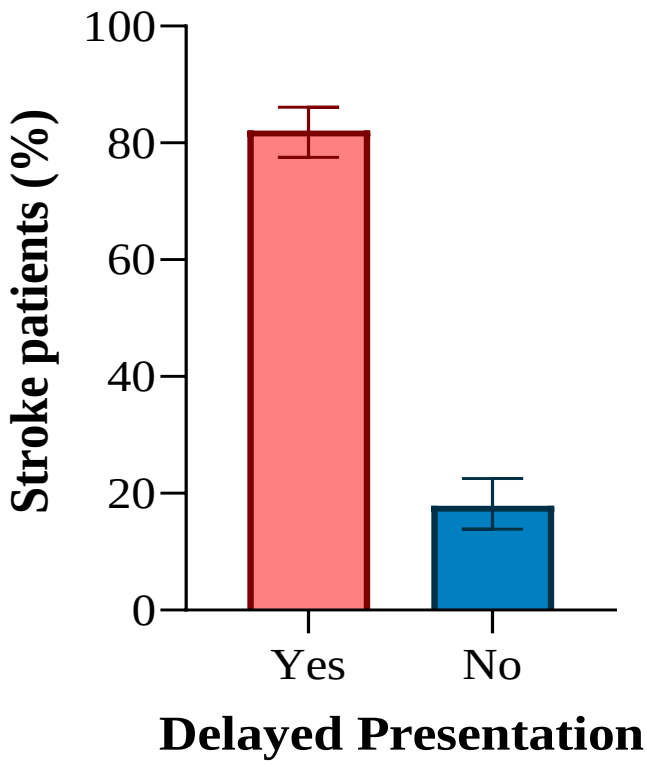

Figure 4: Percentage of adult suspected stroke patients who presented to the EMD MNH beyond 5Hrs (Delayed presentation)

More than half (80%) of patients presented to the EMD-MNH beyond 4.5hours, (delayed presentation) only 20% of patients presented within the timeline for thrombolysis i.e. 4.5Hrs.

4.6 Factors associated with delayed presentation among adult suspected stroke patients presenting to the EMD MNH.

In bivariate analysis using chi-square, factors that had statistically significant association with delayed presentation were poor knowledge on stroke symptoms of the care giver (P 0.010), place of residence outside Dar es Salaam (P 0.032) and having being referred from another hospital (P<0.001) Table 4.

Delay is higher in patients whose caregiver's knowledge on stroke symptoms was poor-155 (87.1%) as opposed to those whose caregiver's knowledge was good to very good 111(76%). Delay was also more frequent among patients who were referred from another hospital -237(86.5%) as compared to those who presented to the emergency department directly -29 (58%). Also patients who lived outside Dar es Salaam were more likely to

arrive to MNH with delay 55(91.7%) as opposed to those who came from Dar es Salaam 211(79.9%)

Table 4: Factors associated with delayed presentation among adult suspected stroke patients presenting to the EMD MNH.

Variables	Category	Delayed n (%)	Not delayed n (%)	P - value
Education completed	A level to University	15 (65.2)	8 (34.8)	0.167
	O level secondary	25 (89.3)	3 (10.7)	
	Primary	194 (82.6)	41 (17.4)	
	No formal	32 (84.2)	6 (15.8)	
Marital status	Married	200 (80.3)	49 (19.7)	0.128
	Not married	66 (88.0)	9 (12.0)	
Residence	Dar es salaam	211 (79.9)	53 (20.1)	**0.032**
	Outside Dar es salaam	55 (91.7)	5 (8.3)	
Knowledge of stroke	Poor	155 (87.1)	23 (12.9)	**0.010**
	Good to very good	111 (76.0)	35 (24.0)	
Referral status	Referred	237 (86.5)	37 (13.5)	**< 0.001**
	Not referred	29 (58.0)	21 (42.0)	
Brain imaging	Done before arrival to MNH	12 (85.7)	2 (14.3)	1.000
	Done after arrival to MNH	252 (81.8)	56 (18.2)	
Mentation	Conscious	252 (81.6)	57 (18.4)	0.487
	unconscious	14 (93.3)	1 (6.7)	

4.7 Multivariate Analysis of factors associated with delayed presentation among adult suspected stroke patients presenting to the EMD MNH.

