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COLLEGE OF HEALTH SCIENCE SCHOOL OF MEDICINE

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TYPES AND ASSOCIATED FACTOR OF STROKE AT SELECTED PUBLIC REFERRAL HOSPITALS IN ADDIS ABABA; ETHIOPIA

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PATTERNS AND ASSOCIATED FACTORS OF STROKE AT SELECTED PUBLIC REFERRAL HOSPITALS, IN ADDIS ABABA, ETHIOPIA

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LIST ACRONYMS

AF-Atrial Fibrillation

AAU-Addis Ababa University.

DM- Diabetes Millets.

ECSA-Ethiopian Central Statistical Agency

EDHS-Ethiopian Demographic Health Survey.

HF-Heart Failure

HTN-Hypertension

MNR -Medical Registration Number.

NGO- Non Governmental Organizations.

OPD-out patient department.

SPSS -Statistical Package for the Social Sciences/ Statistical Product and Service Solutions.

SSA -Sub –Saharan Africa

TASH -Tikur Anbesa Specialized Hospital

VHD- Valvular Heart Disease

WHO- World Health Organization.

ZMH- Zewuditu Memorial Hospital

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ABSTRACT

Introduction: Stroke is "rapidly developing clinical signs of focal (or global) disturbance of cerebral functions, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin. According to the latest WHO data published in May 2014 Stroke Deaths in Ethiopia reached 28,320 or 4.71% of total deaths. The prevalence of stroke is decreasing in the developed countries while it is increasing in low level and middle income countries. **Objectives:** This study aims to determine the types and associated factors of stroke among three selected hospitals in Addis Ababa Ethiopia.

Methods: Institutional based cross sectional study design was conducted among stroke patients who were attending at three selected hospitals in Addis Ababa, Ethiopia from May 1/ 2016 to April 30/2017. The data was extracted form patient charts using English version questionnaire. The study period was from December 2017 -June 2017. The data was entered to SPSS-24 version then it was edited analyzed and interpreted. Finally the output is presented by using tables, chats and texts .Then the result will be disseminated for all concerned bodies.

Result: Among 156 study patients, 102 of were male, 50.64 % patients were aged above 55 years .the mean(SD) age of the study patient was 54.84±17.12SD years .Ischemic stroke (51.92%) was dominant than hemorrhagic stroke (48.08%), The determinant risk factor of stroke was hypertension followed by heart failure and valvular heart disease. There was significant association between hemorrhagic stroke and hypertension whereas Ischemic stroke was significantly associated with atrial fibrillation.

Keywords: Subtypes of Stroke, associated factors, Ethiopia

1. INTRODUCTION

1.1. BACKGROUND

The word stroke was first announced into medicine in 1689 by William Cole. Before Cole, the common term used to describe very acute none traumatic brain injuries was “apoplexy”, used by Hippocrates circa 400 BC (1).

Recently American heart association defined stroke as infarction of CNS and retina (2). Stroke is a sudden blood vessel related incident in the brain followed by sudden neurological deficit. According to WHO(introduced in 1970 and still used) stroke is defined as "rapidly developing clinical signs of focal (or global) disturbance of cerebral functions, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin(3).

Stroke is a non-communicable disease with significant socioeconomic consequence worldwide. But the burden has been predicted to rise for developing countries; still data‟s are limited, especially in sub-Saharan Africa. Stroke is the 2nd Ethiopian top 50 causes of death by age-standardized death rate and the 6th Ethiopian total deaths by cause percent among top 50 causes. (3, 7)

The two main forms of stroke are ischemic stroke, where there is a sudden blockage of a blood vessel, and hemorrhagic stroke, where there is a leakage of blood out of the vessel. Both of these dangerous and life threatening conditions are related, in some way, to heart health.. When the heart is damaged or malfunctions in various ways, it can lead to stroke although the brain is only 2% of body weight, it receives up to 20% of the body's blood flow. (10)

There are clinical risk factors which lead to stroke. This is hypertension, DM heart failure, valvular heart disease coronary heart disease and atrial fibrillation.

People with high levels of bad cholesterol /low density lipoprotein (LDL)/ and low levels of good cholesterol/high density lipoprotein (HDL)/have a greater risk of stroke. Foods that have a lot of saturated fats also have a lot of calories and can contribute to obesity that increases risk of getting stroke.(9).

Most scholars recommend, 30-40 minutes exercise per day, to maintain a healthy weight and prevent obesity. Exercise and healthy diet are crucial for better heart & brain function. Heart disease and stroke share several equivalent risk factors, including hypertension, diabetes, and high bad cholesterol etc. Controlling these risk factors can result healthy brain and heart (10).

Diseases of the heart can lead to stroke through various mechanisms. Cardio embolic stroke is caused by clotted blood when it travels from the heart into the brain. Naturally circulatory system is supposed to prevent the formation of blood clots by keeping blood cells moving. When blood sits around, for instance atrial fibrillation, it tends to clot (11).

According to a release by the World Health Organization (WHO) stroke accounts for 10.8% mortality and 3.1% of disease burden worldwide (11). There is an epidemiologic and demographic transition of diseases in most developing countries with increased risk for cardiovascular diseases .It has been projected that by the year 2030, about 80% of all stroke cases will occur in low and middle income countries of the world (3).

