

## STROKE IN ASHANTI REGION OF GHANA

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### SUMMARY

**Objective:** To determine the morbidity and mortality in adult in-patients with stroke admitted to the Komfo Anokye Teaching Hospital (KATH).

**Methods:** A retrospective study of in-patients with stroke admitted to the KATH, from January 2006 to december 2007 was undertaken. Data from admission and discharge registers were analysed to determine stroke morbidity and mortality.

**Results:** Stroke constituted 9.1% of total medical adult admissions and 13.2% of all medical adult deaths within the period under review. The mean age of stroke patients was 63.7 (95% ci=62.8, 64.57) years. Males were younger than females. The overall male to female ratio was 1:0.96, and the age-adjusted risk of death from stroke was slightly lower for females than males (relative risk= 0.88; 95% ci=0.79, 1.02, p=0.08). The stroke case fatality rate was 5.7% at 24 hours, 32.7% at 7 days, and 43.2% at 28 days.

**Conclusion:** Stroke constitutes a significant cause of morbidity and mortality in Ghana. Major efforts are needed in the prevention and treatment of stroke. Population-based health education programs and appropriate public health policy need to be developed. This will require a multidisciplinary approach of key players with a strong political commitment. There is also a clear need for further studies on this topic including, for example, an assessment of care and quality of life after discharge from hospital. The outcomes of these studies will provide important information for the prevention efforts.

**Keywords:** Stroke, Cerebrovascular disease, CVD, Komfo Anokye Teaching Hospital, Ghana

### INTRODUCTION

Cerebrovascular disease, principally stroke, is the second leading cause of death in adults worldwide and is a major contributor to disability and reduced quality of life.<sup>1</sup> The global burden of disease assessment for the years 2002–30 shows rather bleak projections of the worldwide burden of stroke.<sup>2,3,4</sup> although available data on stroke mortality are limited, it is now well documented that stroke is a major cause of death in middle- and low-income countries,<sup>1</sup> and approximately 87% of all deaths by stroke occur in these countries.<sup>2</sup> community-based studies in sub-Saharan Africa (SSA) show that stroke is the cause of 5% to 10% of all deaths.<sup>3,5,6</sup> This parallels the increasing prevalence of hypertension – the major risk factor for stroke.<sup>7</sup> Evidence in SSA suggests that case fatality rates for stroke may be higher than those in high-income countries,<sup>3</sup> and contribute significantly to the burden of disease.<sup>3,4,8</sup> this may be due to limited healthcare facilities and high rates of risk factors such as hypertension.<sup>9</sup>

Ghana is undergoing a rapid epidemiological transition. Consequently, the last few decades have seen major causes of death shifted from solely communicable diseases to a combination of communicable and chronic non-communicable diseases.<sup>10</sup> The increasing rates of cardiovascular disease (CVD) mortality, particularly stroke, have been unprecedented. For example, in Accra, CVD rose from being the seventh and tenth cause of death in 1953 and 1966 to number one cause of death in 1991 and 2001.<sup>11</sup> In another study of adult patients from Komfo Anokye Teaching Hospital (KATH), Kumasi, 17.9% of acute medical admissions were ascribed to cardiovascular causes including hypertension, heart failure and stroke.<sup>12</sup>

The 2003 data on in-patient causes of death in 32 sentinel hospitals in the 10 regions of Ghana revealed that stroke was the fourth leading in-patient cause of death in 32 sentinel hospitals in the 10 regions of Ghana.<sup>10</sup> The increasing prevalence of hypertension in Ghana,<sup>13,14,15,16</sup> particularly in urban centres, clearly suggests that the burden of stroke will continue to increase unless urgent action is taken to halt the rising prevalence of hypertension.

The increasing burden of stroke will put a huge burden on the already overstretched health care resources. The neglect of the extent of the problem as reflected on the low policy priority and low interest from development partners<sup>17</sup> indicates that many people will continue to bear the brunt of the disease. In a study conducted at Korle-Bu teaching hospital, Accra, from 1994 to 1998, about 69% of stroke patients died within 24 hours of the onset of stroke.<sup>18</sup> This figure is overly high when compared to countries in Europe and North America,<sup>19,20</sup> and may reflect inadequate healthcare facilities and uncontrolled CVD risk factors. Similar to many African countries, information on stroke is very limited in Ghana. For example, it is unclear whether the high stroke mortality rate within 24 hours of admission in Accra reflects the patterns in other major hospitals in Ghana.

The main objective of this study was to determine stroke morbidity and mortality among adult in-patients admitted to the Komfo Anokye teaching hospital (KATH) between 2006 and 2007.

## METHODS

Records of all patients admitted to KATH from January 2006 to December 2007 were reviewed. Data were first obtained from tally sheets on all stroke cases that were reported at KATH from January 2006 to December 2007. Four cases were below 25 years and were therefore excluded from the analyses. A chart extraction instrument was designed to extract relevant

clinical data from the tally sheets. The questionnaire recorded age, sex, length of hospital stay and outcome of management (dead/alive). The study was approved by the Committee on Human Research Publication and Ethics (CHRPE) of the School of Medical Sciences, Kwame Nkrumah University of Science and Technology, Kumasi; and the Komfo Anokye Teaching Hospital, Kumasi. Special permission was also sought from the head of the Medical Directorate and records department.