In Multivariate analysis model adjusted for all factors with P <0.2 knowledge, referral status and residence were found to be independent predictors of timeliness of presentation. An additional factor for delay was brain imaging (whether/not patient got imaging done before arrival to the EMD – MNH.

Patients whose care givers had Poor knowledge on stroke symptoms were 2.4 times (OR 2.48 (95% C.I 1.29 – 4.79) likely to present late to the EMD (beyond 4.5Hrs)

Patients who were referred from different facilities were more likely to present late to the EMD (OR 8.09 (95% C.I 3.63 – 18.02)

Patients residing outside Dar es salaam were 3.5 times more likely to present late to the EMD (O.R 3.56(95% C.I 1.24 – 10.18)

Education level, marital status, and Severity of stroke symptoms were not found to be significantly associated with delayed presentation among suspected stroke patients presenting to the EMD.

Table 5: Multivariate Analysis of factors associated with delayed presentation among adult suspected stroke patients presenting to the EMD MNH.

	Univariate analysis			**Multivariate analysis**		
Variable	**cOR**	**95% CI**	**P -value**	**aOR**	**95% CI**	**P - value**
Education level						
A level to university	0.35	0.10 – 1.19	0.094	0.69	0.17 – 2.73	0.592
O level secondary	1.56	0.36 – 6.87	0.555	1.51	0.31 – 7.31	0.609
Primary education	0.89	0.35 – 2.26	0.802	1.05	0.37 – 3.01	0.930
No formal education	Ref					
Marital status						
Not married	1.80	0.84 – 3.85	0.132	1.93	0.81 – 4.61	0.141
Married	Ref					
Resident						
Outside Dar es salaam	2.76	1.05 – 7.24	**0.039**	3.56	1.24 – 10.18	**0.018**
Dar es salaam	Ref					
Knowledge on stroke						
Poor	2.12	1.19 – 3.79	**0.011**	2.48	1.29 – 4.79	**0.007**
Good and very good	Ref					
Referral status						
Referred patients	4.64	2.40 – 8.97	**< 0.001**	8.09	3.63 – 18.02	**< 0.001**
Self-referral patient	Ref					
Radiological investigation						
Done before arrival to MNH	1.33	0.29 – 6.12	0.712	8.03	1.43 – 45.23	**0.018**
Done after arrival to MNH	Ref					
Severity of stroke						
Unconscious	3.17	0.41 – 24.57	0.270	1.55	0.19 – 12.83	0.683
Conscious	Ref					

4.8 Final Disposition of adult suspected stroke patients presenting to the EMD MNH.

More than three quarters of adult suspected stroke patients who presented to the EMD during the study period were admitted to the Neurology ward (83%). 12.3% were admitted to the Neurosurgical ward and 2% were admitted to the intensive care unit and HDU.1% of the adult suspected stroke patients died at the emergency department and 1% was discharged home.

