

# Magnitude of stroke and associated factors among patients who attended the medical ward of Felege Hiwot Referral Hospital, Bahir Dar town, Northwest Ethiopia

Beza Mulat<sup>1</sup>, Jibril Mohammed<sup>1</sup>, Mastewal Yeseni<sup>1</sup>, Mebratu Alamirew<sup>1</sup>, Munira Dermello<sup>1</sup>, Niyat G/michael<sup>1</sup>, Mulusew Andualem Asemahagn<sup>1\*</sup>,

## Abstract

**Background:** Stroke is the abrupt onset of a neurologic deficit and attributable to a focal vascular cause. It is an alarming issue and the third leading cause of deaths globally. Stroke was considered as a disease of developed nations, but now it becomes a top priority public health problem to developing countries as a result of globalization, which results in life style change, and less attention to prevent non-communicable diseases. This study was aimed to assess the magnitude of stroke and associated factors among patients attended the medical department of Felege Hiwot Referral Hospital between September 2014 and September 2015.

**Methods:** An institution based cross sectional study was conducted among 427 adult ( $\geq 30$  years old) stroke patient records in June 2016. Data were extracted from the Internal Medicine Department patient registration logbook using data extraction guideline. SPSS version 20 was used to edit and analyze data. Descriptive statistics and logistic regression analysis were computed to describe study objectives and identify factors associated with stroke, respectively.

**Results:** Nearly one-third (36.8%) of reviewed records went to female patients. Nearly two third (60%) patients were aged above 50 years old. About 48(11.2%), 120(28%), 73(17.1%) and 77(18%) patients had diabetes mellitus, hypertension, cardiac and unknown diagnosis, respectively. Only 32(7.5%) were stroke patients (56.7% ischemic and 43.3% haemorrhagic). The majority (63.6%) were male stroke patients and 56.7% were urban residents. Older age, being (hypertensive, diabetes and cardiac), alcohol intake and cigarette smoking were significant factors to stroke.

**Conclusions:** The magnitude of stroke among Internal Medicine Department attendees in Felege Hiwot Referral Hospital was lower compared with previous studies. Age, co morbidity (cardiac, diabetes and hypertensive), alcohol intake and cigarette smoking were identified factors to stroke. Thus, improving personal behaviour/ life style/ and early screening are important to prevent stroke in the study area. [*Ethiop. J. Health Dev.* 2016;30(3):129-134]

**Key words:** Stroke, factor, Felege Hiwot Hospital, Bahir Dar, Ethiopia

## Background

Stroke or cerebrovascular accident is defined as the abrupt onset of neurologic deficit that attributes to a focal vascular cause (1). It mainly occurs because of poor blood flow to the brain which results in cell death (2). Inability to move, cognitive impairment, talking problems, feeling as the world is spinning, severe headache and loss of vision are key signs and symptoms of stroke (1, 2). Ischemic (clot) due to lack of blood flow and haemorrhagic due to intracranial bleeding are two types of strokes. Although haemorrhagic strokes are more severe and cause higher risk of mortality, about 85% of all strokes are ischemic (1-3).

Globally, stroke has covered about 16 million incidences and 9.7% deaths (3). Over 23 and 7.8 million new stroke cases and deaths are expected by 2030, respectively if there will not be intervention (4). Based on the WHO report (5), about 5.71 million people died with stroke and it was estimated to be 6.3 million in 2015 (6). Stroke was top leading cause of death in 25 Latin American and Caribbean countries (272,000 deaths) in 2002 (7). Based on evidences from 1990-2010, stroke incidence decreased by 12% in

developed countries, but increased by 12% in low and middle-income countries (8).

Developing countries have shared the majority of global stroke mortality (9, 10). About 85.5% of world's stroke deaths have occurred in developing countries (7). There was an increment of stroke prevalence by 8% in Africa between 2002 and 2004 (11). Smoking, alcohol intake, diabetes mellitus, poor physical activity and unhealthy diets were the stated factors to stroke (2, 12-16). Old age also has a positive linkage with stroke (2, 17, 18).

Stroke accounted 45% of all admissions and 17% of medical deaths with 40% thirty-day case fatality rate in Nigeria (19). Evidence in Tanzania revealed that there were 316 stroke cases per 100,000 patients (20). Study finding from Addis Ababa, Ethiopia, indicated that haemorrhagic stroke was the most common (57%) of all patients (21). Another study from Gondar university hospital, Ethiopia, (22) showed 69.4% ischemic stroke and 13% hospital mortality rate.