A recent review on global stroke cases showed that while there is a decline in stroke incidence in developed countries, most developing countries are experiencing a rise in stroke incidence of about 100 percent [4]. Available information on risk factors and epidemiology of stroke are mostly based on western populations, with few data from developing countries, especially Africa [5].

Stroke prevention is an important public health goal in low-and-middle income countries due to its high mortality and morbidity in these settings. Epidemiological data from high-income countries have demonstrated decrease incidence of stroke.

1.2. STATEMENT OF THE PROBLEM

Stroke is a pathological entity with high prevalence and severe impact in affected individuals, both in developed and those in developing countries. However, two-thirds of deaths caused by stroke occur in low and middle-income countries (9). Although the burden of cerebrovascular accident is not known in Africa, it's a frequent cause of mortality and morbidity in hospital practice (2, 5).

In the last 20 years, many studies have reported decreasing incidence of stroke in developed countries (9). The reason for this trend is not totally known, but it can be attributed to better knowledge and management of risk factors (4).

Data from WHO shows that the risk of dying from stroke is 10.8% mortality and 3.1% of disease burden worldwide making it challenging in line with struggling to overcome the burden of infectious diseases and increasing number of non-communicable diseases. According to the latest WHO data published in May 2014 Stroke Deaths in Ethiopia reached 28,320 or 4.71% of total deaths. The age adjusted Death Rate is 71.94 per 100,000 of population ranks Ethiopia #107 in the world. Currently, stroke can be considered the greatest public health problem in Ethiopia and in many countries of Latin America (6, 9, and 10)

In United States, in 2008 the cost of care with disability caused by stroke was estimated in 18.8 billion dollars, while productivity loss and premature deaths had cost of 15.5 billion dollars (5, 10).

In Ethiopia although, admission to the hospitals due to stroke is increased time to time there is no such kind of enough research done on the cases of factors that suggested being associated with stroke. This in turn affects the quality of patient care. Even though, similar study on stroke were conducted in other parts of the world and Ethiopia, this study differ in that it is intended to assess the patterns and associated factors of stroke at selected hospitals in Addis Ababa through better wider scope than the previous similar studies. Thus, this study aimed to determine stroke associated factors and diagnostic modalities at selected public hospitals in Addis Ababa. So this study will fill this gap to realize patterns and associated factors of stroke and will show some strategies used in prevention.

1.3. Significance of the study

This study provides basic information on the types and associated factors of stroke that have a valuable contribution for the academic community, service providers, and health care professionals. Above all to the patients who are suffering from stroke? Thus, it provides a basic clue for the prevention and early detection which would lower the morbidity and mortality due to this life debilitative, threatening, preventable and manageable emergency case. Furthermore it will used for other researchers as reference source.

2. LITERATURE REVIEW

Stroke is the third leading cause of death in the world with high mortality and morbidity in low and middle income country. According to World Health Organization, 5.71 million people die from stroke in 2004(15).

Data from national statistic from United Kingdome reveals that alcohol use12.8%, active Smoking 20%, past smokers 66%, alcohol, and illegal drug use 62%, diabetes mellitus 5%, high cholesterol use 21%, Illegal drug use 19.8% were factors associated with presence of stroke(13).

According to the study conducted in Sweden the prevalence of stroke was 7% with a significant association of age, 65-80years (4.7%), >80 years (11.6%) and Sex; male 8.4% and female 5.7% (11).

According to the study conducted in South Brazile, the prevalence of stroke was 8.4% with a significant association of comorbidities like hypertension (29.8%), diabetes malitus (9.1%), age between 40-59years (39%)and 60-79years (16.8%), marital status widowed (7.6%),hypertension history from father 28.4% and Mother 45.6%, being male sex 44.1% and female 55.9% and smoking 27.4%(12).

A research conducted in Nigeria showed that old patients showed a significantly greater frequency of athero-thrombotic (27.5% vs. 21.9%, P<.05) and cardio embolic infarctions (24.4% vs. 26.3%, P<.001) and a lesser frequency of stroke of unusual cause with a significant association of patients younger than 85 years of age (27% vs. 13.5%, P<.001), longer duration of hospital stay (22.03+/-29.6 vs. 17.5+/-21.5 days), and lesser frequency of absence of neurologic deficit at the time of hospital discharge (21.4% vs. 33.1%)(3, 5).

According to Juan de Jesus and et al the prevalence of stroke was 7.8% (95%CI; 6.9-8.8) and higher in men, being hypertension patient (OR 2.8, 95%CI; 2-4), taking low HDL cholesterol (OR 2.6, 95%CI1.7-3.9) and male sex (OR; 1.7, 95%, 1.2-2.5) were had a significant association to the presence of stroke (14).

A study conducted in Zambia showed that 50.3% of stroke patients had ischemic stroke while 49.7% had hemorrhagic stroke with a significant association of hypertension (50.9%), cardiac diseases (16.6%), diabetes mellitus (7.4%), alcohol (10.4%), cigarette smoking (4.9%) and tuberculosis meningitis (3.1%) (4, 7, 8).
Another study conducted in Ghana showed that 79.8% were women with 77.6% had hypertension, 18.4% had diabetes and hypertension, and 20 (4.0%) had just diabetes (9).

