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COLLEGE OF MEDICINE AND HEALTH SCIENCE

DEPARTMENT OF MEDICINE

ONE YEAR PREVALENCE OF STROKE AMONG ADULT PATIENTS VISITING WUSTH FROM AUGUST 2014-AUGUST 2015EC

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WOLKITE, ETHIOPIA

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Abbreviations

AHA……. American heart association

ASA……. American stroke association

Au……... August

CNS…… Central nervous system

CT……... Computed tomography

DM…… Diabetes mellitus

Dr. ……Doctor

EC …… Ethiopian calendar

FBS ……... Fasting blood sugar

GBD……. Global burden of disease

GC……. Gregorian calendar

GP…… General practitioner

HDL…… High density lipoprotein

HIV……... Human immune virus

HS……. Hemorrhagic stroke

ICSOL……. Intracranial space occupying lesion

ICU…… Intensive care unit

IS……. Ischemic stroke

JUSH…… Jimma university specialized hospital

LDL…… Low density lipoprotein

MPH…… Master of public health

MRI……. Magnetic resonant imaging

RBS……. Random blood sugar

SNNPR…… Southern nation nationalities and people region

SPSS…… Statistical package and software for social science

TIA……. Transient ischemic attack

WHO…… World health organization

WUSTH… Wolkite university specialized and teaching hospital

Abstract

Background

Stroke is one of the leading causes of death and disability in developing countries.

The burden of stroke has varied widely in different areas, and there is a paucity of information about stroke in the selected study area.

Objectives

Prevalence of stroke among patients visiting WUSTH from august 2014 to august 2015EC.

Method

Hospital based retrospective observational study in patients who visited WUSTH medical emergency from august 2014 - august 2015 EC was conducted.

A pretested checklist was used to extract relevant data from the chart of stroke patients as secondary data. All statistical analyses were performed in the SPSS version 25 software.

Results

A total of 422 case of stroke were retrieved from the record room. Among those 19 cases were found to be stroke patients.

Among stroke patients CT scan reports were found in patients.

The prevalence of stroke among patients admitted to medical emergency ward was 4.5%. The CT scan performance rate was 31.6%.

Among these 12 (63.2%) were males and 7 (36.8%) were females.

Among stroke patient's majority of the cases were >65year 11(57.9%) followed by those between 45 -65years and 15-45years each accounting 4(21.1%). Their mean age was 64.4 years.

The most common clinical feature was body weakness 12(63.2%) followed by failure to communicate 4(21.1%), and loss of consciousness 2(10.5%).

The average time at presentation was 16hr.

Among stroke patients the most common risk factor was HTN and heart disease each accounting 4(21.1%) followed by diabetes mellitus 2(10.5%).

The most common complication was aspiration pneumonia 4(21.1%) followed by raised ICP 3(15.8%), followed by bed sore and DVT each accounting 1(5.3%).

After treatment 16(84.2%) cases achieved complete recovery while death was the outcome in 3(15.8%).

Age between 46 - 65(AOR=7.2; 95% CI (1.58, 32.64)), age>65 (AOR =2.44; 95% CI (0.69, 8.7)), residency (AOR=0.61; 95% CI (0.22, 1.7)), hypertension (AOR=3.53; 95% CI (1.09, 11.49)), diabetes mellitus (AOR=4.58; 95% CI (1.027, 20.46)), were significantly associated with stroke.

Conclusion

There was a low rate of CT scan performance rate. Ischemic stroke was the most common type of stroke. Nonetheless, hemorrhagic stroke occurred more frequently compared to hospitals in developed countries. Patients with ischemic stroke were younger than those with hemorrhagic stroke.

heart disease and HTN were the most prevalent risk factors followed by diabetes mellitus.

The in-hospital case fatality rate (15.8%) is comparable to SSA hospital studies.

The most common attributable causes of death were aspiration pneumonia and increased intracranial pressure.

CHAPTER ONE

INTRODUCTION

1.1. Background

Stroke is defined as a rapidly developing signs of focal/global disturbance of cerebral function with symptoms lasting for 24hours or more; or leading to death with no apparent cause other than vascular origin (WHO 1988).
It is currently defined as focal/global neurologic deficit resulting from spontaneous hemorrhage or infarction in the CNS with objective evidence of hemorrhage/infarction irrespective of the duration (AHA/ASA 2009)

Stroke is a leading cause of death and disability worldwide.
The latest data from the Global Burden of Diseases Study 2013 (GBD 2013) ranked cerebrovascular disease as the second largest contributor to death and disability-adjusted life years worldwide after ischemic heart disease. There are two main types of stroke hemorrhagic and ischemic stroke.
Most of the patients with ischemic stroke present with altered mental status. But, the focal neurologic deficit was the commonest neurologic presentation among patients with intracerebral hemorrhage.

Worldwide in adults, stroke is the 2nd most common & leading cause of disability and death according to WHO (2014) report and the 4th leading cause of death in the United States.
The annual incidence of stroke is 180-300 million according to the latest WHO statistics and it is responsible for 10.8% of total deaths.
Stroke in the developing world is becoming a leading cause of death from infectious diseases that affects mainly adults and adult disability.

Worldwide, stroke was estimated to be about with approximately 16 million people developed first-ever-strokes and 62 million stroke survivors.
Also stroke causes about 5.5 million deaths annually in their lifetime, from this stroke disease, which accounts for more than 85 percent of all cases of Ischemic stroke patients.
A recent systematic review of worldwide stroke incidence showed that stroke incidence has declined by 42% in high-income countries over the 4 decades from 1970–1979 to 2000–2008(due to proper management of hypertension and dietary factors).

According to world health organization (WHO), much of the burden of deaths resulting from stroke, estimated to be 10.8% mortality and 3.1% of the disease burden in worldwide, this can be attributed to patients are present late due to the standard of care is lower compared to hospitals in developed countries.
The burden of stroke has varied widely in different areas, and there is a paucity of information about stroke in the selected study area.

In the African Continent there are a total of 1.89 million stroke survivors among people aged 15 years or more in the year 2009, with a prevalence of 317.3 (314.0–748.2)/100000 population.
Comparable figures for the year 2013 based on the same rates would amount to 535 thousand new stroke cases and 2.09 million stroke survivors, suggesting an increase of 10.8% and 9.6% of incident stroke cases and stroke survivors respectively, attributable to population growth and ageing between 2009 and 2013(from first meta - analysis of stroke in Africa).
The prevalence of ischemic stroke is relatively higher than hemorrhagic stroke in most studies from Africa.
In a study in northwestern Nigeria, stroke was found to be the major (77.6%) neurologic admission and the most common cause of neurologic and medical death.
In Nigeria, the prevalence of hemorrhagic and ischemic stroke in two hospitals was 29.5% and 54.7% respectively.
The burden of stroke is increasing in sub-Saharan Africa considering other myriad of medical problems like malnutrition, malaria, HIV/AIDS and other causes of encephalitis and meningitis, demographic transitions, increased vehicular traffic, and persistent regional conflicts and etc.