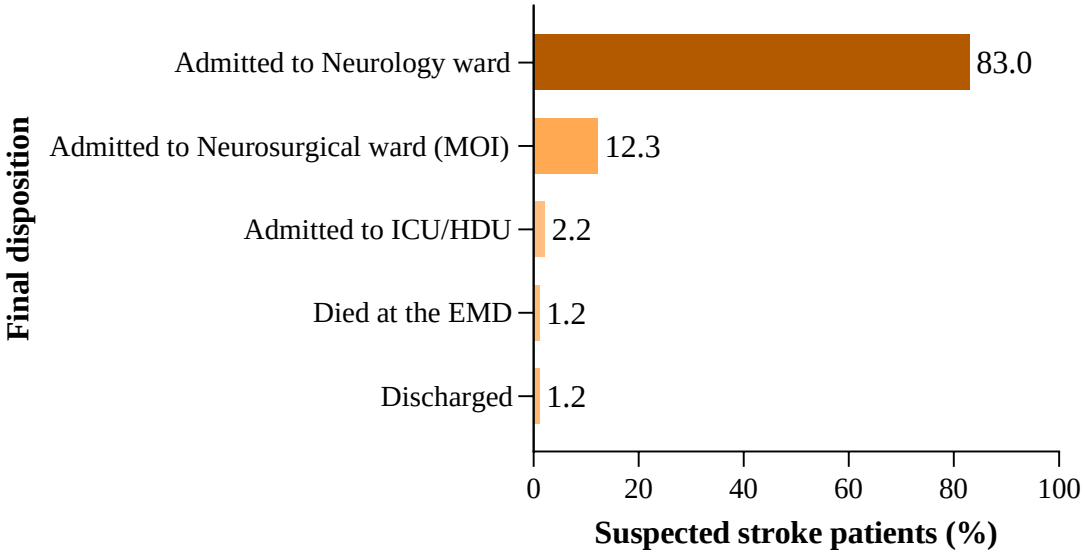

Figure 5: Final disposition of suspected stroke patients from the EMD.

CHAPTER FIVE

5 DISCUSSION

This prospective cross-sectional study aimed to determine factors associated with presentation of stroke at the EMD, MNH.

Knowledge, residence and referral status were independent predictors of delay in the studied patients. There was no statistical significance in association of delay with education level of the care giver, marital status of the patient or severity of the stroke symptoms. Most of adult suspected stroke patients who presented to the EMD MNH were admitted to Neurology ward, which is a capable stroke unit and most patients who did imaging before arriving to the ward had Ischemic changes in their CT Head.

Delay from symptom onset to admission to a stroke capable unit is common in low income countries. We found high proportion of patients presented after 4.5Hrs which is similar to previous studies done in low- and middle-income countries particularly in Africa,(21) However these findings are not similar to a study done in Tunisia which reported proportions of patients who arrive at the hospital within 3Hrs from stroke onset was 43% and another low proportion was 10% which was reported in Nigeria (22). The findings in our study are also consistent with a study done by Mohamed Acherqui in Morocco in which only 8.42% of patients were eligible for thrombolysis, and of these 74% of patients were ineligible because of onset to thrombolysis delay of more than 4.5Hrs (23). The proportion of patients with delays exceed those reported in some of the developing countries but remain significantly lower than ones reported in developed countries, a possible explanation for this difference might be the differences in sociodemographic characteristics and lifestyle of the study settings.

Among significant factors associated with delay in seeking care for suspected stroke patients was knowledge on stroke symptoms and knowing when and where to seek care.

We found more than three quarter of the studied patient's caregivers had poor knowledge on stroke symptoms. This is consistent with a study done in Kampala Uganda by Mark et all which revealed that of the studied participants only 17.7% knew three or more warning signs of stroke, majority knew one or two. (20) Another study done in Egypt looking at public awareness also revealed similar findings, knowledge on stroke warning

signs is still poor and people do not recognize most of the signs(24). Another study done in Tanzania by Julian revealed almost similar findings on knowledge of stroke symptoms, a very small percentage of respondents could name a conventional stroke symptom and less than 1% were able to identify 3 symptoms(25). These proportions are compared to those reported outside SSA, an example of this is seen in studies done from North America, Europe and Asia which showed more than half of lay people could correctly identify at least one stroke symptom without a pick list.(26,27)

In our study more than half of the participant's caregivers were able to cite Hypertension as stroke risk factor; this is encouraging considering the relationship between hypertension and stroke. However, communities still need to be made more aware and health education need to emphasize on the significance of hypertension. This is not in consistence with a study done in Kampala which showed a bit less percentage of patients, were able to recognize hypertension as a significant risk factor for stroke(20)

In our study over 80% interviewed care givers picked Hospital as where they would go to in an event of stroke, this is encouraging to see the community knows where to seek help in case of a stroke, and this shows that majority of people know where to go to incase they get a stroke, they just don't recognize the stroke symptoms early enough. These findings are consistent with what was found in a study done by Julian et all, which also revealed a proportion of 88.3% who chose Hospital as where they would go to incase of a stroke(25)

Another significant factor for delay found in our study was Referral status. Most patients spent more than 5 Hours at the referring hospital being stabilized and going through a series of evaluation before getting to MNH which is a capable stroke unit. It could further be accounted for by the hierarchical referral system in place in Tanzania as this study was conducted in tertiary hospital which was the last and highest destination in the chain of referral and the only stroke capable center in Tanzania.(28)
This is contradicting with many studies done in both SSA and developed countries looking at factors for delay among stroke patients, this can be explained by the fact that other hospitals outside Tanzania transfer patients to a stroke capable center as soon as

they present to their facility, which is not the case in Tanzania.(7,17). Findings in our study were consistent with findings in a study done in Nigeria by Philip et al which revealed significant delay of more than 3Hrs among patients who were referred from other facilities to a stroke capable center(29)
In contrast most of the patients who came straight to EMD MNH from home, presented in less than 5Hrs of symptom onset.