Prevention of stroke has been a key target for health care interventions in developed countries for decades, with recent WHO statistics demonstrating a 42% decrease in stroke incidence since 1970. This trend is not observed uniformly worldwide, with the same review demonstrating a 100% increase in stroke incidence in developing countries over a similar time period. Economic changes in these countries are anticipated to amplify this problem, with key risk factors for stroke also increasing in prevalence [17, and 18].

Furthermore, more effective treatment of childhood diseases will likely increase the proportion of elderly people in these countries, further increasing the burden of chronic disease. A large hospital based study in Tanzania estimated the incidence of stroke to be between 108-316 per 100,000 with significant differences between rural and urban populations [19].

Information concerning the community incidence of stroke is scarce with only one large study demonstrating a significantly lower incidence of stroke than hospital based studies [20]. Reliable information on stroke in sub-Saharan Africa (SSA) is therefore poor and it is difficult to accurately estimate stroke incidence in its population. Nevertheless, the aforementioned studies demonstrate a steady, yet substantial increase in the burden of stroke, hence necessitating further research and implementation of appropriate prevention strategies. The rising incidence of stroke and stroke associated morbidity is especially problematic in SSA. Financial constraints and delayed presentation [21] contribute to a high case fatality rate.

Multiple studies have identified hypertension as the leading risk factor for stroke in SSAs [22] with a Nigerian study demonstrating >80% prevalence of hypertension in stroke patients [23]. Sub-Saharan populations appear to be more at-risk of developing hypertension and subsequent

stroke. Current literature demonstrates higher mean systolic and diastolic blood pressures (BP) in people of African descent in comparison with their Caucasian counterparts [24].

Study conducted at Tikur Anbesa specialized hospital shows that Stroke related complications were detected in 71.8% of the study participants and the most frequent complication was aspiration pneumonia which occurred in 33.8% but the other miscellaneous complications included were sepsis, hypokalemia exposure keratitis were detected in 25% of stroke patients which was common in patients with severe neurologic deficit as measured by Glasgow coma scale (GSC) and old age. Besides, GCS < 12 and age > 40 years were both significantly associated with developments of complications after stroke and a total of 23% patients died during their in-patient stay(2,6).

Furthermore a recently published multicenter study demonstrated a 2 to 5 fold increase in stroke incidence in a population of black Americans [25]. This difference could be accounted for by a combination of factors, including hypertension. A large study conducted in South Africa suggested that up to 45% of strokes in SSAs could be prevented by simple blood pressure control measures [25].

The contribution of eclampsia to stroke incidence should also not be underestimated. Of those patients who progress to eclampsia, approximately 4.9% will develop a stroke [26]. This represents a small but not insignificant portion of stroke burden in this population. Better access to maternal health care services could play an important role in reducing pregnancy related stroke.

3. OBJECTIVES

3.1. General objective

To assess types and associated factors of stroke at three selected hospitals in Addis Ababa, Ethiopia 2017

3.2. Specific objectives

- To determine the types of stroke at the three selected hospitals.
- To identify associated factors of stroke at the selected hospitals.
- To assess clinical variables of stroke.
- To assess soscio-demographic characteristics of study subjects.

4. METHODS AND MATERIALS

4.1. Study Area

This study is conducted at three selected public referral hospitals in Addis Ababa, Ethiopia. These are Black lion specialized hospital, Zewuditu memorial hospital, and Abet hospital. These three hospitals are selected by lottery method among 11 referral hospitals.

Addis Ababa is the capital city of Ethiopia which has an area of 530 km^2. According to the 2007 population census, Addis Ababa has a total population of 3.385 million, with annual growth rate of 3.8%; it has 10 sub- cities .There are 11 governmental hospital, 24 health centers, 32 health posts & more than 500 private health institutions providing health services including communicable and none communicable disease.

4.2. Study Design

Institution based cross sectional study design was used.

4.3. Study Period

This study was conducted from December 2016 - June 2017.

4.4. Source Population

All patients attending at selected three public hospitals in Addis Ababa.

4.5. Study Population

Those patients admitted in the above three selected hospital`s medical ward with the diagnosis of stroke from May 1/2016-April 30/2017.

4.6. Sample size determination and sampling technique

4.6.1. Sample size determination

One year (from May 1/2016-April 30/2017) total patients admitted to the three selected hospitals with the diagnosis of stroke were taken .Since the total 156 study subjects were taken there was no sampling method used. There are eleven public hospitals in Addis Ababa. Three hospitals were selected by lottery method (figure 2).