From a hospital-based data in Senegal, 70% of strokes were of ischemic in nature and hypertension was identified as the major risk factor in 68% followed by diabetes mellitus in 37.3% of cases.
The burden of stoke in Ethiopia is not clearly known but some Hospital studies have shown that stroke is an important cause of hospital morbidity and mortality in our country and the burden of stroke appears to have increased significantly over the past three decades

A prospective hospital-based study conducted at another center in Ethiopia reported ischemic stroke as the commonest type of stroke.

Hemorrhagic stroke was the most common cause of stroke accounting for 59.2% of patients who had brain Computerized Tomography (CT) scan in a study conducted in a single center in Ethiopia a decade ago.
Hemorrhagic stroke was the most common cause of stroke accounting for 57% of all patients and 59.2% among those who had CT scan and admitted to medical wards of Tikur Anbessa Specialized Hospital (Zenebe G et al)

Hypertension was the most frequent risk factor identified followed by cardiac disease, 65.6% and 22.7% respectively in Ethiopian patients, Valvular heart disease (VHD) accounted for 40% of all heart diseases, and almost half of these also had atrial fibrillation of which none were on treatment in Ethiopian patients. The overall mortality was 44.5% (Zenebe G et al).

1.2. Statement of the problem

Stroke is an abrupt onset of a neurological deficit attributable to a vascular cause and is a major cause of death worldwide as well as in Africa (WHO). The exact burden of stroke is not known in Africa but estimates suggest that 8% of all first-ever strokes occur in Africa and that 5% of the 30 million stroke survivors worldwide live in Africa.

Reliable data on stroke incidence and outcomes in sub-Saharan Africa are sparse but some studies show developed countries experience a decline in stroke incidence and mortality rates, while the problem is increasing in sub-Saharan Africa (Jerome H. Chin et al).
The burden of stoke in Ethiopia is not clearly known but some hospital-based studies have shown that stroke is an important cause of hospital morbidity and mortality.

A study done in black lion hospital showed the burden of stroke appears to have increased significantly over the past three decades.
Hemorrhagic stroke was the most common cause of stroke accounting for 57% of all patients and 59.2% among those who had CT scan (Zenebe G et al)

There was no study done on prevalence of stroke and associated factor in our hospital and gurage zone.

1.3. Significance of the study

Reliable data on stroke prevalence, risk factors and outcomes in sub-Saharan Africa are sparse and unknown in Ethiopia (only there are few hospital-based studies with small population size and single center).

Therefore, it is imperative that a lot has to be done to address these issues.

Hence, the purpose of this study was aimed at determining the prevalence of stroke among patients visiting WUSTH over 1year period and to assess some of major risk factors attributing for stroke.

CHAPTER TWO

LITERATURE REVIEW

The recommended standard WHO stroke definition is as follows: A focal (or at times global) neurological impairment of sudden onset, and lasting more than 24 hours (or leading to death), and of presumed vascular origin.
Most of the studies that reported patterns, risk factors and outcomes of stroke have been carried out mainly in Europe and North America. Also, there are few hospital-based studies with small number of patients in different African countries.
Adeloye D et al in 2014 in meta- analysis of 1227(finally only 19 studies were analyzed) studies done from January 1970 to December 2013 (pioneer meta-analysis of stroke in Africa) found that a total of 1.89 million stroke survivors among people aged 15 years or more were estimated in Africa in 2009, with a prevalence of 317.3 (314.0–748.2)/100000 population.

Comparable figures for the year 2013 based on the same rates would amount to 535 thousand (87.0–625.3) new stroke cases and 2.09 million (2.06–4.93) stroke survivors, suggesting an increase of 10.8% and 9.6% of incident stroke cases and stroke survivors respectively, attributable to population growth and ageing between 2009 and 2013.

Xiao-ying Yao et al in 2012 in their retrospective study from January 2004 to December 2009, stroke case review found female patients were much older than male patients when experiencing their first ischemic stroke attack and had a significantly higher prevalence of diabetes mellitus, heart diseases and Atrial fibrillation.

In contrast, male patients were more likely to be current or ex-smokers and to drink heavily than female patients. Hypertension was equally frequent in both groups &with regard to family history; more male patients had positive family history of hypertension.

Abu-Odah et al in 2014 in study on 100 patients diagnosed with stroke found that ischemic stroke is the most common sub-type (66 patients) and identified, hypertension, Psychological troubles, obesity, diabetes, smoking, and hypercholesteremia as a risk factor for stroke.

Walker et al in 2013 in their case ascertainment from Tanzanian Stroke Incidence Project (TSIP) and verbal autopsy included 200 stroke cases (69 from Dares Salaam and 131 from Hai) and 398 controls (138 from Dares Salaam and 260 from Hai) and identified risk factors were previous cardiac illness, HIV, infection a high ratio of total cholesterol to HDL cholesterol, smoking and hypertension was a significant independent risk factors for stroke.

In Hai, additional risk factors of diabetes and low HDL cholesterol were also significant.

In his review two studies in Tanzania and Gambia recently demonstrated 1-month fatality rates of 24% and 27% respectively. Fatality rates is <20% in developed countries

Thomas Richard et al in 2013 in his Review of current literature concerning the incidence, risk factors and mortality of stroke identified hypertension as the leading risk factor for stroke in Sub-Saharan Africans with a Nigerian study demonstrating >80% prevalence of hypertension in stroke patients

Most of the studies done in Africa (sub-Saharan countries) show that ischemic stroke is the most common pattern and Hypertension was most common risk factor for both stroke (hemorrhagic & ischemic), other risk factors include: alcohol intake (32.6%), previous stroke (23.6%), family history of stroke (23.2%), HIV infection (25.4%), Hypercholesterolemia (14%) and tobacco smoking (13.4%).

Few studies done in Ethiopia show that Occurrence of unusually high number of hemorrhagic stroke cases and the major risk factors identified were hypertension, Diabetes Mellitus and Atrial fibrillation.
Factors independently associated with mortality were female sex, pneumonia, Glasgow Coma Scale (GCS) less than or equal to 8 and stroke severity at admission, Age & diabetes as a risk factors in patients admitted to Tikur Anbessa Hospital (Sofia et al)

Cross sectional study conducted from August 2015 to January 2016 in an urban tertiary care center in Addis Ababa, Ethiopia by Ayalew et al. and his colleagues with

total of 104 patients shows mean age was 53 years, and 56% were male.

Only 30% of patients arrived using an ambulance service. The most common presenting symptoms were altered mental status (48%), hemiparesis (47%), facial palsy (45%), hemiplegia (29%), and aphasia (25%). Hypertension was the most common risk factor (49%), followed by cardiovascular disease (20.2%) and diabetes mellitus (11%).

The majority of strokes were hemorrhagic in etiology (56%). The median arrival time to the emergency center was 24 h after symptoms onset; only 15% presented within three hours. Patients with hypertension, or presented with loss of consciousness were significantly more likely to have hemorrhagic stroke ($p < .001$ and $p = .01$ respectively). The predominant etiology type in this cohort is hemorrhagic stroke. Lastly, the median arrival time to an emergency center was 24 h after symptom onset.

Retrospective study by Hailu et al and his colleagues in st.paul millennium hospital in April 2016 with total of 163 stroke patients with a median age of 68 years and M:F ratios of 1.3:1 were analyzed.
Hemorrhagic stroke was the most common type of stroke accounting for 1.3% of cases. The most commonly identified risk factors were; Hypertension (60.7%), structural heart disease (18.4%), atrial fibrillation (14.7%) and diabetes mellitus (11%).