### Study Area

Komfo Anokye Teaching Hospital is located in Kumasi, the capital of the Ashanti region in Ghana. The strategic location of this 1000 bed capacity hospital at the confluence of the country's transportation network and the position of Kumasi as the leading commercial centre in Ghana makes it about the most accessible tertiary medical facility in the country. As a result of this, it receives referrals from eight out of the ten regions of the country. An increasing number of patients also come in from the neighbouring countries. Its catchment areas therefore have an estimated population of ten million people.

### Statistical Analyses

Differences in continuous variables were assessed by means of t-test. Risk ratios and their 95% confidence intervals were estimated by means of poisson regression with robust variance to examine the differences. All analyses were performed using stata 9.2 (Stata Corp, College Station, Texas).

## RESULTS

A total of 1054 stroke cases were reported between January 2006 and December 2007. Of the 1054 patients, 1050 were 25 years and above. Of these, 537 (51.1%) were males and 513 (48.9%) were females giving male to female ratio of 1:0.96 (table 1).

**Table 1** Mean age, length of hospital stay and mortality by sex

	All (n=1050)	Male (537)	Female (513)
Age (years)	63.7 (62.8, 64.6)	62.0 (60.5, 63.2)	65.4 (64.1, 66.7)
Hospital length of stay	6.2 (5.9, 6.6)	6.3 (5.8, 6.8)	6.1 (5.7, 6.6)
CVA deaths (%)	43.4 (40.4, 46.4)	53.5 (48.9, 58.1)	46.5 (41.9, 51.1)
CVA deaths in 24 hours (%)*	13.2	14.3	11.8
CVA deaths in 1-7 days (%)	62.1	59.0	65.6
CVA deaths in 8-14 days (%)	20.4	22.1	18.4
CVA deaths in 15-21 days (%)	2.9	2.9	2.8
CVA deaths in 22-28 days (%)	1.1	1.2	0.9
CVA deaths in >28 days (%)	0.4	0.4	0.5

**Key:** Values for age, length of stay are expressed as means, and CVD deaths as percentages (%) with corresponding (95% confidence intervals); CVA - Cerebrovascular Accident; \*Among those who died.

The mean age of stroke patients was 63.7 years. Males were younger than females ( $p < 0.001$ ). The mean (median) length of hospital stay for stroke patients was 6.2 (5.2) days. The mean length of stay did not differ between males and females. Stroke constituted 1.3% of the total hospital admissions; and 6.3% of total hospital deaths. About 9.1% of total adult medical admissions and 13.2% of the total adult mortality on the medical wards were attributed to stroke. Mortality from stroke

was the top cause of death at the medical directorate in both 2006 and 2007 (KATH 2006 and 2007 Annual Reports).

#### **Stroke Morbidity and Mortality**

A total of 456 (43.4%) patients died from stroke. of these, 46.5% were females and 53.5% were males (age-adjusted relative risk was 0.88, 95% CI: 0.79-1.02,  $p = 0.08$ ). Sixty patients (13.2%) died in less than 24 hours on admission, but the majority of deaths (62.1%) occurred within the first seven days of admission (table 1). The case fatality rate was 5.7% at 24 hours, 32.7% at 7 days, and 43.2% at 28 days (table 2).

**Table 2** 24 hours, 7 days, 14 days, 21 days and 28 days case fatality of cerebrovascular disease by sex

	All (n=1050)		Male (537)		Female (513)	
	No. of deaths	Case fatality, %	No. of deaths	Case fatality, %	No. of deaths	Case fatality, %
24 hours	60	5.7	35	6.5	25	4.9
7days	343	32.7	179	33.3	165	32.0
14 days	436	41.5	233	43.4	203	39.6
21 days	449	42.8	240	44.7	209	40.7
28 days	454	43.2	243	45.3	211	41.1

## **DISCUSSION**

The main objective of this study was to determine the morbidity and mortality in adult in-patients with stroke admitted to KATH for the years 2006 and 2007. Our findings indicate that stroke is associated with considerable morbidity and mortality in KATH patients. Majority of stroke deaths occurred within the first seven days of admission.

#### **Limitations of the Study**

The study has several limitations. First, as a hospital-based study, the observations made may not be representative of all cases of stroke occurring in the community. Secondly, this study did not examine the data on the subtype of stroke suffered by the study participants. Despite the availability of CT scan in the KATH, only about 5% - 10% of the patients had CT scan, mainly due to cost. Future studies should examine subtypes of stroke in Ghana. Lastly, follow-up data on stroke survivors were not available.