4.6.2. Hospital selection procedure

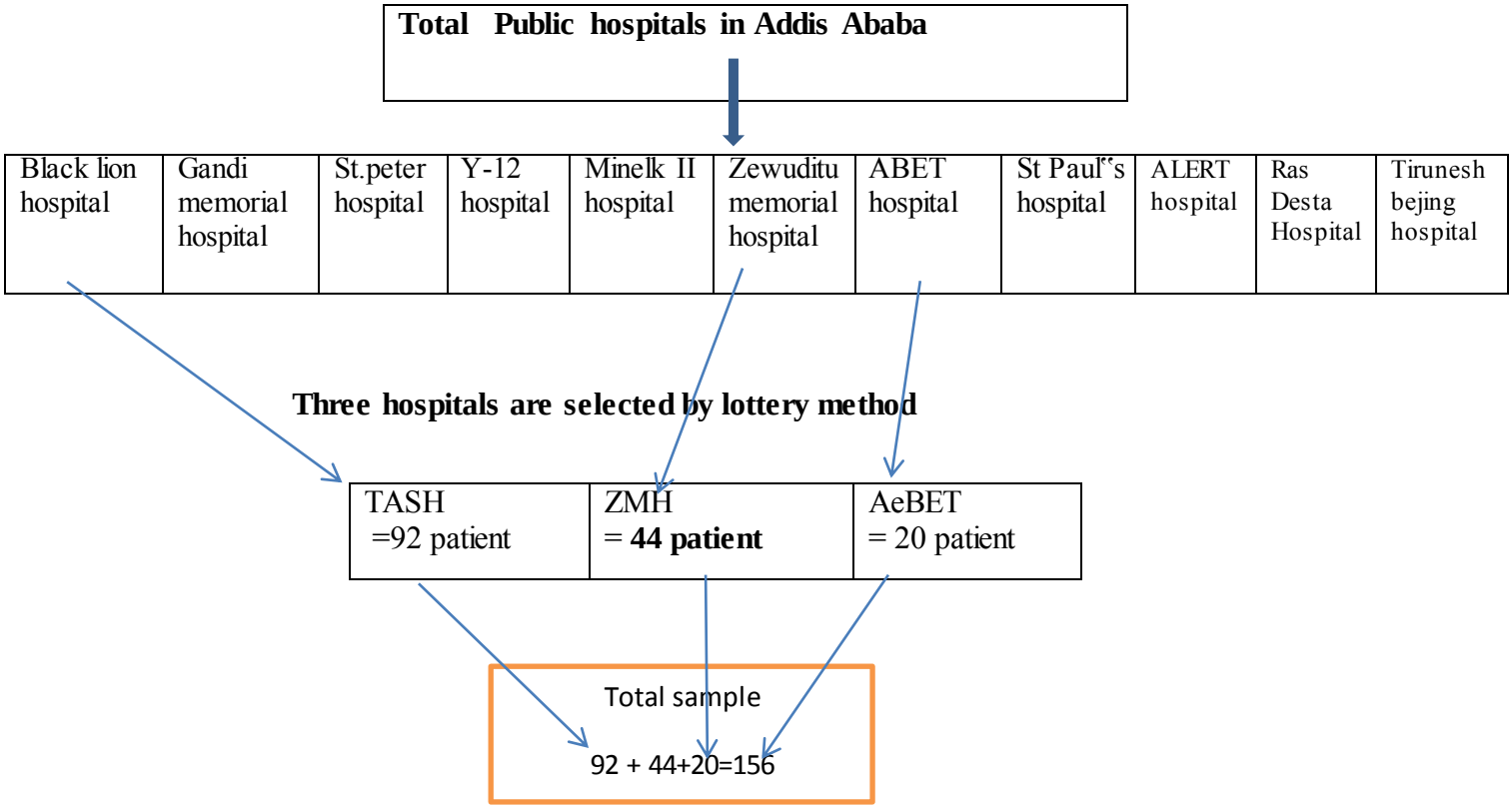


Figure 1 Schematic Presentation of hospital selection procedure

4.7. Eligibility criteria

4.7.1. Inclusion criteria

All patients admitted to the selected hospitals during the study period who were fulfill the World Health organization`s case definition of stroke and who had a CT scan report of stroke were included in the study.

4.7.2. Exclusion criteria

Those patients <18 years old and who did not fulfill the definition of stroke and patient records with incomplete information mainly with no diagnosis were excluded from the study

4.8. Study variables

4.8.1. Dependent variable:

- Stroke

4.8.1. Independent variables:

- Socio-demographic variables (sex, age, ethnicity)
- Life style (obesity,)
- Clinical variables (DM, HTN, atrial fibrillation heart failure, valvular heart disease)

4.9. Operational Definition

Patient identification number; it is the hospital code written on patient chart.

Stroke Surveillance Site Code; It is selected hospital at which data is going to be collected

Interviewer Code; it is identification number given to each data collectors.

Obesity; A person who has unhealthy body weight with body mass index >30kg/m2.

4.10. Data collection period

Data collection period was from April 20-2017 to May 10-2017.

4.11. Data collection tool and procedure

Pre-tested check list was used for data collection from HMIS LOG books of each hospital. The check list was adopted from different literatures. It was pretested at non selected yekatit-12 hospital two weeks before data collection. Data extracting structured English version questionnaire, adopted and modified from different literatures was used to collect data from medical ward of each selected hospitals.

Four trained data collectors and one supervisor were recruited to run the data collection procedure. Continuous follow up and supervision was done by the supervisor and principal investigator. First 193 charts MRN were taken from HMIS books .then it was given to chart room staffs to get patient charts .Finally the required data was gathered by the data collectors.