In hospital case fatality rate was 30.1% and a significant number (45.4%) of patients was discharged with neurologic deficit and the median duration of hospital stay was 11.14 days.

Gender, stroke subtype, previous history of stroke and transient ischemic attack were the main determinants of treatment outcome.

A hospital based retrospective study done by Moges Bay, Amy Hintze2, Chloe Gordon-Murey, Tatiana Mariscal, Gashaw Jember Belay, Aynishet Adane Gebremariam and Charmayne M. L. Hughes at Gondar university referral hospital from June 20th 2012 and April 30th 2018 included a total of 448 patients with stroke admitted to this hospital and 58.0% of patients were female, and 42.0% were male. Among these, 141 (31.5%) had an ischemic stroke confirmed by neuroimaging, 82 (18.3%) had a hemorrhagic stroke confirmed by neuroimaging, and 252 (50.2%) had a stroke with undetermined type.

The mean age of stroke was 63.9 years (range = 18–100, *SD*: 15.1 years), with no differences observed between stroke subtypes. The most common symptoms that led to patients seeking medical intervention were hemiparesis (67.4%), communication difficulties (56.0%), facial deviation (37.3%), and globalized headache (36.4%). Hypertension was the most commonly reported risk factor

(37.1%), which was more prevalent in hemorrhagic (*n* = 37, 45.1%) than ischemic stroke patients (*n* = 53, 37.6%), stroke with undetermined type (*n* = 76, 33.8%).

Retrospective cross-sectional study done by Hayet Assefa and Desalew Tilahun Beyene at JUSH among stroke patients who were admitted to stroke unit from December 1, 2015, to November 31, 2017 included a total sample size of 394 patients 367 have participated in the study with a response rate of 93.14%.

From a total of study participants, 236(64.31%) had a hemorrhagic stroke while 131(35.69%) had an ischemic stroke and the majority of them had hypertension followed by diabetes mellitus which accounts 123 (29.64%) and 89(21.45%) respectively.

Regarding treatment outcome among stroke patients admitted to stroke unit during study period majority of them were died followed by improved which accounts 139(37.87%) and 97(26.43%) respectively

CHAPER THREE

OBJECTIVES OF THE STUDY

1.1. General objective

To determine prevalence of stroke patients among patients visited WUSTH from August 2014 to August 2015EC.

1.2. Specific objectives

-To determine stroke prevalence in adult patients visited WUSTH from August 2014 to 2015EC.

-To assess some of major risk factors for stroke patients visiting WUSTH from August 2014 to August 2015EC.

-To describe socio-demographic profiles of patients admitted with stroke to WUSTH from August 2014 to August 2015EC.

CHAPTER FOUR

METHODS AND MATERIALS

4.1 Study Area and period (study circumstance)

The study was conducted in WUSTH medical emergency room, medical ward, ICU and patient card registry room.

WUSTH is located at Gubrye town, Gurage zone, SNNPR, Ethiopia

It is located at 170km far from Addis Ababa. It provides service more than 1.7 million population living in Gurage zone and surrounding districts

The catchment population of WUSTH is expected to be 800,000 people according to the information from hospital administration.

It was established in 2012 EC and is currently the main referral hospital in Gurage zone with more than 150 beds for in patient and from this department of medicine has 40 beds.

It is also teaching hospital for WKU for preclinical, clinical, other health, midwifery, nursing, medical laboratory and residency programs

4.2 Study period

The study was conducted from August 2014 to August 2015EC.

4.3 Study design

A retrospective quantitative descriptive study was conducted.

A secondary data was obtained from charts of the patients visited medical emergency of WUSTH.

4.4 Population

4.4.1 Source population

All adult patients visited WUSTH medical emergency from August 2014 to August 2015EC.

4.4.2 Study population

Randomly sampled patients visited WUSTH medical emergency from August 2014 to August 2015EC.

4.5. Inclusion and exclusion criteria

Inclusion criteria

Patients with recorded diagnosis of stroke/cerebral vascular accident; as per WHO criteria for diagnosis of stroke with or without CT or MRI of the brain, whose age is ≥ 15 years.

Exclusion criteria

(1) Patients with transient ischemic attack (TIA)

(2) Missing information from the chart

(3) Known cases of ICSOLs (intracranial space occupying lesions)

(4) Known traumatic brain injury as a cause

4.6Sample size and Sampling technique

4.6.1 Sample size

The sample was calculated using a formula for estimation of single population proportion taking prevalence of stroke subtypes and risk factors in stroke patients visited medical emergency and either admitted to medical ward/ICU or referred or died to be p=50% (prevalence not known) **,** margin of error 5%, and using 95% confidence level.

n =Zα/2 p (1-p) / d2

P = 50% used as the expected prevalence of patterns, risk factors and outcomes in stroke patients admitted to WUSTH medical emergency/ward/ICU or referred or died being unknown

Zα/2 = standard normal variable at 95% confidence level (1.96)

d= precision (margin of error)

n = Z2p(1-p)/w2 =(1.96)2x 0.5(1-0.5)/(.05)2 =384 patients

The final sample size

n=384

With 10 % additional for probable missing information the sample size will became 422.

4.6.2 Sampling technique

Among the 3115 patients that have visited medical emergency from august 2014-2015EC., simple probability random sampling of the 422 patients was conducted.

4.7 Variables

Dependent variable

Stroke prevalence

Independent variables

Hypertension

Atrial fibrillation

Admission date

Smoking

Age

Sex

DM

VHD

HHD

IHD

PFO

Previous stroke/TIA

Drugs/stimulants

DIC

TTP

Protein C/S deficiency/Factor 5 Leiden deficiency

DVT

CNS vasculitis

IEC

Dyslipidemia

4.8 Data collection

Data collection was done from august 18,2014 up to august 22,2015, from the sample unit of 422 patients.

The other relevant information was taken from the patient chart with pretest data checklist after a patient were clerked by Medical residents, GPs and interns.

4.8.1 *Data collection instruments*

Data collection format containing individual patient characteristics was prepared before the data collection time.

4.8.2 *Data collection process*

Data collection was done from 2 August 2015 up to august 15 2015EC.

Relevant information from patient's chart was entered into pretested data checklist.

4.8.3 *Data collectors*

Data was collected by 4 medical interns from patient card registry room and medical emergency card register log book after they were trained for 2 hours about the sample unit, objective of the study, variables on the questionnaire and its implication.

The reason for choice of medical interns is that they have better knowledge and experience in this topic. So that their involvement in data collection could validate the accuracy of information to be obtained.

Then, they were assigned to fill the data collection format.

All data collection activities were supervised by primary investigator.

4.9 Pre-test

The structured data collection format was pre tested on a sample of 15 patients before actual data collection begins.

4.10 Data quality control

Adequate training was provided for data collectors, and the compilation format

was prepared in simple English to maintain clarity and easier understanding by those data collectors.

Pre-testing of data collection tools was made.

Data was checked for completeness and internal consistencies right after collection by principal investigator

4.11 Data processing and analysis

The data collected was cleaned, edited and entered into a computer and analyzed using software SPSS-25.