#### **Discussion of the Key Findings**

Stroke morbidity and mortality from both hospital and medical admission perspectives within the period under review were high. Stroke constituted 9.1% of the total medical adult admissions. These figures could even be higher if all stroke cases were reported to KATH.

Chronic disease is commonly considered as a spiritual illness, which requires spiritual intervention rather than treatment in a hospital and therefore could be under-reported.<sup>21</sup> This finding is consistent with the previous unpublished study in Accra, where stroke was responsible directly for 12.7% of medical admissions (Amoah et al. unpublished data).

These figures far exceed those reported in Sokoto, Nigeria,<sup>22</sup> where stroke constituted 0.36% of total hospital admissions and 1.9% of the total hospital mortality from 1994 to 1998.<sup>22</sup> These findings clearly suggest that stroke is a major burden in Ghana. The findings reflect on poor high blood pressure control in Ghana.<sup>13,15,16</sup> High blood pressure is the most consistent and powerful predictor of stroke and is causally involved in nearly 70% of all stroke cases.<sup>23,24,25,26</sup> Consequently, stroke is related to the quality of blood pressure control.<sup>27</sup> Evidence suggests that effective treatment of high blood pressure reduces the risk of stroke by 35% to 40%.<sup>28</sup> it has been estimated that reducing the mean population blood pressure level by even as little as 2–3 mmHg could have a major impact in reducing stroke associated morbidity and mortality.<sup>29</sup> for example, a 2 mmHg reduction of systolic blood pressure at the population level would result in an 8% overall reduction in mortality due to stroke, and a 5 mmhg reduction would result in 14% reduction.<sup>29</sup> However, in Ghana, blood pressure control rates are very low despite recent

studies reporting high prevalence of hypertension. In a study in Ashanti region, only 6.2% of the hypertensive patients had their blood pressure adequately controlled.<sup>9</sup> These findings clearly indicate that adequate measures to improve treatment and control of hypertension deserve urgent attention.

About 13% of deaths in this current study occurred within 24 hours of admission into hospital. In a previous study in Accra, 69% of stroke deaths occurred in less than 24 hours after onset of the disease.<sup>18</sup> Thus, our finding seems to suggest a better 24-hour stroke survival in KATH. nevertheless, the majority of deaths (62.1%) occurred within the first seven days of admission. in most countries where stroke services and systems are well organised, there has been a significant reduction in the mortality and morbidity from stroke.<sup>19,20</sup> In Wolfe *et al*'s study in London, the case fatality for stroke was 16.0% for white people and 9.7% for African descent people at seven days.<sup>19</sup> These figures are far less than the case fatality rate of 32.7% found in our present study. These findings may reflect the limited healthcare facilities or resources for treating stroke patients in Ghana.<sup>9</sup>

The increasing prevalence of stroke in Ghana is likely to put a huge pressure on already weak health care system, and threaten the viability of poorly funded public health and primary health care services.<sup>8,30</sup> The increasing burden of stroke also has huge economic implications, especially given that nearly half of the stroke patients (48%) were below 65 years of age. The economic impact of stroke could be felt both as cost to the country's health care system as well as the loss of income and production of those affected either directly by the disease or indirectly as caregivers to those with stroke.

Our findings underscore the urgent need for both clinical and public health measures to minimise the burden of stroke in Ghana. In view of the scarcity of resources in Ghana, activities aimed at controlling stroke and other CVDs will have to compete with many other pressing health needs.<sup>31</sup> Nevertheless, the burden of stroke in Ghana is now evident and substantial, and can no longer be swept under the carpet. In addition, the incidence of stroke increases with age. As life expectancy increases in Ghana, the number of people who will experience a stroke will increase significantly in the near future. It is therefore imperative that urgent measures be taken to reduce the risks and thereby optimise the health outcomes for stroke and other CVDs in Ghana. Stroke prevention is best accomplished by the control of risk factors, particularly hypertension.<sup>30</sup> This will require a multidisciplinary approach and sustained effort involving a broad range

of interventions and resources.<sup>10</sup> A strong political commitment is also needed to promote the relevant policy and environmental changes to support adequate education and prevention programs in Ghana. The establishment of national guidelines for prevention, detection, treatment, and control of stroke and risk factors such as hypertension will be a tangible essential step.<sup>30</sup> These measures could have a considerable impact in reducing stroke and other CVDs in Ghana. A national CVD prevention programme in Mauritius showed substantial reductions in CVD risk factors.<sup>32</sup>

## CONCLUSION

Stroke constitutes a considerable cause of morbidity and mortality in Ghana. Major efforts are urgently needed to prevent and treat patients with stroke. In most countries where stroke services and systems are well developed, there has been a significant reduction in the mortality and morbidity from stroke. Hence, investing in emergency medical services is very crucial. Population-based health education programs and appropriate public health policy also need to be developed. This will require a multidisciplinary approach of key players with a strong political commitment. There is also a clear need for further studies on this topic including, for example, into what happens to stroke patients after discharge from hospital. The outcomes of these studies will provide important information for the prevention efforts and minimize the likely disability that is associated with stroke.

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