4.12. Data Processing and Analysis

Data was checked for completeness &accuracy daily, coded and entered to SPSS version 24.0. Data Analysis was performed using SPSS version 24.0. Descriptive statistics is used to present in means standard deviation for numerical variables and frequency percentages for categorical

variables. Finally, the types of stroke and its associated factors were extracted from SPSS so that it was presented by using charts, tables, and graphs to show results as appropriate. Binary logistic regression and odds ratio was done for associated factors. Categorical variables were analyzed by Chi-squares test. The significance level used was $p<0.05$

4.13. Data quality assurance

In order to keep the data quality, the questionnaire first prepared in English then the pre-test was carried on 5% of the sample size so that the consistency/completeness of the questionnaire in line to the medical records was checked. Thus, correction was done according to the available data on medical records.

4.14. Ethical considerations

Approval letter of ethical clearance was obtained from Addis Ababa University. Then official letter was sent to the selected hospitals. But since this is a retrospective study based on analysis of patients‟ record, it was neither necessary to obtain written consent nor approval institutional review board. Finally, confidentialities of the information gathered were assured via avoiding the name and address of the patients in the questionnaire.

4.15. Dissemination of the results

The result will be presented to Addis Ababa University department of emergency medicine and other conferences as possible. Then it will be disseminated to study area hospitals, Addis Ababa university research unit and ministry of health. Moreover, efforts will be made to publish in peer review journals.

5. Result

5.1. Socio-Demographic Characteristics

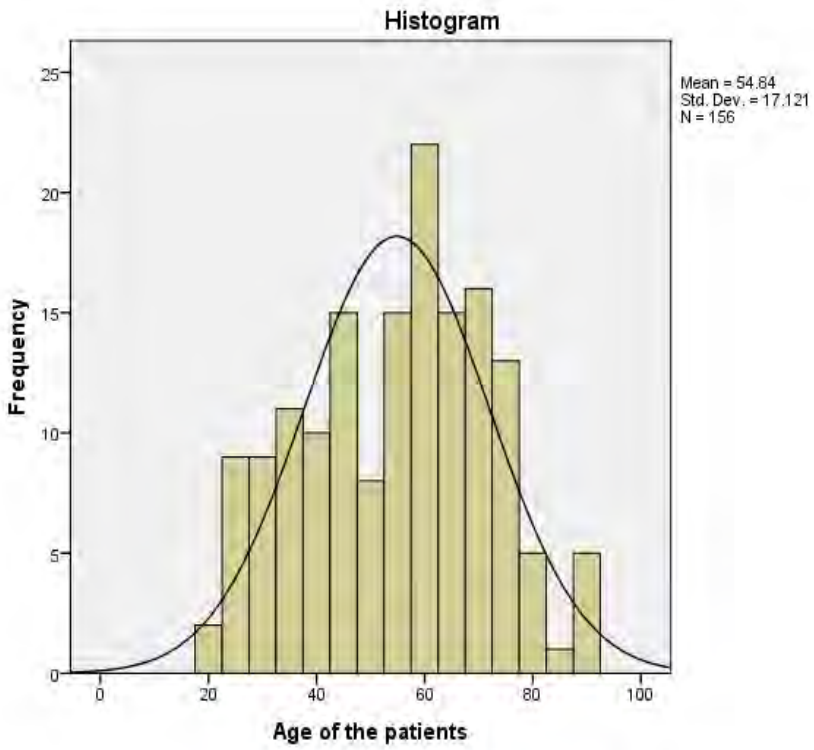
During the study period, a total of 193 stroke patient charts were retrieved from HMIS log book of each public hospital. Among these, the study was conducted on 156 patients who fulfill the inclusion criteria. The rest 37 charts were with incomplete information and some of them were lost. Thus, these were excluded from the study.

Majority of the patients 79 (50.64%) were aged above 55 years with the mean (SD) age of 54.84 ± 17.12SD years with the age range from 20-90years. The majority of the patients, 65.38% (n=102) were male. i.e. M: F =1.89:1 where the majority of the patients, 55.13%(n=86) have been living in Addis Ababa (Table 1).

Table 1. Socio-Demographic Characteristics of study participants in the stroke and associated factors among-3-public hospital in Addis Ababa Ethiopia, 2017 (n=156).

Variables	Category	Frequency	Percent
Age	<34	22	14.10
	35-54	55	35.26
	≥55	79	50.64
	Total	156	100
Sex	Male	102	65.38
	Female	54	34.62
	Total	156	100
Residence	Addis Ababa	86	55.13
	Out of Addis Ababa	70	44.87
Total		156	100

Figure-2 Age distribution of the study participants in the stroke and associated factors among-3-public hospital in Addis Ababa Ethiopia, 2017 (n=156)



5.2. CLINICAL VARIALES

This study identifies different clinical variables. Among the study patients, 46.8% (n=73) patients had neurological signs with disturbed consciousness followed by right or left sided hemiparesis, 44.2% (n=69) (Table-2).

Table-2- Clinical characteristic and neurological signs observed at presentation in the three selected Referral Hospitals admitted patients during May 2016 to April 30/2017 in Addis Ababa Ethiopia,(n=156).