Descriptive statistics was done for most of the variables. Categorical variables were also compared using Chi-squared tests as applicable & odds ratios (with 95% confidence interval CI) calculated from the 2x2 tables.

Descriptive statistics and bivariate analysis were used to look for association between various independent variables and dependent variables. Following analysis, when applicable data was interpreted (with 95% CI, at 1-Alpha =0.95) and P-value <0.05 was taken as statistically significant.

Results presented in writing, tabulation & figurative presentations from which conclusion and recommendation was made. Results compared with other studies & discussed.

4.12 **Operational definition**

Stroke - is defined as a rapidly developing signs of focal/global disturbance of cerebral function with symptoms lasting for 24 hours or more; or leading to death with no apparent cause other than vascular origin with or without CT/MRI confirmation.

Ischemic stroke - An episode of neurological dysfunction caused by focal cerebral, spinal, or retinal infarction.

Hemorrhagic stroke - A stroke that happens when an artery in the brain leaks blood or ruptures (breaks open). The leaked blood puts too much pressure on brain cells, which damages them.

Hypertension - Patients were previously diagnosed and receiving antihypertensive medication or diagnosed with hypertension that indicated blood pressure of ⩾140/90 mm/Hg.

Dyslipidemia-diagnosed and had hyperlipidemia (total cholesterol ⩾200 mg/dL, low-density lipopolysaccharide (LDL) cholesterol ⩾100 mg/dL, and high-density lipopolysaccharide (HDL) cholesterol <40 mg/dL for men or <50

mg/dL for women, and or serum triglyceride ⩾150 mg/dL).

Diabetes mellitus (DM) - If the patient was previously on oral hypoglycemic agent/insulin treatment or diagnosed and had DM (fasting blood sugar (FBS) level ⩾ 126 mg/dL or had documented random blood sugar (RBS) level ⩾200 mg/ dL with poly-symptoms, or glycosylated hemoglobin of ⩾6.5%).

TIA - was originally defined as a sudden onset of a focal neurologic symptom and/or sign lasting less than 24 hours (AHA/ASA).

4.13 Result dissemination

After finalizing the report, the finding of the study will be disseminated to all relevant stakeholders through Presentation and publication.

Copies of the research will be submitted to WUSTH, WKU college of medicine and health science, from which data were collected, the ministry of health and other concerned institutions and stake holders for possible applications of the study.

4.14 Ethical consideration

Permission letter was obtained from Wolkite University, College of Medicine and Health Science.

At the time of data collection, a verbal consent was taken from the data collectors for their willingness to do so.

Confidentiality and privacy of patient was ensured and any specific information will not be used outside of this research purpose and the patient's identity will be kept secret.

CHAPTER FIVE

RESULTS

A total of 19 cases of stroke among the 422-sample size WUSTH visit were retrieved from the record room. Amongst those CT scan reports were found in 6 patients. The CT scan performance rate was 31.6%.

5.1 Stroke prevalence and subtypes

The prevalence of stroke among patients admitted to medical emergency ward was 4.5%.

The most common stroke subtype was ischemic stroke accounting for 11(57.9%) cases while hemorrhagic stroke accounted for the remaining 8(42.1%) cases.

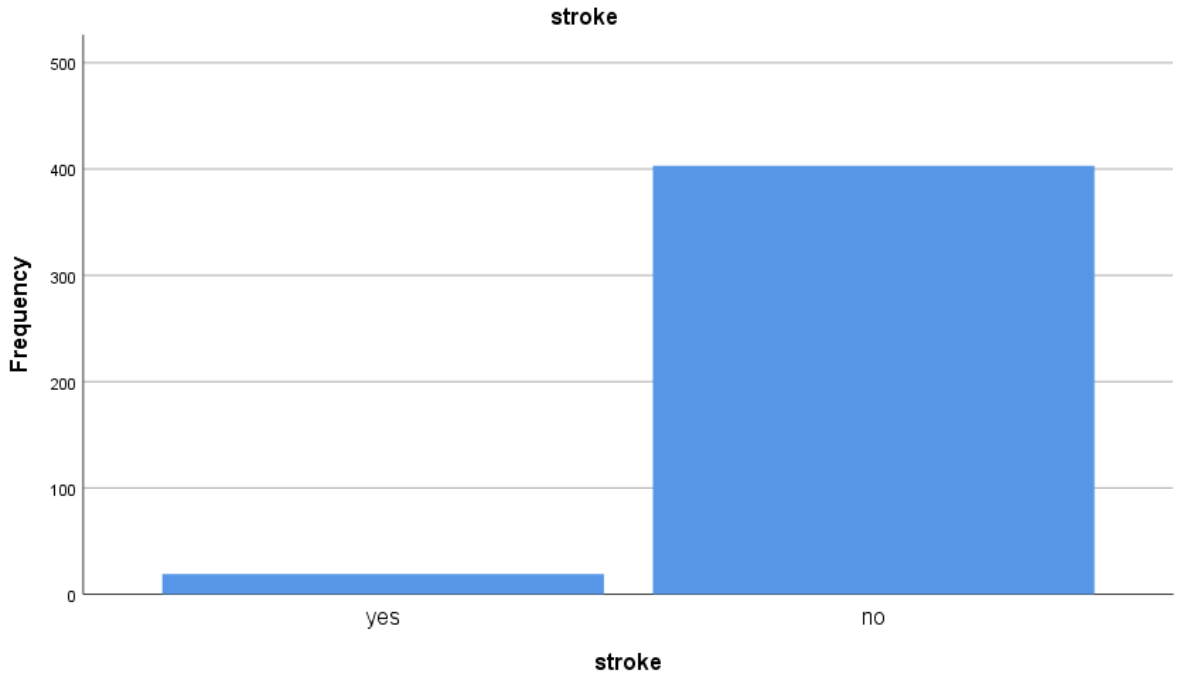

Figure 1 **frequency of stroke among total cases visited WUSTH medical emergency**