Chronic diseases become major global public health problems, mainly, in developing countries. However,

<sup>1</sup>School of Medicine, College of Medicine and Health Sciences, Bahir Dar University, Ethiopia;

<sup>1\*</sup>School of Public Health, College of Medicine and Health Sciences, Bahir Dar University, Ethiopia,

E-mail address: bducumhs16@gmail.com / muler.hi@gmail.com

there is limited evidence on the magnitude and factors of stroke in Ethiopia, particularly, in Felege Hiwot Referral Hospital, Bahir Dar town, which is the aim of this study. Findings of this study will be important evidence to the studied hospital and Amhara Regional Health Bureau to know the burden of stroke and determinant factors, and plan appropriate preventive methods against stroke.

## Methods

**Study design, Area and Period:** An institution based cross sectional study was conducted on 427 adult stroke patient records (a one year records) from the Internal Medicine Department of Felege Hiwot Referral Hospital in June 2016 to determine the proportion of stroke and its contributing factors. Felege Hiwot Hospital is a Referral Hospital to Amhara Regional State and found in Bahir Dar town, capital city of the Amhara Regional State, Western Ethiopia. Currently, the hospital is also serving as a teaching referral hospital to Bahir Dar University. Internal Medicine Department was one of the overcrowded departments by regular and referral patients for chronic healthcare services. About 18, 000 people visited the department from September 2015 to September 2016 for chronic care related services of which 427 were adult chronic stroke patients. The reason for using only a one year data is the absence of complete data set in the department beyond the existing data. Almost all of the data elements before one year were incomplete and inconsistent.

**Sample size and Sampling procedure:** All patient records diagnosed for adult stroke in the Internal Medicine Department from September 2015 to September 2016 (427) were the target population to this study. Patients aged  $\geq 30$  years old were included in the study. Patient records with incomplete information, mainly with no patient diagnosis/status, were excluded. Only 427 adult stroke patient records were included in the data collection/extraction process.

**Data collection tools and procedures:** Pretested data extracting guideline was used to collect data on adult stroke from the patient registration logbook of Internal Medicine Department. Socio-demographic, behavioural and diagnosis related issues were major questionnaire contents. Three data collectors (5<sup>th</sup> year medicine students) and one supervisor (master public health lecturer) were participated in the data collection process.

**Quality Assurance:** Data collectors and supervisor took one day training (theory and practice) on study objective, data collection procedures and confidentiality. Pre-testing of data extraction guideline, daily supportive supervision on data collectors, checking completeness and consistency of data and data edition were major data quality tasks.

**Data Processing and Analysis:** Collected data were edited manually and stored using different storage mechanisms to prevent data lose. Data were entered to

SPSS Version 20 statistical package software for further edition and analysis. Study objectives were described using different descriptive statistics. Bivariate and multivariate logistic regression analysis was computed to identify factors associated with the stroke. The association between the study and outcome variables was described using odds ratio and 95% confidence interval (CI).

**Ethical Clearance:** Ethical clearance was taken from Ethical Review Committee of Bahir Dar University, College of Medicine and Health Sciences. Informed consent was obtained from Felege Hiwot Referral Hospital administrator after submitting the ethical clearance and supporting letter. No any personal identifier was taken from the patient registration logbook. No one other than the investigators had access to the collected data. Investigators used the collected data only to answer their stated objectives.

## Results

**Socio-Demographic characteristics of patients:** From the total reviewed patient records, nearly one-third (36.8%) were records of female patients. Significant number (60%) patients were above 50 years old. More than half (56.7%) reviewed records were from urban residents. The majority (71%) patients were Christian followers and 43% were records of repeat patients (Table 1).