Variables	Category	Frequency	Percent
DM	Yes	45	28.85
	No	111	71.15
AF	Yes	31	19.87
	No	125	80.13
HF &VHD	Yes	53	33.97
	No	103	66.03
Smoking	Yes	38	24.36
	No	118	75.64
HTN	Yes	116	74.36
	No	40	25.64
Obesity	Yes	7	4.49
	No	149	95.51
Neurological signs observed at presentation	Change in mental status	73	46.8
	Weakness/paresis	69	44.2
	Speech disturbance	11	7.1

Besides, in this study the major clinical variable that result stroke is hypertension 74.36 % followed by HF & VHD 33.97% results hemorrhagic stroke (48%) followed by ischemic stroke (51.92%) respectively (Fig.2).

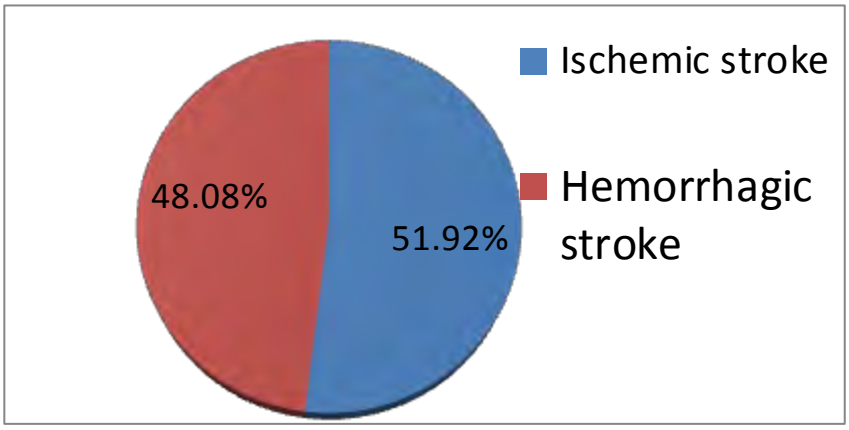


Figure-2- **Types of stroke in the three selected Referral Hospitals in Addis Ababa Ethiopia, 2017.**

5.3. DIAGNOSTIC IMAGING METHODS

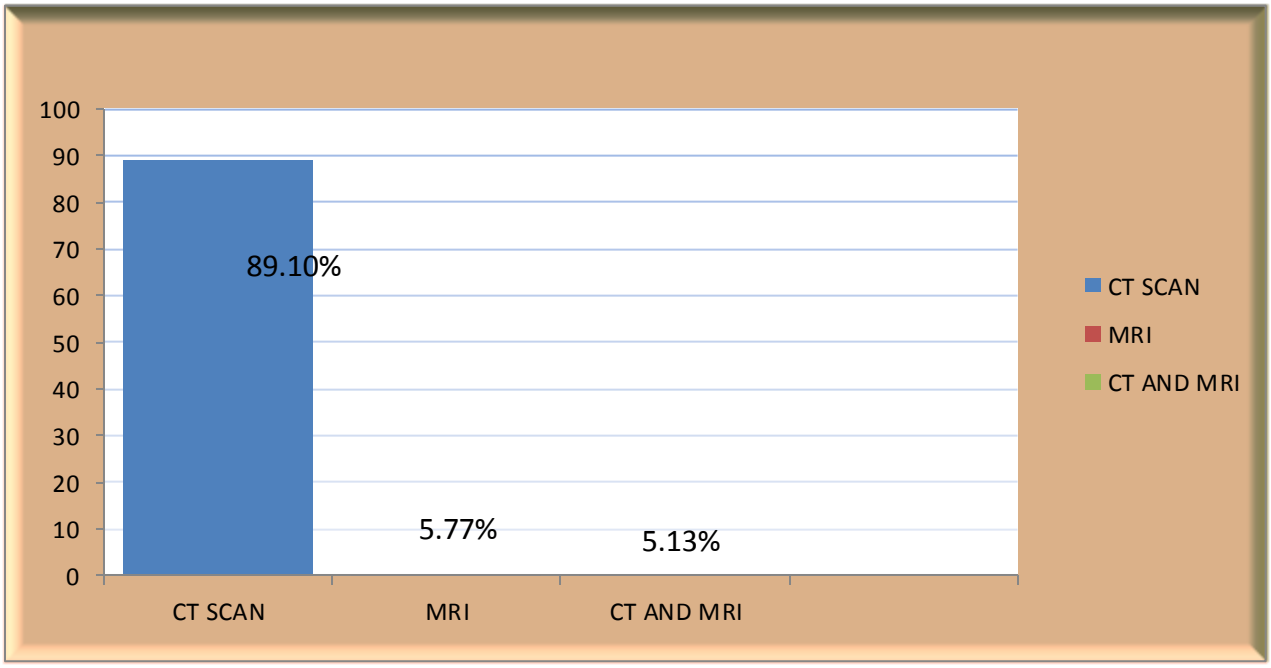


Figure- 3-Diagnostic imaging method performed for stroke patients admitted at the selected hospital, May 2016 to April 2017.