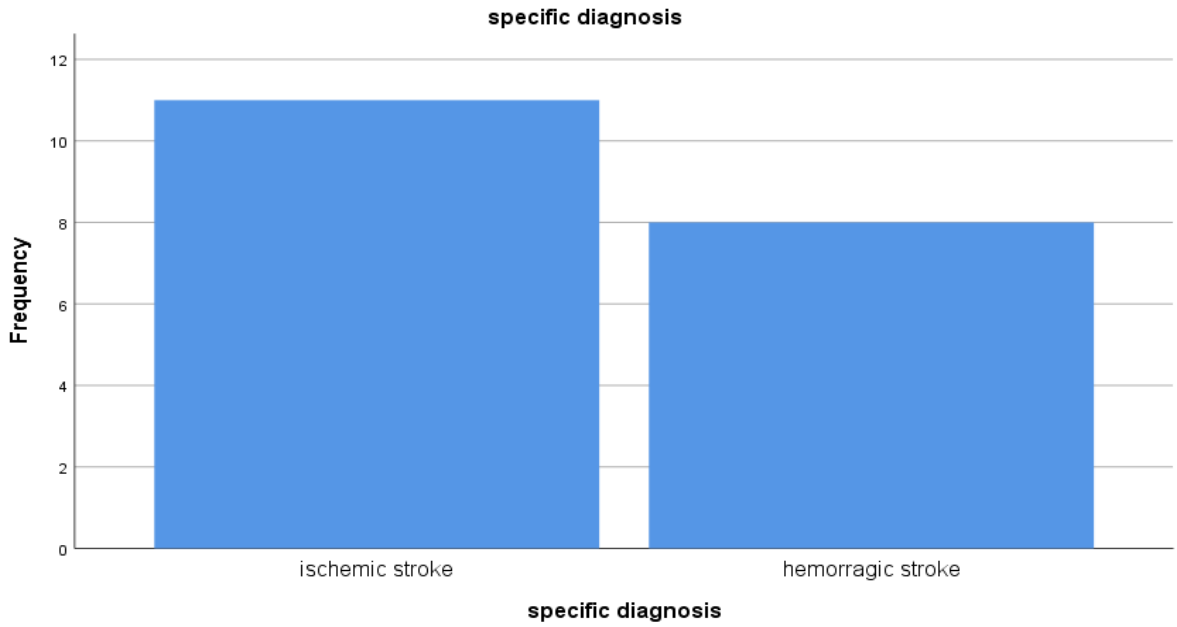

Figure 2 **frequency of subtype of stroke among patients visited WUSTH medical emergency**

5.2 Sociodemographic Characteristics

Among total patients 91(45.3%) of them were female while 231(54.7%) of them were male. From this stroke female patients account for 7(36.8%) and male account for 12(63.2%) with a male to female ratio of 1.7:1.

Among patients enrolled on study 208(49.3%) of them were >65 years old and 176(41.7%) of them were 46-65 old and 38 (9%) of them were 15-45 years.

Among stroke patient's majority of the cases were >65year 11(57.9%) followed by those between 45 -65years and 15-45years each accounting 4(21.1%). Their mean age was 64.4 years. The median age at diagnosis was 72 ± 17 years old.

Stroke in the young, defined by age less than 45 years, accounted for 4(21.1%) of the total cases.

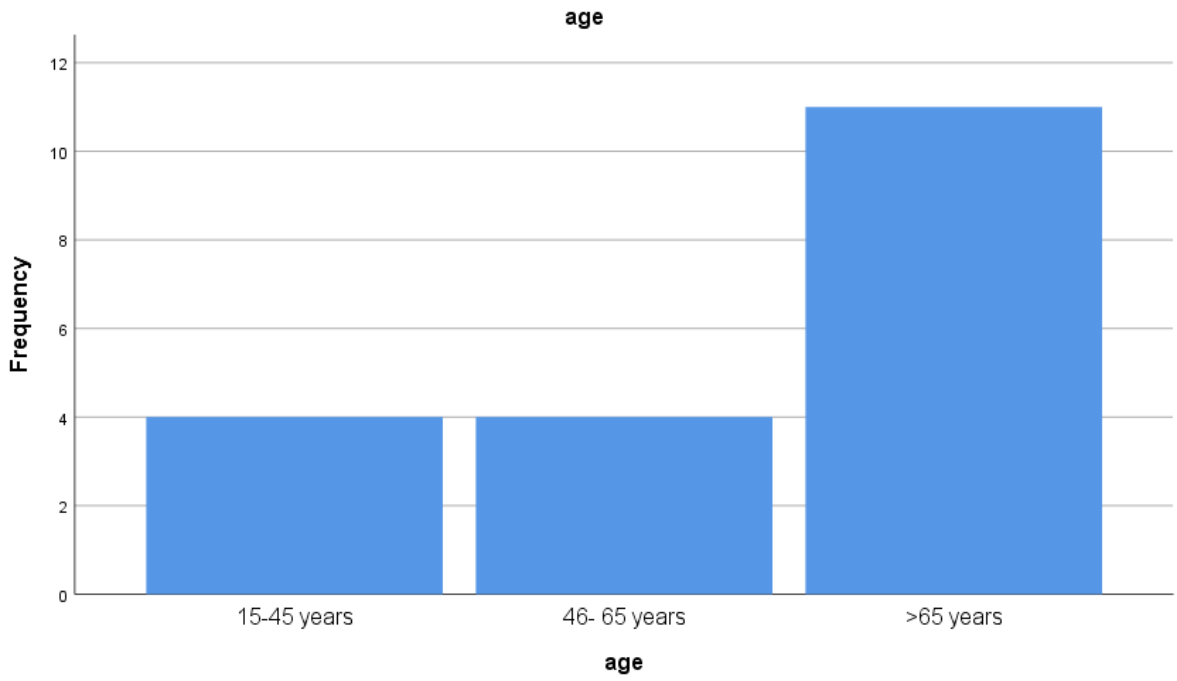

Figure 3 **frequency of age gap among stroke patient visited WUSTH medical emergency**

Patient from total of sample, patient of urban resident accounted for 88(20.9%) while those from rural area accounted for 334(79.1%).

Among stroke patients those from urban residence accounted for 6(30.6%) while those from rural area accounted for 13(68.4%).

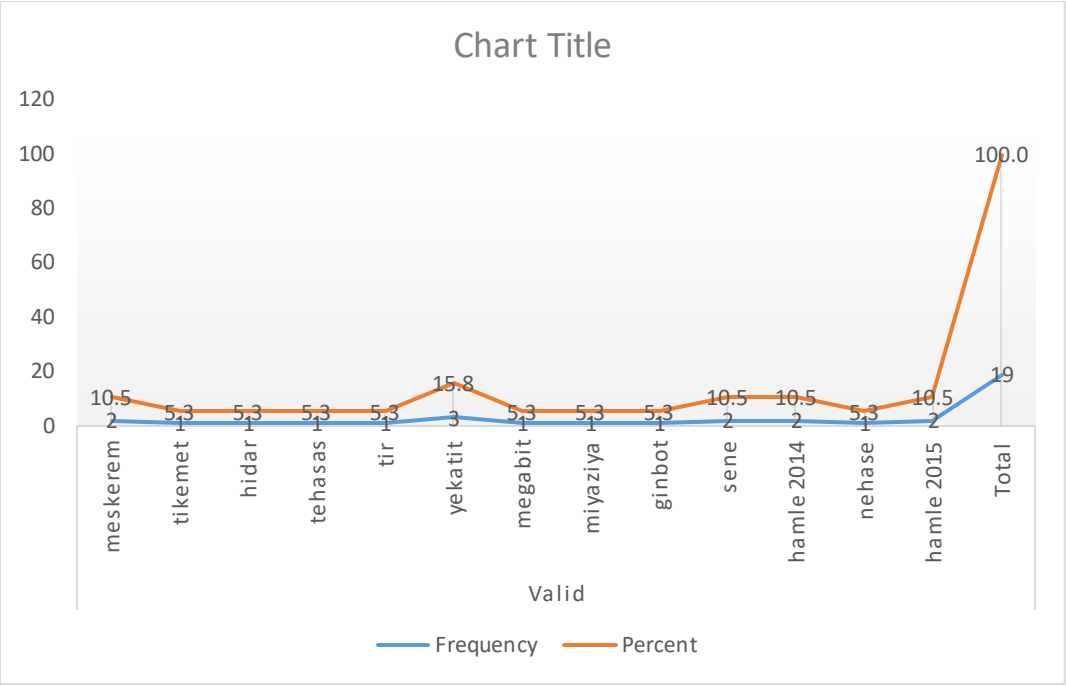

Figure 4 **Monthly trend of stroke patients visited WUSTH medical emergency**

5.3 Risk Factors

Hypertension and heart disease were the most common risk factors identified each accounting 4(21.1%) cases followed by diabetes mellitus accounting 2(10.5%). And 1(25%) were found to be both hypertensive and diabetic.