Table 1: **Socio-demographic characteristics of stroke patients in Felege Hiwot Referral Hospital, June 2016.**

Variables	Frequency	Percent
<b>Age in years</b>		
≤ 50	171	40.0
> 50	256	60.0
<b>Sex</b>		
	270	63.2
	157	36.8
<b>Residence</b>		
	185	43.3
	141	56.0
<b>Religion</b>		
	202	71.0
	114	29.0
<b>Patient category</b>		
	183	43.0
	244	57.0

**Patients Diagnosis and Treatment:** Based on the one year Internal Medicine Department records, 48 (11.2%) and 120 (28%) patients had Diabetes Mellitus and hypertension, respectively. Cardiac diseases; 73 (17.1%), stroke; 32 (7.5%) and pneumonia; 40 (9.4%) were reviewed patient diagnosis profiles. Seventy-seven (18%) patient profiles had unknown diagnosis. About 25% of adult stroke patients got only counselling and appointments as treatment. Nearly one fourth; 108 (25.3%) were alcohol drinkers and only 77 (18.0%) were cigarette smokers. The majority (65%) patients got treatment to other types of diseases in addition to stroke (Table2).

Table 2: Patient diagnosis and treatment in Internal Medicine Department of Felege Hiwot Hospital, June 2016.

Variables	Response	Frequency	Percent
<b>Patient diagnosis</b>			
Hypertension	Yes	120	28.1
	No	307	71.9
Diabetes Miletus	Yes	48	11.2
	No	379	88.8
Cardiac diseases	Yes	73	17.1
	No	354	82.9
Stroke	Yes	32	7.5
	No	395	92.5
Atrial fibrillation	Yes	21	5.0
	No	406	95.0
Hypercholesterolemia	Yes	16	3.7
	No	411	96.3
Pneumonia	Yes	40	9.4
	No	387	90.6
Unknown diagnosis	Yes	77	18.0
Treatment status	Drug and advice	320	75.0
	Counselling/appointment	107	25.0
<b>Patient Behaviour:</b>			
Alcohol intake	Yes	108	25.3
	No	319	74.7
Cigarette smoking	Yes	77	18.0
	No	350	82.0
Physical exercise	Yes	47	11.0
	No	380	89.0

**Factors associated with Stroke:** Based on bivariate and multivariate logistic regression analysis, age, co morbidity (hypertension, diabetes and cardiac), alcohol intake and cigarette smoking showed significant association with stroke. Younger patients ( $\leq 50$  years old) were 59% times less likely to get stroke compared with patients greater than 50 years old; AOR=0.41,

95% CI= [0.11-0.65]. Hypertensive patients were (AOR= 2.80, 95 % CI= [1.24-5.76]) times more likely to get stroke than their counter parts. Diabetic and cardiac patients were more likely to acquire stroke compared with diabetic and cardiac patients; AOR=3.21, 95%CI= [1.52-7.38] and AOR= 2.14, 95%CI= [1.18-4.91], respectively (Table 3).

Table 3: Factors to stroke among patients attended Felege Hiwot Referral hospital, June 2016

Variable	Stroke status		COR 95% CI	OR 95%CI
	Yes (%)	No (%)		
<b>Age in years</b>				
≤50	6(1.4)	165 (38.6)	0.32 (0.13-0.84)	0.41 (0.11-0.65)*
>50	26 (6.1)	230 (53.9)	1	1
<b>Sex</b>				
Male	20 (4.7)	250 (58.5)	0.97 (0.44-2.17)	0.62 (0.31-1.83)
Female	12 (2.8)	145 (34.0)	1	1
<b>Religion</b>				
Christian	19 (4.5)	284 (66.5)	0.57 (0.26-1.27)	0.42 (0.20-1.19)
Muslim	13 (3.0)	111 (26.0)	1	1
<b>Residence</b>				
Rural	13 (3.0)	172 (40.3)	0.89 (0.40-1.95)	0.57 (0.28-1.61)
Urban	19 (4.5)	223 (52.2)	1	1
<b>Hypertension</b>				
Hypertensive	17 (4.0)	103 (24.1)	3.21 (1.46-7.07)	2.80 (1.24-5.76)*
No hypertensive	15 (3.5)	292 (68.4)	1	1
<b>Diabetes mellitus</b>				
Diabetic	10 (2.3)	38 (8.9)	4.27 (1.74-10.35)	3.21 (1.52-7.38)*
Non diabetic	22 (5.2)	357 (83.6)	1	1
<b>Cardiac diseases</b>				
Yes	11 (2.6)	62 (14.5)	2.81 (1.20-6.50)	2.14 (1.18-4.91)*
No	21 (4.9)	333 (78.0)	1	1
<b>Alcohol intake</b>				
Yes	14 (3.3)	94 (22.0)	2.49 (1.12-5.50)	1.96 (1.09-3.85)*
No	18 (4.2)	301 (70.5)	1	1
<b>Cigarette smoking</b>				
Yes	11 (2.6)	66 (15.5)	2.61 (1.12-6.02)	2.01(1.10-4.51)*
No	21 (4.9)	329 (77.0)	1	1
<b>Physical exercise</b>				
Yes	5 (1.2)	42 (9.8)	1.56 (0.50-4.55)	0.82 (0.31-3.72)
No	27 (6.3)	353 (82.7)	1	1
<b>Patient category</b>				
New	22 (5.2)	222 (52.0)	1.71 (0.75-3.99)	1.38 (0.56-3.29)
Repeat	10 (2.3)	173 (40.5)	1	1