Another significant factor for delay was Residence, most patients who lived outside Dar es Salaam, where MNH was located presented later than the time window for thrombolysis. Most got to the EMD more than 12Hrs after symptom onset, this could be explained by transport and infrastructure hurdles in developing countries.

Other factors like Education, Marital status and severity of stroke did not significantly contribute to delay in this population.

About 83% of suspected stroke patients in this study were admitted to Neurology ward which is where the stroke unit is, this is because this group of patients had Ischemic findings in their imaging hence diagnosed as Ischemic stroke. The rest of the patients whose imaging revealed Hemorrhage were transferred to a Neurosurgical ward.

5.1 STRENGTHS

1. Consecutive recruitment of suspected stroke patients presenting to the EMD was done hence reducing the chances of missing participants
2. Structured evaluation of stroke knowledge using validated tool.

5.2 LIMITATIONS

This was a single centred study at a tertiary hospital and therefore has reduced generalizability, however MNH is the only stroke capable public centre in Tanzania hence we may have received patients from all over the country.

CHAPTER SIX

6 CONCLUSSION AND RECOMMENDATION

6.1 CONCLUSSION

Delay among stroke patients to a tertiary hospital is a significant factor for delay. Independent factors for delay found in this study were poor knowledge, residency outside Dar es Salaam and being referred from a lower level health facility. Even the small proportion of patients who got to the emergency department within the thrombolysis time window were not thrombolysed.

6.2 RECOMMENDATION

1. Creating public awareness on warning signs and presentation of stroke among communities, especially those with risk factors, through mass media, television programs, social networks or commercials. This will ensure a larger population is reached and educated.

2. Guidelines should be put in place in referral facilities which will guide rapid transfer of suspected stroke patients to a stroke capable centre. Patients should not spend much time at a centre with no capabilities for stroke management so that they get to a stroke centre within the recommended thrombolysis time window.

3. A larger study is needed to further evaluate and map factors for delay in each level of acquisition of care before presenting to the tertiary hospital among stroke patients.

4. Another study to assess the reason as to why even the small proportion of patients that got to the ED within the time for thrombolysis were not thrombolysed.

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APPENDIX

APPENDIX I: CASE REPORT FORM

INCLUSSION CRITERIA

1. All adults aged 18 yrs. or above presenting to the EMD-MNH with suspected stroke that score at least 1 point in the ROSIER scale.
2. Brain CT scan evidence of a recent stroke
3. Patients referred with a referral diagnosis of stroke who meets at least 1 point in the ROSIER scale.

Exclusion criteria

1. Patients with old stroke (previously diagnosed stroke which is not a cause of the current presenting symptom)
2. Trauma patients.

PATHWAY TO EMERGENCY CARE AND KNOWLEDGE OF STROKE AMONG ADULT PATIENTS WITH SUSPECTED STROKE PRESENTING TO THE EMERGENCY DEPARTEMENT-MNH.

Record ID	_____
PATIENT'S INITIALS	_____
MRN	_____
DATE	_____
STUDY NO	_____

SCREENING - ROSIER SCALE

Use patient's clinical presentation

Has there been any LOC/Syncope?	◯ Yes No
Has there been seizure activity?	◯ Yes No
Is there ACUTE onset (or on awakening from sleep) of :	_____
Asymmetrical facial weakness	◯ Yes No
Asymmetrical arm weakness	◯ Yes No
Asymmetrical leg weakness	◯ Yes No
Speech disturbance	◯ Yes No
Visual field defect	◯ Yes No
TOTAL	_____

SOCIO-DEMOGRAPHIC INFORMATION

INFORMANT	◯ Patient himself/herself ◯ Patient's family member ◯ Others
SEX	◯ MALE ◯ FEMALE
DATE OF BIRTH	_____
AGE	_____