Table 3 Shows supportive diagnosis methods performed for the patient admitted in the study participants of stroke and associated factors among-3-public hospital in Addis Ababa Ethiopia, 2017 (n=156).

Type of diagnostic method performed	Frequency	Percent
Angiography	18	8.04
carotid ultrasound	37	16.52
ECHO	68	30.36
ECG	101	45.08
Total	224	100

N.B for one patient more than one diagnosis method may have been done .that is why 224 which > 156 the sample size of this study is.

Table-4- Crud and adjusted analysis of Factors associated with the presence of ischemic stroke in -3-public hospitals in Addis Ababa, Ethiopia, 2017 (n=156).

Variables	Category	Ischemic stroke		OR (95% CI)	
		Yes (%)	No (%)	COR	AOR
Age	<34	11(50)	11(50)	1.00	1.00
	35-54	17(37.8)	28(62.2)	0.61(0.22-1.70)	00.41(0.12-1.39)
	>=55	53(59.6)	36(40.4)	1.47(0.58-3.76)	1.39(0.46-4.13)
Sex	Male	51(50)	51(50)	0.8(0.41-1.55)	0.77(0.36-1.68)
	Female	30(55.6)	24(44.4)	1.00	1.00
Residence	Addis Ababa	52(60.5)	34(39.5)	**2.16(1.14-4.11)**	1.94(0.92-4.12)
	Out of Addis Ababa	29(41.4)	41(58.6)	1.00	1.00
DM	Yes	29(64.4)	16(35.6)	**2.06(1.01-4.21)**	2.12(0.92-4.86)
	No	52(46.8)	59(53.2)	1.00	1.00
AF	Yes	27(87.1)	4(12.9)	**8.88(2.93-26.88)**	**8.08(2.50-26.12)**
	No	54(43.2)	71(56.8)	1.00	1.00
HF &VHD	Yes	36(67.9)	17(32.1)	**2.73(1.36-5.47)**	**3.07(1.34-7.01)**
	No	45(43.7)	58(56.3)	1.00	1.00
Smoking	Yes	26(68.4)	12(31.6)	**2.48(1.15-5.38)**	1.18(0.47-2.97)
	No	55(46.6)	63(53.4)	1.00	1.00

NB: COR- Crude odds Ratio; AOR-Adjusted odds ratio; CI-Confidence interval.

Table-5- Crud and adjusted analysis of Factors associated with the presence of hemorrhagic stroke in -3-public hospitals in Addis Ababa, Ethiopia, 2017 (n=156).

Variables	Category	Hemorrhagic stroke		OR (95% CI)	
		Yes	No	COR(95%CI)	AOR(95%CI)
Age	<34	11(50)	11(50)	1.47(.58-3.76)	1.77(0.58-5.39)
	35-54	28(62.6)	17(37.8)	**2.43(1.16-5.06)**	0.50(0.18-1.39)
	≥55	36(40.4)	53(59.6)	1.00	1.00
Sex	Male	51(50)	51(50)	1.25(0.65-2.42)	1.19(0.59-2.41)
	Female	24(44.4)	30(55.6)	1.00	1.00
HTN	Yes	64(55.2)	52(44.8)	**3.25(1.48-7.11)**	**4.49(1.89-10.67)**
	No	11(27.5)	29(72.5)	1.00	1.00
Obesity	Yes	4(57.1)	3(42.9)	1.47(0.32-6.77)	0.94(0.19-4.74)
	No	71(47.7)	78(52.3)	1.00	1.00

NB: COR- Crude odds Ratio; AOR-Adjusted odds ratio; CI-Confidence interval

6. DISCUSSION

In this study Ischemic stroke was the common subtype of stroke accounting 51.92 % while Hemorrhagic stroke was comprised of 48.08 %(fig 2) with significant association of hypertension 74.36 %,(table 5) cardiac disease 33.97%, and diabetes millets 28.85 %(table 4). This is almost similar with the study conducted in Zambia showed that 50.3% were Ischemic stroke while 49.7% had Hemorrhagic stroke with significant association of hypertension (50.8%), cardiac disease (16.6%), and diabetes millets (7.4%).(3,8). Similarly a prospective study conducted at hawasa university referral hospital stated 50.3% had Ischemic stroke and 49.% were hemorrhagic stroke with the risk factors included hypertension (50.9%), cardiac diseases (16.6%), diabetes mellitus (7.4%), cigarette smoking (4.9%)

In contrary previous study at Black lion hospital exhibited hemorrhagic stroke was the commonest one accounting 57%. This difference could be Black lion is the highest referral center of the country where hemorrhagic stroke patients are referred to. Ischemic stroke is easier to manage as compared to hemorrhagic stroke.