HTN was identified in 3(75%) and 1(25%) of patients with ischemic and hemorrhagic stroke respectively (P=0.141).

Any type of structural heart disease was present in 4(21.1%) of patients.

The majority of case of heart disease were unknown (no investigation was done) but the most common known was IHD 2(10.5%) followed by HHD and VHD each accounting 1 (5.3%).

There were 3(15.3%) patients who were smoker (all male), alcoholic 2(10.5%) (all male) and 8(42.1%) (all male) were chat chewers.

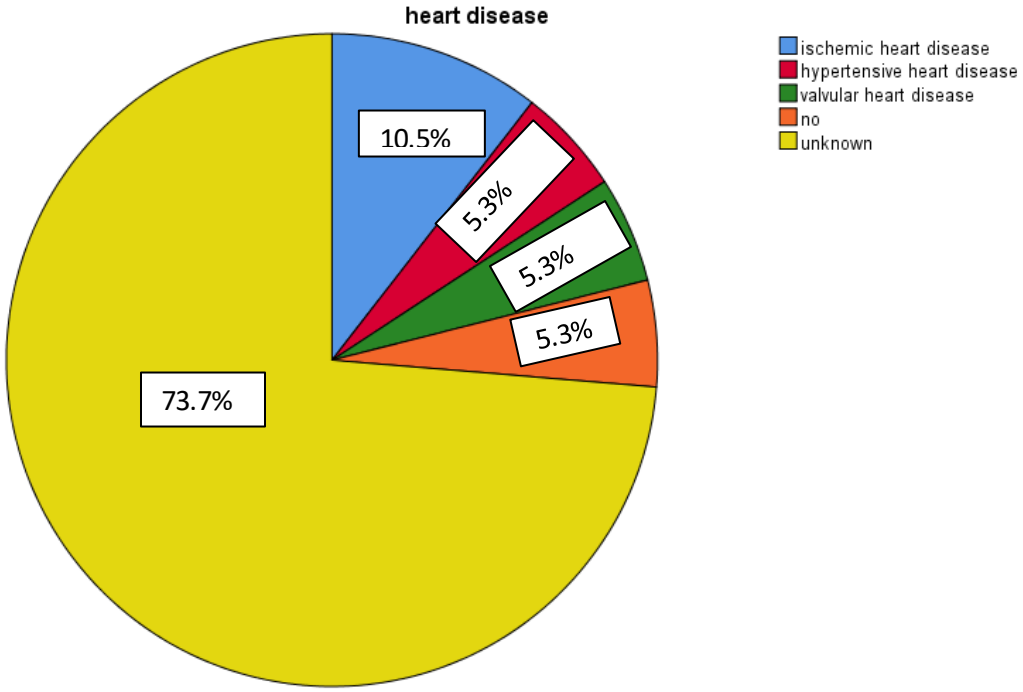

Figure 5 ***Heart disease distribution among patients visited with stroke at WUSTH.***

Variables		Total N (%)	Ischemic N (%)	Haemorrhagic N (%)
Sex	F	7(36.8%)	2(18.2%)	5(62.5%)
	M	12(63.2%)	9(81.8%)	3(37.5%)
Age(yrs)	15-45	4(21.1%)	3(27.3%)	1(12.5%)
	41-65	4(21.1%)	2(18.2%)	2(25%)
	>65	11(57.9%)	6(54.5%)	5(62.5%)
Area of residence	Urban	6(31.6 %)	5(45.5%)	1(12.5%)
	Rural	13(68.4%)	6(54.5%)	7(87.5%)
Hypertension	yes	4(21.1%)	3(27.3%)	1(12.5%)
	No	15(78.9%)	8(72.7%)	7(87.5%)
DM	yes	2(10.5%)	1(9.1%)	1(12.5%)
	No	17(89.5%)	10(90.9%)	7(87.5%)
heart disease	HHD	1(5.3%)	1(9.1%)	0(0%)
	IHD	2(10.5)	1(9.1%)	1(12.5%)
	Other	1(5.3%)	1(9.1%)	0(0%)
	Unknown	14(73.7%)	8(72.7%)	6(75%)

Table 1 **sociodemographic factor and risk factor profile of stroke patients visited WUSTH medical emergency**

5.4 Factors Associated with stroke

All the variables which fulfilled the chi-square assumption were fitted into bivariable and multivariable logistic regression. Patients age, sex, residency, hypertension, diabetes, alcohol, fulfilled the variable screening criteria (p-value < 0.25) and entered into multivariable logistic regression analysis. Consequently, age, hypertension and diabetes mellitus were significantly associated with stroke at multivariable with less than 0.05 p values.

Accordingly, the age of patient showed a significant association with the risk of stroke. Based on our study stroke risk factors like age, hypertension and diabetes mellitus are strongly associated with AOR of 7.18, 3.534, and 4.58 respectively. The odds of having stroke among age 46-65 patients were 7.18 times higher as compared to age 15-45 years patients [AOR = 7.18; 95% CI (1.58-32.64)]and the odds of having stroke among those >65 years of age was 2.445 CI 95% (0.687-8.7). This study showed that patients with hypertension had 3.534 times higher odds of developing stroke as compared to those patients without hypertension. [AOR =3.534; 95% CI [(1.087-11.485)].

Patients with diabetes mellitus had 4.583 times higher odds of developing stroke a compared to those without diabetes mellitus. [AOR =4.583; 95% CI [(1.087-11.485)].

Variable		Stroke		p-value	COR (95%CI)	p-value	AOR (95%CI)
		Yes	no				
Age	15-45	4(21.1%)	34(8.4%)		1		
	46-65	4(21.1%)	172(42.7%)	0.027	5.05(1.206-21.222)	0.011	7.18(1.58,32.64)
	>65	11(57.9%)	197(48.9%)	0.224	2.107(0.634-7.001)	0.167	2.445(0.68,8.7)
Residency	Urban	6(31.6%)	82(20.3%)	0.245	0.553(0.204-1.5)	0.352	0.612(0.21,1.72)
	Rural	13(68.4%)	321(79.7%)		1		
Hypertension	Yes	4(21.1%)	154(38.2%)	0.141	0.431(0.141-1.323)	0.36	3.534(1.09,11.48)
	No	15(78.9%)	249(61.8%)		1		
Diabetes	`Yes	2(10.5%)	135(33.5%)	0.054	0.234(0.053(-1.026)	0.046	4.583(1.026,20.463)
	No	17(89.5%)	268(66.5%)		1		

Table 2 **Bivariate and multivariable analysis of factors associated with stroke among patients visited medical emergency WUSH, from august 2014-august 2015EC.**

5.5 Clinical presentation and duration of presentation

Body weakness was the most common 12 (63.2) followed by failure to communicate 4(21.1%) and loss of consciousness 2(10.5%).