MARITAL STATUS	◯ Married ◯ Divorced ◯ Single ◯ Widow/widower ◯ Cohabit
LEVEL OF EDUCATION	◯ University level ◯ A-level secondary education ◯ O-level secondary education ◯ Primary education ◯ None
RELIGION	◯ Christian ◯ Muslim ◯ None
ADDRESS	_____

PATHWAY CHARACTERISTICS

VITAL SIGNS	_____
BLOOD PRESSURE	_____
PULSE	_____
RESPIRATORY RATE	_____
SPO2	_____
TEMP	_____
RBG	_____
GCS	_____
MOUTH DEVIATION	◯ Yes ◯ No
HEMIPARESIS	◯ Yes ◯ No
Slurred speech	◯ Yes ◯ No
PUPILS	◯ Equal ◯ Unequal
REASON FOR REFERRAL	◯ CT Brain ◯ Others

What was the reason for refferal	_____
Patient brought in to the ED with CT Brain	◯ Yes ◯ No
What were the CT Brain findings	◯ Ischemic ◯ Hemorrhagic
Does the patient have MRI brain	◯ Yes ◯ No
What were the MRI findings	◯ Ischemic ◯ Hemorrhagic
Did the patient get CT Brain/MRI Brain at the EMD	◯ Yes ◯ No
What were the findings?	◯ Ischemic ◯ Hemorhagic
Chief Complaints	_____
When did the symptoms start?	◯ Within 5 Hrs ◯ 5 - 10 Hrs ◯ >12 Hrs ◯ >24 Hrs
When did the patient seek care after symptom onset (From Patient/care giver)	◯ Within 5 Hrs ◯ 5-10 Hrs ◯ >12 Hrs ◯ >24 Hrs
Where did the patient go first to seek care? (from the patient/care giver)	◯ Health Center ◯ District hospital ◯ Regional Hospital ◯ Zonal hospital ◯ Tertiary hospital
How long did they stay at the referring hospital before being transferred to the EMD-MNH	◯ Within 5 Hrs ◯ 5-10 Hrs ◯ >12 Hrs ◯ >24 Hrs
Final Disposition	◯ Admitted to Neurology ward ◯ Admitted to Neurosurgical ward (MOI) ◯ Admitted to ICU/HDU ◯ Discharged ◯ Died at the EMD

KNOWLEDGE OF STROKE SYMPTOMS		
Hujui dalili za kiharusi	◯ Yes	No
Kupooza	◯ Yes	No
Kupoteza fahamu	◯ Yes	No
Kuchanganyikiwa/kushindwa kuzungumza	◯ Yes	No
Mwili kuchoka	◯ Yes	No
Kupata ganzi	◯ Yes	No
Homa	◯ Yes	No
Mapigo ya moyo kwenda kasi	◯ Yes	No
Kizunguzungu	◯ Yes	No
Mkono kukosa nguvu	◯ Yes	No
Kubanwa pumzi	◯ Yes	No
Kushindwa kuona	◯ Yes	No
Nyinginezo	◯ Yes	No

Unafikiri nini husababisha kiharusi?	☐ Shinikizo la damu ☐ Msongo wa mawazo ☐ Chakula ☐ Chakula chenye mafuta mengi ☐ Lehemu nyingi ☐ Uzito mkubwa ☐ Kutokufanya mazoezi ☐ Mgando wa mafuta ☐ Pombe ☐ Gonjwa la kurithi ☐ Mapenzi ya Mungu ☐ Kuvuta sigara ☐ Uchawi ☐ Sijui
Utakwenda wapi ukipata dalili za kiharusi	◯ Utaenda hospitali ◯ Utampigia daktari ◯ Utaenda kwenye vituo vya afya ◯ Utaenda kwa mganga wa jadii/mganga wa kienyeji/ au mchawi ◯ Utaita daktari wa mazoezi ya viungo ◯ Utaomba ndugu msaada ◯ Utaomba marafiki msaada ◯ Utajitibu mwenyewe ◯ Utachanganya matibabu ya hospital na matibabu ya kienyeji
JUMLA YA UELEWA	_____

APPENDIX II. CONSENT FORM (ENGLISH VERSION)

STUDY TITLE: **PATHWAY TO EMERGENCY CARE AND KNOWLEDGE OF STROKE AMONG ADULT PATIENTS WITH SUSPECTED STROKE PRESENTING TO THE EMERGENCY DEPARTEMENT – MUHIMBILI NATIONAL HOSPITAL.**

Introduction

Greetings, I Dr. Winnifrida Wilbard Msangi, a second year resident undertaking Emergency Medicine course at Muhimbili University of Health and Allied Sciences (MUHAS). I am currently conducting a study as titled above as part of my study requirements. I hereby request your participation and support in my study once I or my research assistant approaches you. Your choice to participate or not will have no any effect on the care and management beloved one. Please you may ask questions, any time if you do not understand anything patterning this study.