In this study diabetes millets had statistical association with ischemic stroke .The odds ratio of having stroke was {COR (95%CI); **2.06 (1.01-4.21)}** .This means the possibility of getting stroke was relatively two fold higher in diabetic patients than non-diabetic patients. This finding is compatible with the prospective study done at Pale rmo University, Italy where the risk of ischemic stroke in patients with diabetes mellitus was twice those without diabetes millets COR {(95%CI); 2.2(1.9-2.6)} (31,33)

Atrial fibrillation had significant association to the prevalence of Ischemic stroke. The odds of which were {AOR (95%CI) **8.08(2.50-26.12)}.**So this study showed having stroke was eight times is more likely in atrial fibrillation patients than who had no atrial fibrillation .In line with this study there are many studies which showed that the risk of atrial fibrillation is the prevalent factor for development of stroke . Research done at Gondar hospital showed that atrial fibrillation was resulted 34.8% of Ischemic stroke of all case. Atrial fibrillation was identified in 19.87% of all cases in our study which is almost similar with other reports from elsewhere (15-23%) [28-30]. But it is lesser than the study done at Gondar hospital Ethiopia, which was identified in 28.7% of all cases. This difference could be the study setting and period. (6, 32)

Heart failure and other valvular heart disease had association with stroke. The possibility of having Ischemic stroke is triple than those who had no cardiac problem. The odds ratio of having stroke was {AOR (95%CI); 3.07(1.34-7.01)} (33).

In this study hypertension had significant association to the prevalence of stroke. The odds of having stroke were {AOR (95%CI); 4.49 (1.89-10.67)}. This implies the possibility of having stroke was relatively five folds higher among hypertension patients than non-hypertension patients. Similarly study conducted in Cuba showed that hypertensive patients were three times more likely to have hemorrhagic stroke than normotensive patients. The odds ratio in that study was {AOR (95%CI); 2.8(2.0- 4.3)}.The slight difference could be due to the community awareness towards the risk factors of stroke. (34).

Limitation of the study

- ✓ This is hospital based retrospective chart review study which cannot be generalized to the general population.
- ✓ Time constraint and interruption of internet.
- ✓ Greater challenge to get data from St. Paul's hospital due to lack of managerial staff cooperation.

7. CONCLUSION

The prevalence of Hemorrhagic stroke had a significant association in patients with hypertension, whereas Ischemic stroke had significant association with DM, AF, and HF &VHD. The pre dominant risk factors of stroke were hypertension for hemorrhagic stroke and atrial fibrillation for Ischemic stroke. Therefor early identification, careful treatment of stroke and creating community awareness about risk factors of stroke and providing health education is essential.

8. RECOMMENDATION

Based on the findings the following recommendations are forwarded

To The Health Professionals:

- Stroke is become predominant problem for our country. Therefore early identification and treatment will improve prognosis and decrease the complication.
- In addition creating Community awareness about prevention of risk factors and Regular medical checkup should be provided routinely.

To The Community:

- Many of stroke risk factors are easily preventable with good life style and Regular medical checkup, having this information from health professional is crucial.
- Periodic follow up and adherence to the treatment of risk factors like hypertension and diabetes mellitus can minimize the chance of getting stroke.

To The ministry Of Health:

- Community outreach program has to be planed and awareness about risk factors of stroke, benefit of regular medical checkup and treatment follow up should be given to the whole region.

To researchers:

- This research can be used as reference and would rather to do prospective study with better wider scope.

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ANEXES

Annex I

Questionnaires:

Questionnaires to assess types and associated factors of stroke at-3 selected public hospitals in Addis Ababa Ethiopia 2017.

Name and signature of data collector _____Date_____

Stroke Surveillance Site Code _____

Interviewer Code _____

Date of completion of the instrument_____

1. Social demographic factors

Patient Identification number (MRN) _____

Questionnaires	Alternative response
Age?	_____Years
Sex	1. Male 2. Female
Residency	1. Addis Ababa 2. Out Of Addis Ababa

2. Risk factors assessment: - Tick with (√) for appropriate response.

Variables	Response
Diabetes Miletus	Yes
	No
Atrial fibrillation	**yes**
	no
Heart failure and valvular heart disease	**Yes**
	No
Smoking	**Yes**
	No
Hypertension	**Yes**
	No
Obesity	**yes**
	no

3. Which Neurological signs were observed at first medical examination of hospitalization?

Neurological signs	Disturbed consciousness
	Weakness/ paresis
	Speech disturbance

4. What subtype of stroke was diagnosed? 1. Ischemic _____
   2. Hemorrhagic stroke

5. Which images method was performed? 1. CT-scan---------- 2.MRI------

6. Which of the following diagnostic examinations were performed?

   A. Angiography
   B. Carotid Ultrasound
   C. Electrocardiogram
   D. Medical autopsy
   E. Other(specify

7. Which of the following complications occurred during the patients stay in hospital?

   A. Deep venous thrombosis
   B. Aspiration Pneumonia
   C. Bed sore
   D. Other CV complication
   E. No complication stated

8. Patient Outcome ----------

Annex II

Declaration

I, the undersigned, declare that this is my original work and that all sources of materials used for this thesis are duly acknowledged

Name: Getasew Mulatu

Signature: _____

Date of submission: _____

Place: Addis Ababa, Ethiopia

This thesis has been submitted for examination with my approval as University advisor.

Name of advisor:

1. Dr. Sofia Kebede
Signature_____
Date_____

2.Haimanote Geremew
Signature_____
Date_____

Examiners	**Signature**
1._____	_____
2._____	_____
3._____	_____