The mean duration of presentation is 16 hours.

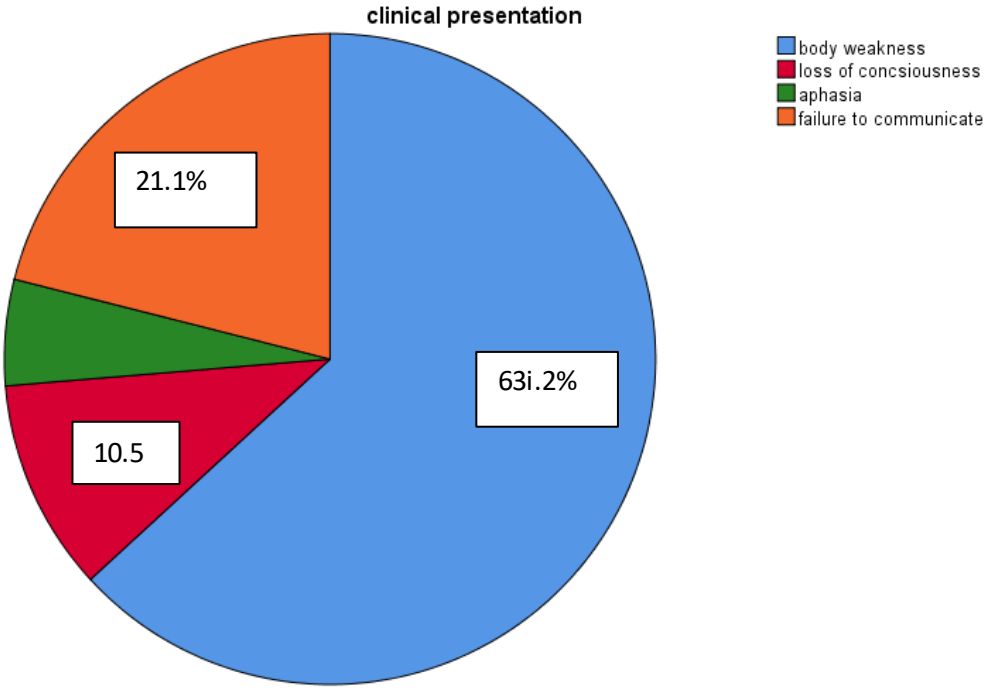

Figure 6 **clinical presentation distribution among stroke patients visiting medical emergency, WUSTH**

5.6Complication

Among those stroke patients 10(52.6%) did not have documented complication and 47.4% have complications among which aspiration pneumonia is the most common complication 4(21.1%) followed by raised ICP 3(15.8%), bedsore and DVT each accounting 1(5.3%).

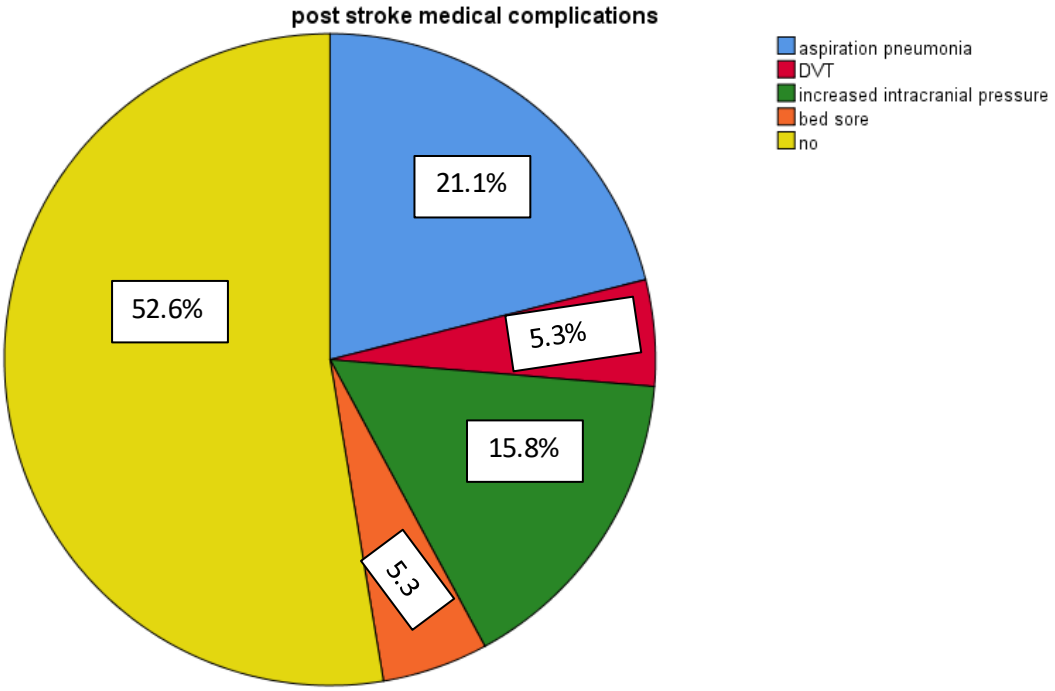

Figure 7 **post stroke complications among patients visited WUSTH medical emergency**

5.7 Outcomes

The in-hospital case fatality of stroke was 3(15.9%) compared to 3.8% mortality among the total 422 patients. And 16(84.2%) patients from stroke were discharged with improvement compared to 394(93.4%) of the total case.

		Frequency	Percent
Total stroke patient	improved	16	84.2
	Died	3	15.9
	Total	19	100.0

Table 3 **frequency of outcome among total stroke patients visited WUSTH medical emergency**

CHAPTER 6

DISCUSSION

This is the first study on stroke in WUSTH focusing on the prevalence, risk factors, and sociodemographic factors of stroke.

The CT scan performance rate (31.6%) was very low, that can be explained the unavailability of CT scan in our hospital and patients should be sent to Addis Abeba for imaging.

In our study ischemic stroke was the commonest subtype accounting for 57.9% of cases. There is a great variation in this proportion in different SSA studies which utilized CT scan with reported rates for hemorrhagic stroke ranging from 15-60%.

Despite this difference, hemorrhagic stroke appears to be more common in SSA countries compared to the developed world.

This difference may be the result of difference in study designs, hospital admission bias or difference in the population pyramid, socioeconomic and risk factor profiles between the two populations.

In our study male patients were more affected by stroke 12(63.2%) which is comparable to study done in felegehiwot referral hospital which is 62.5%. The probable justification to this fact could be more alcohol intake, cigarette smoking and chat chewing among males, which will contribute to the high chance of developing chronic diseases like stroke.

This study also revealed that among all stroke patients 3(100%) were male smokers, 2(100%) were male alcoholics and 8(100%) were male chat chewer.

In our study older age >45years was factor associated with stroke AOR=7.187, table

As indicated by various studies, age and chronic diseases have direct correlation due to physiology/ biological, environmental and life style/behavior related attributable factors.

Mean age of stroke patients at our hospital is 64.4 years

Although study in black lion hospital shown that patients with hemorrhagic stroke were younger (60 years) than those with ischemic stroke (70 years); majority of both stroke subtypes occur after 65 years of age 54.5% vs 62.5% IS and HS respectively.