Aim of the study

The purpose of this study is to determine the pathway to emergency care of adult patients with suspected stroke presenting to the EMD-MNH, assess their knowledge on stroke symptoms and determine factors for delay in presentation after onset of symptoms.

Benefits

No payment or any fringe benefits for your participation in the study as personal instead the results and its implication will be beneficial for the hospital and general population using the hospital.

Risks

There is no risk in participating in this study.

What does this study involve?

This study involves the research assistant or principal investigator asking structured questions to you, the patient, or relatives and filling the responses in the prepared questionnaire. Also information about you will be obtained from your hospital file.

Consent

Your consent to be enrolled in the study is entirely voluntary and amenable by signing the consent form. You are free not to consent and this will not affect care and management offered to your patient. You may decide on to stop participating in this study at any time for any reason.

Confidentiality

The information you provide is extremely respected and will be preserved strictly confidential. The study information will be stored in protected computer files and in paper records stored in a locked filing cabinet. Only study staff will have access to the information.

Access of information

By signing this form, you allow the research team to use the information and give it to others involved in the research. The research team includes the researcher, facilitators plus others working on this study at MUHAS and EMD-MNH.

Signature:

I, _____ have read/been told the contents of this form. My questions have been answered. I agree to participate in this study.

Signature of participant _____

Date of signed consent _____

For further information, questions or queries, you can contact:

1. The Principal Investigator,
Dr. Winnifrida Wilbard Msangi
Department of Emergency Medicine,
MUHAS,
P. O. Box 65001,
Dar es Salaam, Tanzania.
Tel: +255786848682
Email: doctormsangi@gmail.com

2. Dr Bruno Sunguya
Director of Research and publication
Research and Publication Committee
P. O. Box 65001,
Dar es Salaam, Tanzania.
Tel: +2150302-6

APPENDIX III. CONSENT FORM (SWAHILI VERSION)

FOMU YA RIDHAA YA KUSHIRIKI KATIKA UTAFITI

Utangulizi

Jina langu naitwa Dkt.Winnifrida Wilbard Msangi, mwanafunzi wa udaktari bingwa wa magonjwa ya dharura (Emergency Medicine) katika Chuo Kikuu Cha Afya na Sayansi Shirikishi Muhimbili (MUHAS). Ninaomba ushiriki wako au kwa niaba ya mgonjwa wako katika utafiti huu endapo mimi ama msaidizi wangu atakapokufuata ili kukuuliza taarifa muhimu za mgonjwa wako.

Madhumuni ya utafiti

Kuangalia matibabu aliyopewa mgonjwa anaeonyesha dalili za kiharusi kwanzia alipopata dalili hizo mpaka alipofika muhimbili emd, kuangalia ufahamu wa wagonjwa wenye dalili za kiharusi kuhusu ugonjwa huu, na kuagalia kwa sababu gani wagonjwa wengi wa kiharusi huenda hospitali baada ya muda unaotegemewa kupata matibabu.

Ushiriki katika utafiti:

Wagonjwa wenye dalili za kiharusi waliokuja kutibiwa MNH.

Hatari:

Hatutarajii kuwepo na athari/hatari yeyote itokanayo na ushiriki katika utafiti huu.

Faida za utafiti:

Ushiriki wako ama Ridhaa ya mgonjwa wako kushiriki katika utafiti huu, utawezesha kujua sababu zinazopelekea wagonjwa wenye dalili za kiharusi kuchelewa kufika kupata matibabu.

Usiri:

Taarifa zote zitakazokusanywa katika utafiti huu zitakuwa siri, hivyo ushiriki wako hautajulikana na mtu asiye husika na utafiti bali timu ya watafiti tu.