\* P-value &lt;0.05

### Discussion

Currently, chronic diseases, for example, stroke become an important global public health problem. This study also showed a 32 (7.5%) stroke proportion based on a one year hospital records. This finding is the same with a study finding from Cuba (23), where stroke prevalence was 7.8%. However, it is lower than study finding from African countries (8) where stroke prevalence was 12%. Similarly, it is lower than the study findings from Nigeria; stroke accounted 45% of all admissions and 17% medical deaths (19). Likewise, it is lower from findings in Tanzania where stroke cases were 31.6% (20). Probably, this variation could be resulted from geographic location, facility setups, community awareness on screening, urban-rural residence, and life style/ personal behaviors.

On the same way, the current finding is found to be lower compared with Hospital based stroke findings from Ethiopia: Black lion/Addis Ababa (57%) (21) and Gondar (69.4%) (22). This discrepancy may be created due to discrepancies in data inclusion where studies from Addis Ababa and Gondar Hospitals included a five-year data, but only a one year data in our case. In addition, difference in data handling and registration system may be the cause for this disparity. Unlike Felege Hiwot Referral Hospital, Black lion and Gondar University hospitals had better electronic patient data

recording and handling systems, which may keep data quality and prevent data lose.

Male patients were more affected by stroke; 20 (62.5%) in this study. The probable justification to this fact could be more alcohol intake and cigarette smoking among males, which will contribute to the high chance of developing chronic diseases like stroke. This study also revealed that alcohol intake; AOR=1.96 and cigarette smoking; AOR=2.01, Table3, were significant factors to develop stroke. This finding was supported by various studies from abroad (12-16) and Ethiopia (21-22).

Older age (>50 years old) was factor associated with stroke; AOR=0.41, Table3. As indicated by various studies (2, 17, 18), age and chronic diseases have direct correlation due to physiology/ biological, environmental and life style/behavior related attributable factors. As a result of this fact, there is higher healthcare seeking complains/ frequent facility visit and poor healthcare service satisfaction among elders in most of the time.

In this study, ischemic stroke was more prevalent (56.7%) than haemorrhagic. This is similar with study finding from the University of Gondar Hospital (22), where 69.4% of stroke cases were ischemic. However,

it is different from the study finding in Black lion Hospital (21) in which haemorrhagic stroke was the most prevalence (57%).

Hypertension was found as significant factor to acquire stroke (AOR=2.80, Table3). It was also evidenced by study conducted among 22countries (23, 24), Nigeria (19) and Tanzania (20) where hypertension was the most common risk factor to stroke.

People with diabetes mellitus and cardiac cases were found to be in higher chance to get stroke (AOR=3.21 and AOR= 2.14, Table3) than non-diabetic and non-cardiac patients, respectively. This is because both diabetes and cardiac cases have a direct impact on circulation and can cause stroke. These comorbidities were also reported as factors to stroke by several studies elsewhere (1-3, 14-22).

#### Conclusion:

The level of stroke among patients attended the Internal Medicine Department of Felege Hiwot Referral Hospital was lower compared with the previous studies elsewhere. The majority of stroke patients were males from urban residency. Older age, hypertension, cardiac diseases, diabetes mellitus, alcohol intake and cigarette smoking were found to be significant factors of stroke. Therefore, improving life style, early screening for chronic diseases and personal behaviour (avoid alcohol intake and smoking) are important to prevent stroke.

#### Competing interests

The authors declared that there is no competing interest to this paper.

#### Authors' contributions

BM, JM, MY, MA, MD and NG: Designed the research concept, participated on data collection/analysis, and wrote first paper draft. MAA: edited research design, supervised data collection, edited data, analyzed data, edited/approved final paper and prepared manuscript. All authors approved manuscript submission.

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