In our study hypertension was found in 21.1%, AOR=3.5, of cases unlike other studies elsewhere where it is in more than half of the patients, is by far the most commonly identified risk factor together with heart disease. This difference might have been contributed by methodological differences, socio-demographic factors, and economic status of the study population. Even though we haven't assessed the treatment history, our experience and other studies from SSA tells us that most patients with hypertension are either previously undiagnosed or are not appropriately treated.

majority of the patients was not screened for heart disease with echocardiography 73.7% were unknown but the most common known Any type of structural heart disease was present in 4(21.1%) of patients, among this was IHD 2(10.5%) followed by HHD and VHD each accounting 1 (5.3%).

Diabetes was identified in 10.5%, AOR=4.5; of our patients which is lower than studies elsewhere. It was often present together with hypertension which entails their synergistic effect on stroke. The odds of having hypertension among diabetes patients were 1.7 times higher as compared to non-diabetic patients [AOR = 1.71; 95% CI (1.12-2.65)].

Therefore, the beneficial effect of screening and treatment of hypertension and diabetes for the prevention of stroke cannot be overemphasized.

Rheumatic heart disease, which was reported to be a common risk factor for stroke especially in the young in other Ethiopian studies, was found to be less common in our study. That is mainly because around 73.7% of our cases was not screened for heart disease and there was no echocardiography in WUSTH.

Tobacco smoking was 15.8% in our patients as it was common in other countries (13.4%-26.8%)

Only 2 of the patients have confirmed dyslipidemia but this does not show us comparable result as other researches, as most of patients (84.2%) were not investigated with lipid profile.

The in-hospital case fatality rate of stroke in our study,15.8%, while higher than reports from western studies, is comparable to SSA studies reporting rates between 14.7%-44.5%.

But this is only the in-hospital fatality which could not explain the home-based mortality rate of the patient.

A prospective follow up study with confirmation is necessary to get the true short-term mortality.

Most of the deaths were attributed to early complications of stroke especially increased intracranial pressure.

Prevention, early identification and management of these factors would at least have salvaged some of the patients.

Therefore, the increased early mortality in our patients is partly due to the absence of an emergency stroke care setup capable of early identification and management of these acute complications.

CHAPTER 7

CONCLUSION AND RECOMMENDATION

CONCLUSION

There was a low rate of CT scan performance rate.
Ischemic stroke was the most common type of stroke. Nonetheless, hemorrhagic stroke occurred more frequently compared to hospitals in developed countries. Patients with hemorrhagic stroke were younger than those with ischemic stroke.

Hypertension and heart disease were the most prevalent risk factors followed by diabetes mellitus. The in-hospital case fatality rate (15.8%), which is comparable with other SSA hospital studies.

The most common attributable causes of death were increased intracranial pressure.

RECOMMENDATION

A prospective hospital-based study and community-based stroke incidence and prevalence studies are required to define the true sociodemographic characteristics of stroke and the associated factors in our population.

Strategies for screening and management of hypertension and heart disease should be given priority as these are the most prevalent risk factors identified.

An emergency care set up, perhaps protocol based, capable of early brain imaging, identifying and managing early stroke complications is valuable for the prevention of early stroke related mortality.

Limitations of the Study

This is a hospital-based study and as such the results cannot be generalized to the general population.

As this study is based on retrospective chart review, the data obtained was not complete.

The study hasn't assessed the rate of disability, duration of stay, functional limitation and detail outcomes of the disease during discharge and after discharge.

Acknowledgement

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ANNEXES

Annex one

Consent form(verbal)

Good morning/Good afternoon;

My name is_____ I came from Wolkite University. I am seventh year medicine student and I am going to do research on the topic of stroke prevalence in WUSTH over one year from august 2014 -august 2015 EC. and I would like to ask you for data collection with patient chart revision and forming the data collection checklist.

Annex two

Data collection questionnaire format

1) Admission date of the patient

2) What is sex of the patient

1)Male

2)Female

3) what is age of the patient

4) what is residency of the patient

1)urban

2)rural

5)specific diagnosis

1. stroke;

if yes: A) ischemic stroke

B) hemorrhagic stroke

2. not stroke

A) pneumonia

B) hypertension

C) heart failure

D) DM

E) bronchial asthma

F) Acute febrile illness

G) poisoning

H) Acute glomerulonephritis

I) anemia

J) dyspepsia

K) intestinal parasitosis

L) urinary tract infection

M) chronic liver disease

N) seizure

O) other:

1)upper respiratory tract infection

2)pulmonary tuberculosis

3) Chronic obstructive pulmonary disease

4) HIV/AIDS

5) chronic kidney disease

6) interstitial lung disease

7) shock

8) meningitis/brain abscess

9) hematologic malignancy

6)Clinical presentation

1) Body weakness

2) loss of consciousness

3) aphasia

4) seizure

5) failure to communicate

6)other diagnosis specifics

7) duration of symptoms at presentation

1)<4.5hours

2) 4.5hour-24hours

3) >24hours

8) Is the patient diabetic;

1)yes
2)no

9) is the patient hypertensive

1) yes
2) no

10) is the patient alcoholic

1) yes
2) no

11) is the patient smoker

1) yes
2) no

12) did the patient use other stimulants (like khat, marijuana, cannabis...etc)

1) yes
2) no

13) did the patient had known / newly diagnosed structural heart disease; if yes which one

1) yes….1- IHD
2-HHD
3-VHD
4- atrial fibrillation
5- infective endocarditis
6- others (specific name)

2) no
3) unknown

14) did the patient have dyslipidemia

1) yes...1- LDL≥100mg/dl

2- Triglyceride ≥ 150mg/dl

3- HDL ≤ 40mg/dl for male and < 50mg/dl for female

2) no

3) unknown

15) did the patient have previous stroke

1) yes

2) no

16) did the patient have previous confirmed TIA

1) yes

2) no

17) did the patient had confirmed CNS vasculitis

1) yes

2) no

3) unknown

18) did the patient have self/family history of thrombotic thrombocytopenic purpura

1) yes

2) no

3) unknown

19) did the patient have history of DIC

1) yes

2) no

3) unknown

20) did the patient had laboratory confirmed factor 5 Leiden/ protein C/S deficiency

1) yes

2) no

3) unknown

21) did the patients have complications

1)aspiration pneumonia

2) Deep vein thrombosis

3)increased intracranial pressure

4) urinary tract infections

5)bed sore

6)stress ulcer

7)incontinence

8)pulmonary edema

9)hospital acquired infection

10)other specific

11)no

12) other diagnosis specific

22) what is outcome of the patients

1) improved

2) referred

3) died

4) left against medical advice

Declaration (assurance of investigator)

We the undersigned student, declare that this research result work is our original work in partial fulfillment of the requirement for the degree of medicine.

Name: Dr. Sara Tafesse,

Dr. Yordanos Assefa,

Dr. Askal Teshome and

Dr. Tewekel Faris

Signature: _____

Place: Wolkite University College of Medicine and health sciences

Date of Submission: August 21, 2023

The research result work has been submitted for examination with my approval as a university advisor.

Name of Principal advisor: Mr. GIRMA (Ass. Prof, MPH).

Signature: _____ Date _____

Name of Co-advisor: Dr. RIYAD (MD, internist)

Signature: _____ Date _____