Malipo:

Kwa kushiriki kwenye utafiti huu, hautalipwa wala hautalipa ghrama yeyote.

Kuweka sahihi ya makubaliano:

Mimi, _____, nimesoma/nimesomewa maelezo yote yaliyomo kwenye fomu hii na nimeelewa. Maswali yangu yamejibiwa vizuri na niko tayari kushiriki.

Sahihi ya ndugu/mhudumu wa mgonjwa _____

Sahihi ya Mtafiti _____Tarehe _____

Ukiwa na swali au tatizo lolote, unaweza kuwasiliana na wafuatao:

1. Mkuu wa Utafiti
Dkt. Winnifrida Wilbard Msangi
Idara ya tiba ya dharura,
MUHAS,
S.L.P 65001,
Dar es Salaam, Tanzania.
Simu: +255 786848682
Barua pepe: doctormsangi@gmail.com

2. Dr Bruno Sunguya
Mkurugenzi wa utafiti na machapisho
Chuo kikuu cha Afya na sayansi shirikishi- MNH
S.L.P 65001,
Dar es Salaam, Tanzania.
Tel: +2150302-6

APPENDIX IV. PERMISSION TO CONDUCT A STUDY

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

OFFICE OF THE DIRECTOR OF RESEARCH AND PUBLICATIONS

P.O. Box 65001
DAR ES SALAAM
TANZANIA
Web: www.muhas.ac.tz

Tel G/Line: +255-22-2150302/6
Ext: 1016
Direct Line: +255-22-2152489
Telefax: +255-22-2152489
E-mail: drp@muhas.ac.tz

Ref. No.DA.282/298/01.C/

Date: 14/10/2020

MUHAS-REC-10-2020-388
WINNIFRIDA WILBARD MSANGI
MMed in Emergency Medicine, School of Medicine
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: PATHWAY TO EMERGENCY CARE AND KNOWLEDGE OF STROKE AMONG ADULT PATIENTS WITH SUSPECTED STROKE PRESENTING TO THE EMERGENCY DEPARTMENT-MUHIMBILI NATIONAL HOSPITAL

Reference is made to the above heading.

I am pleased to inform you that the Chairman has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

APPROVAL DATE: 14/10/2020
EXPIRATION DATE OF APPROVAL: 13/10/2021

STUDY DESCRIPTION:

Purpose:

The purpose of this prospective cross sectional study is to determine pathway to emergency care and factors associated with time to presentation among adults with suspected stroke presenting to the emergency department Muhimbili National Hospital.

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided:
https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%20285.pdf and in the MUHAS archives.

APPENDIX V. PERMSSION TO CONDUCT STUDY AT MNH

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT, GENDER, ELDERLY AND CHILDREN

MUHIMBILI NATIONAL HOSPITAL

In reply please quote;

Ref. No.:MNH/TRCU/Permission/2020/122 **Date: 23rd** October, 2020

Head of Department,
Emergency Medicine
Muhimbili National Hospital

RE: PERMISSION TO COLLECT DATA AT MNH.

Name of Student	**Dr. Winnifrida W. Msangi**
Title	**"Pathway to Emergency Care and Factors Associated with Time to Presentation Among Adult Suspected Stroke Patients presenting to the Emergency Department Muhimbili National Hospital".**
Institution	Muhimbili University of Health and Allied Sciences
Supervisor	Prof. Hendry R. Sawe
Co-Supervisor	Dr. Said S. Kilindimo
Period	23rd October, 2020, to 23rd April, 2020

Approval has been granted to the above mentioned student to collect data at MNH.

Kindly ensure that the student abide to the ethical principles and other conditions of the research approval.

Sincerely

HEAD, TEACHING, RESEARCH & CONSULTANCY UNIT
P. O. Box 65000
DAR-ES-SALAAM
MUHIMBILI NATIONAL HOSPITAL

Dr. Faraja Chiwanga
Head of Teaching, Research and Consultancy Unit

c.c DMS
c.c **Dr. Winnifrida W. Msangi**

Upanga West, Kalenga Street, Plot No. 10480/3, P.O. BOX 65000, Dar es Salaam, Tanzania.
Telephone: +255-22-2151367-9, Telephone: +255-22-2151351-2
Email: info@mnh.or.tz, Website: www.mnh.or.tz